



# Montana State University University Facilities Management

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PROGRAMMING BOOK | DECEMBER 14, 2022





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# project details.

# team.

## MONTANA STATE UNIVERSITY

<b>John How</b>	Associate Vice President of University Facilities Management
<b>Kathryn Pearson</b>	Director of Planning, Design, and Construction
<b>Megan Sterl</b>	Director of Engineering and Utilities
<b>EJ Hook</b>	Director of Facilities Services
<b>Kane Urdahl</b>	Maintenance Manager
<b>Chris Catlett</b>	Director of Safety and Risk Management
<b>Evan Burnett</b>	University Architect
<b>Grant Petersen</b>	Construction Manager
<b>Richard Rudnicki</b>	Planning Manager

## A&E DESIGN

<b>Brad Doll</b>	Principal in Charge
<b>Scott Osteen</b>	Project Manager
<b>Rob Church</b>	Project Architect
<b>Jill Reddick</b>	Designer

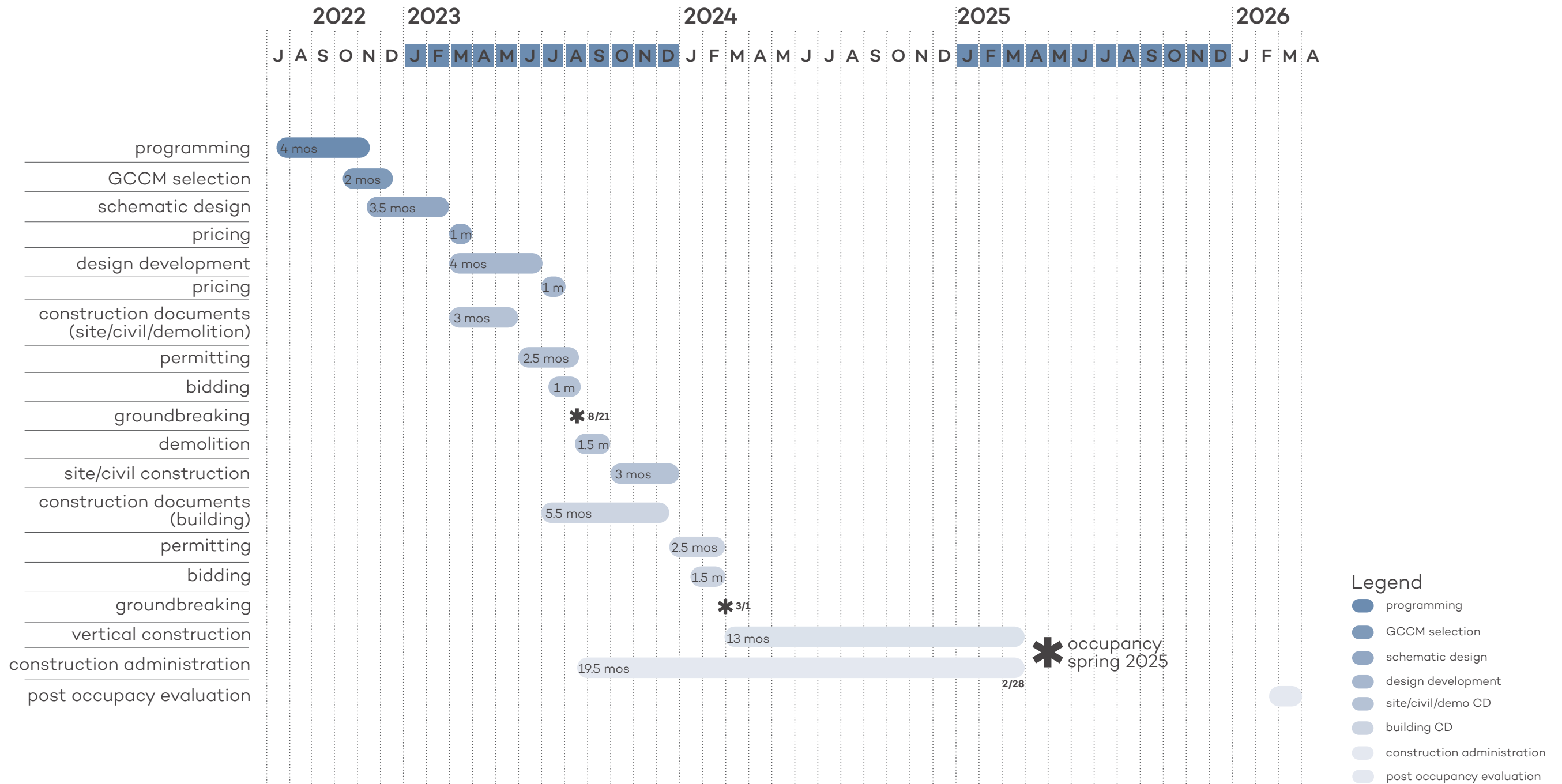
## THOMAS DEAN & HOSKINS, INC.

<b>Kyle Scarr</b>	
<b>Ahren Hastings</b>	

## MCKINSTRY

<b>Karen Hedglin</b>	
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# schedule.



# guiding principles.

The project team, including the previously listed representatives of MSU, A&E Design and McKinstry, established the following Guiding Principles for the project. These will be utilized as the “North Star” for the project, and will be referenced, and modified as warranted to guide and inform decisions as the project progresses.

- 1 COLLABORATION**  
Facilitate a cohesive team environment that encourages collaboration.
- 2 OPTIMIZE**  
Optimize yard layout and building space adjacencies to create efficient work processes.
- 3 WAYFINDING**  
The facility should represent a clear identity and wayfinding solutions for facilities management.
- 4 DESIGN**  
Ensure the building and yard are designed to be efficient, safe, and easily maintained. The overall design should balance high performance design with budget and longevity.

## SHOWCASE:

- + Excellence of Employment and facilities operation programs
- + Conservation and Sustainability
- + Land Use Efficiencies
- + Traditions & History of Campus Built Environment

# executive summary.

Montana State University has experienced steady growth since its establishment in 1893 and has seen this rate of growth increase dramatically in the last two decades. As of the fall of 2022, Montana State University has more than 14,000 undergraduate students and nearly 2000 graduate students. The University currently occupies just over 5 million square feet of university buildings spread across 1,170 acres. There are more than 250 undergraduate degree programs and 83 graduate programs and degrees. As Montana's only land grant university, Montana State University strives to integrate education, creation of knowledge and art and service to communities. The mission of University Facilities Management is to provide and maintain the physical environment that sustains the university's excellence.

Over its long history, the University's maintenance services has served as a center for campus maintenance, repairs and improvements. These groups are charged with the maintenance and operations of all university buildings, grounds, and infrastructure systems. As such, they provide the technical expertise to maintain and update over 5 million square feet of campus buildings as well as the landscaping and grounds maintenance throughout the 1,170-acre campus.

University Facilities Management is overseen by the Associate Vice President of University Facilities Management, John How. The organizational components that have been included in the planning for this new Facilities Maintenance building include Business Operations, Safety & Risk Management, Facilities Services, Engineering & Utilities, Planning Design & Construction, and Facilities Maintenance Administration. In addition, the technical specialty trades within Engineering and Utilities include Engineering, Heating Plant, Heat Maintenance, and Refrigeration Maintenance. The technical specialty trades within Facilities Services consist of Carpenters, Electricians, Painters, Plumbers, Laborers, Locksmiths, Grounds, E-waste and Custodians.

In the summer of 2022, A&E Design was selected to undertake the programming for a new Facilities Management building on the Bozeman campus. The building, and the associated service yard, is meant to provide shop facilities, office space, conference rooms, and vehicle and equipment parking while supporting a collaborative and safe working environment. The principal motivations for the project are threefold. First, the removal of trades buildings from the area between Sixth and Seventh Avenues will free up buildable sites for academic buildings along of the Seventh Avenue corridor. Second, most of the building stock currently occupied by the facilities maintenance groups are beyond their effective lifespans. The trades are primarily housed within what were once surplus WWII era Quonset huts that are inefficient from both a

programmatic and an energy usage standpoint. And finally, is the desire to facilitate a much higher level of cooperation and collaboration between the various trades and departments within University Facilities Management. The consolidation of the various groups into a single facility will create a much higher level of interaction between individuals that are typically siloed by the current structure and will allow for a higher level of operational efficiency and exchange of information.

The process for the programming phase involved the surveying of the existing facilities and grounds, visioning sessions with the steering committee, and meetings with representatives of the various trades. An overall program of required areas was developed which was then tested through the development of a series of conceptual test fit plans and diagrams. The design team was able to meet repeatedly with the steering committee to discuss these diagrams and to clarify needs and goals for the project. A cost analysis was also undertaken, and it was determined that the current funding level of \$25m for tunnel construction, building construction and various soft costs was insufficient for the full program envisioned. A phased program and plan diagrams were developed that illustrate a phase 1 solution within the current funding limits with the option of adding the phase 2 program at a future date. A construction sequencing plan was also developed to insure maintenance of operations during construction.

The phase 1 program includes new shop and office space for all of the trades with the exception of Mechanics and E-waste who will remain in their current locations. This will achieve the first project goal of clearing the space between Sixth and Seventh Avenues for future development. The vast majority of the current occupants of the PLEW building will also stay in their current location for this phase. The result is an approximately 43,000 GSF phase 1 building that should be achievable within the current budget. The 17,500 GSF Phase 2 would then include the construction of shop spaces for the Mechanics and E-waste as well as the construction of office space for PD&C, Business Operations, and Administration currently housed in the Plew Building, and Safety and Risk Management who are currently located west of 19th Avenue on Garfield.

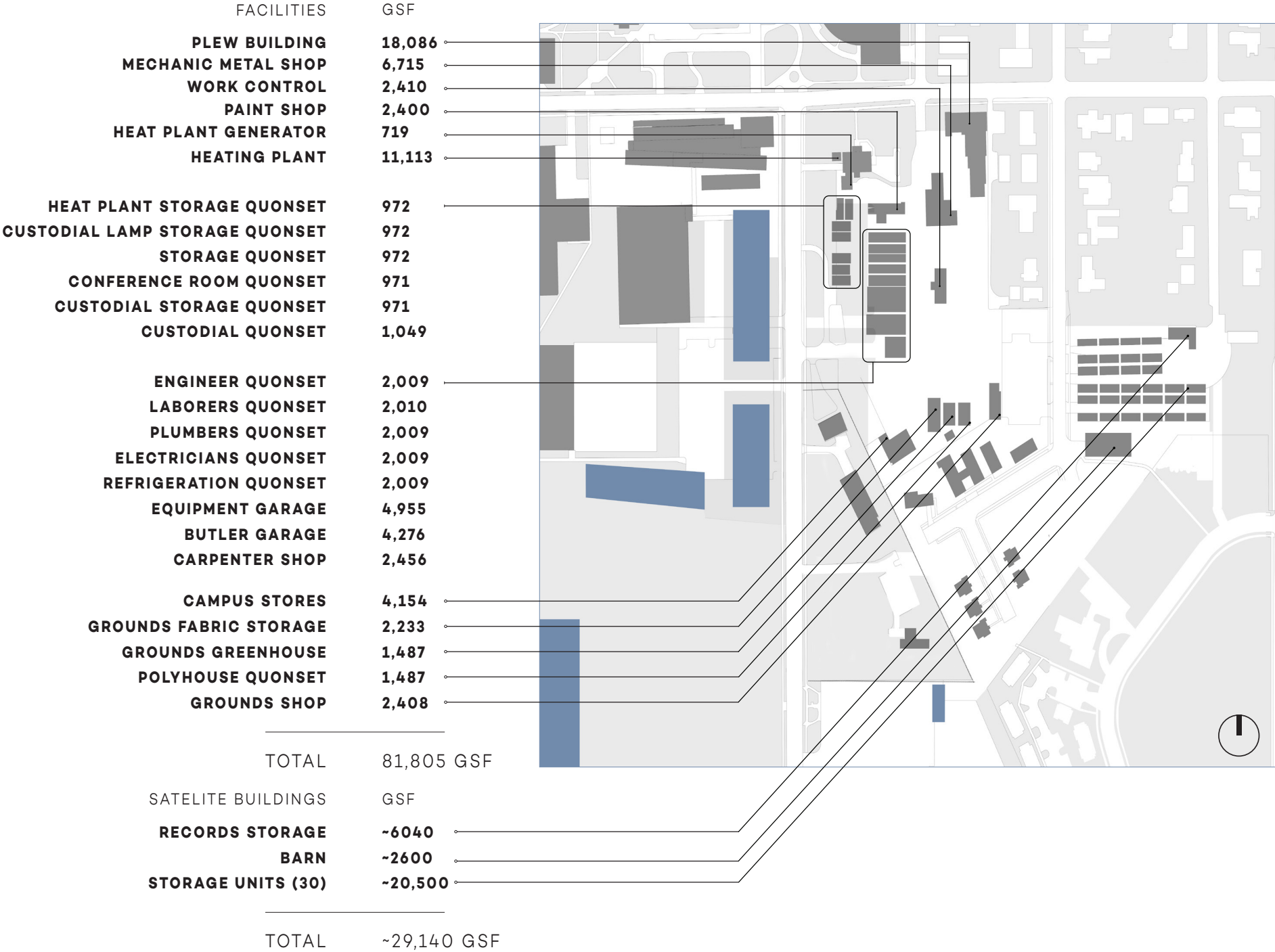
Running in tandem with this programming effort is the conceptual design and cost analysis for a 700-foot-long utilities tunnel extending south from Grant Street along Seventh Avenue. The construction of the tunnel will most likely be undertaken at an accelerated schedule so that its completion will better align with the needs of other projects along 7th Avenue.



**existing conditions.**

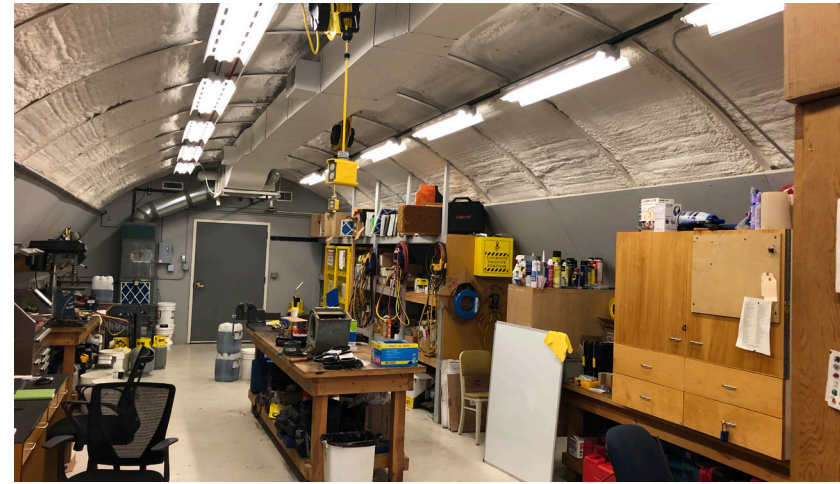
# project need + vision.

The Montana State University's Facilities Management services currently occupies and/or utilizes more than 80,000 gross square feet spread across more than 25 buildings near the southeast limits of the Montana State University Campus.

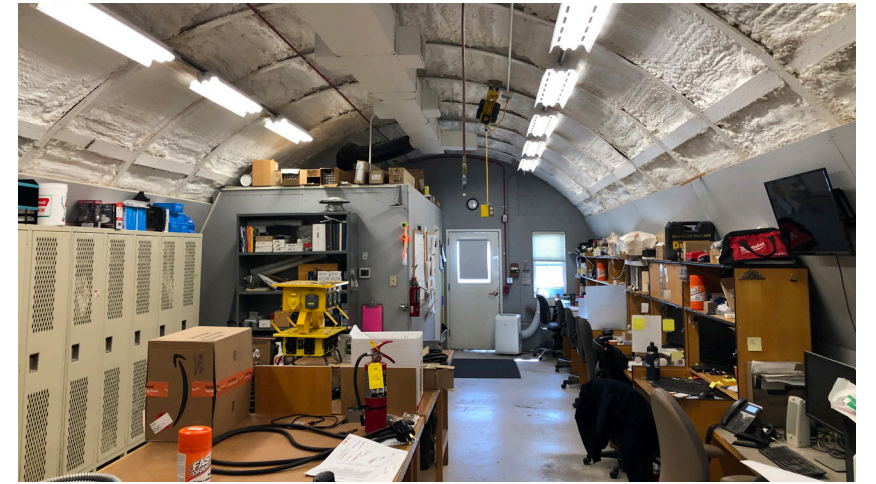




Existing facilities shop - Painting



Existing Shop - Refrigeration



Existing Shop - Electrical



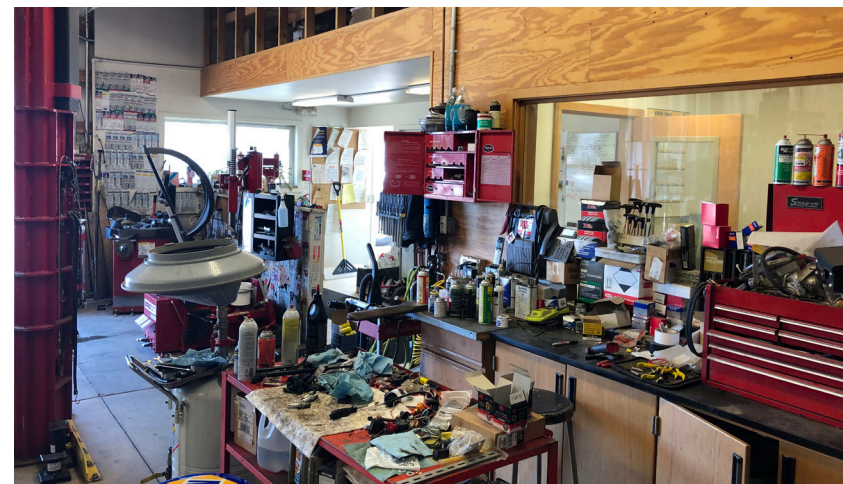
Existing Shop - Plumbing



Existing Offices - Engineering



Existing Shop - Lock Smith



Existing Facilities Shop - Mechanical

The existing physical condition of the facilities yard shops represent a challenge to properly support the current and future demands of campus operations. The presence of hazardous building materials, improper ventilation systems, lack of proper hazardous waste systems, and systemic water intrusion present comfort, health, and safety concerns for the occupants. A majority of offices do not have direct access to a window. Support spaces and storage is generally both insufficient and not specifically designed to support the various needs of the tradesmen and their day to day tasks. Most of the shop and storage space is composed of surplus World War II quonset huts that are poorly insulated and lack proper HVAC systems.

# site analysis.

The roughly 5 acre existing Facilities Yard is south east of the campus core on the south east corner of Grant and 7th Avenue. Current primary access is through a gate adjacent to the Plew Building. Vehicular traffic is limited to Grant, Kagy, 7th Avenue and adjacent service drives. Pedestrian access primarily follows that same pattern with some additional access points between Greek Way and the campus.

To align with the goals of the future development of South campus, it is envisioned that 6th Avenue be transformed into a service road which will serve the east side of any future buildings along 7th avenue.

## Site Circulation and Access

Heavy truck traffic, including deliveries to Stores, container pickups, trash pickups, fuel deliveries, etc. primarily come from Kagy Blvd and north on 7th Ave. to the site. Vans and other work vehicles and equipment access primarily through a gate on the north end of the site, aligning with 6th Ave. Pedestrians currently cross the site at the southern half of the Facilities Yard.

The north entrance to the Facilities Yard creates a point of conflict between Facilities traffic and pedestrians and bicyclists on Grant St. As future buildings are constructed along 7th Ave., this traffic will only increase. Relocating the main entrance to the Facilities Yard will help to reduce these conflicts and will create a dedicated access that takes heavy traffic away from primarily pedestrian and bicycle zones.

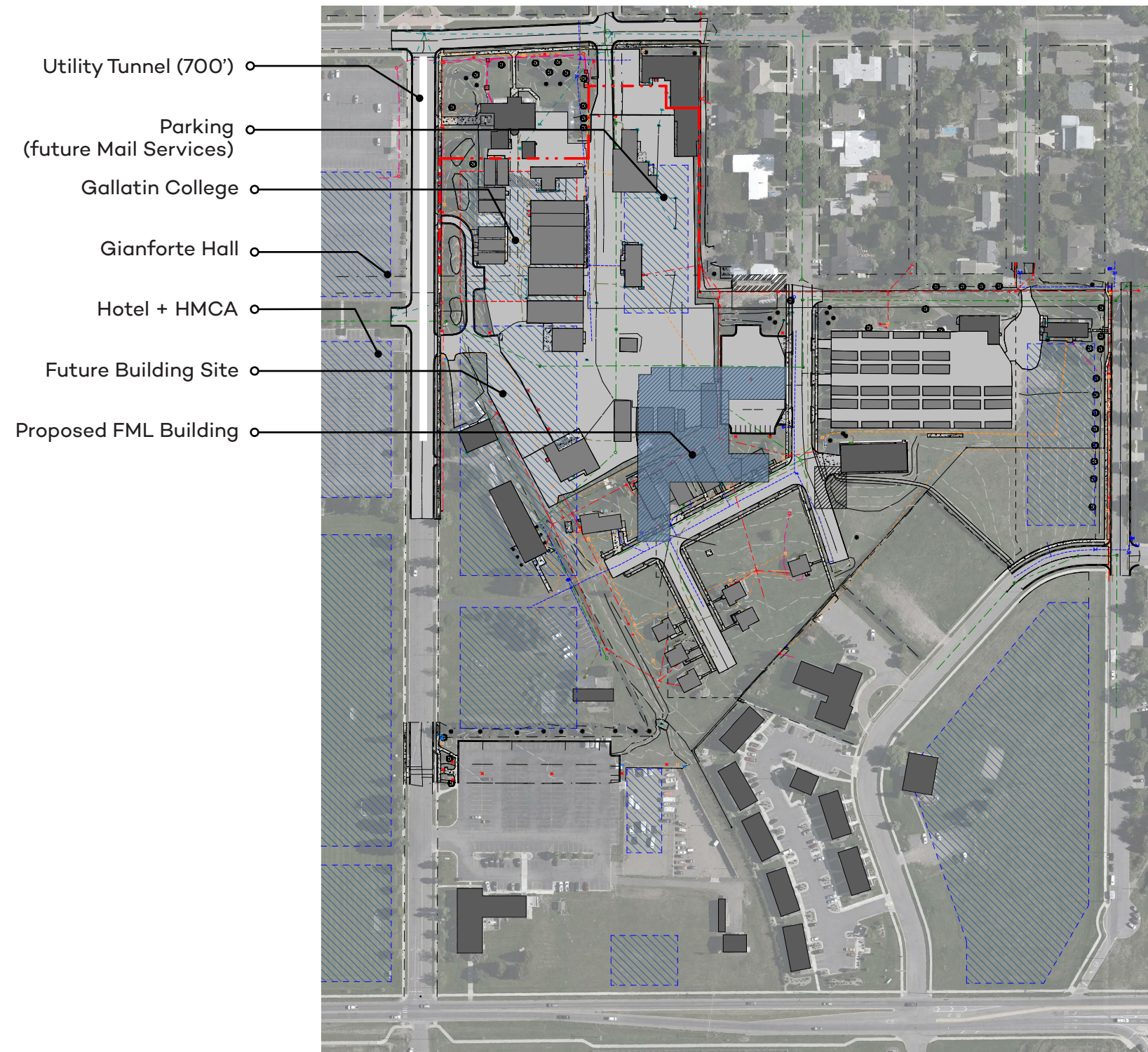
The proposed FML Building sits in a part of campus that keeps utilitarian uses somewhat separated from student and pedestrian areas, while also having quick access to adjacent 7th Ave. and Kagy Blvd, collector and arterial streets, respectively. The proposed site concept changes the primary site access to utilize an existing curb cut on 7th Ave., pushing the heavier truck traffic associated with Facilities south and further away from the pedestrian character along 7th Ave. and Grant. St.

## Future Buildings and Infrastructure

A new utility tunnel is currently being planned for 7th Ave, to feed major utilities to the new buildings planned in the adjacent south campus area. Other adjacent future projects include Gianforte Hall, Gallatin College, a new hotel, and other MSU buildings. The proposed FML Building location is strategically placed away from 7th Ave. giving ample clearance for Gallatin College and other adjacent future buildings, while having easy access to 7th. Ave.

## Access to Utilities

There are many existing water, power, and sewer lines that will be modified or abandoned as part of this project. A utility tunnel is planned to be constructed along 7th Avenue extending south from Grant Ave approximately 700 feet. The tunnel will provide utilities for future buildings along 7th Avenue and for the future Facilities building. The specific utilities within the tunnel include steam, hot water, cold water, electricity, telecommunication, electricity, and where applicable, geothermal. At this time, the new facility is not planned to connect to district steam or chilled water.



UNIVERSITY SERVICES  
FACILITY YARD

**EXISTING**



**PARKING**

Student & visitor parking; SB; garage and pay parking



**PARKING**

Facilities parking; service parking; utilities vehicle parking



**VEHICLE ACCESS**

Facilities outlet; access point



**KEY DESK**

Public interface; student, staff, services interaction



**POINT OF CONFLICT**

Concern with intersection; convergence of different modes of transportation



**VEHICLE CIRCULATION**

Path of vehicles from offsite to and from campus; student vehicular traffic



**FACILITIES CIRCULATION**

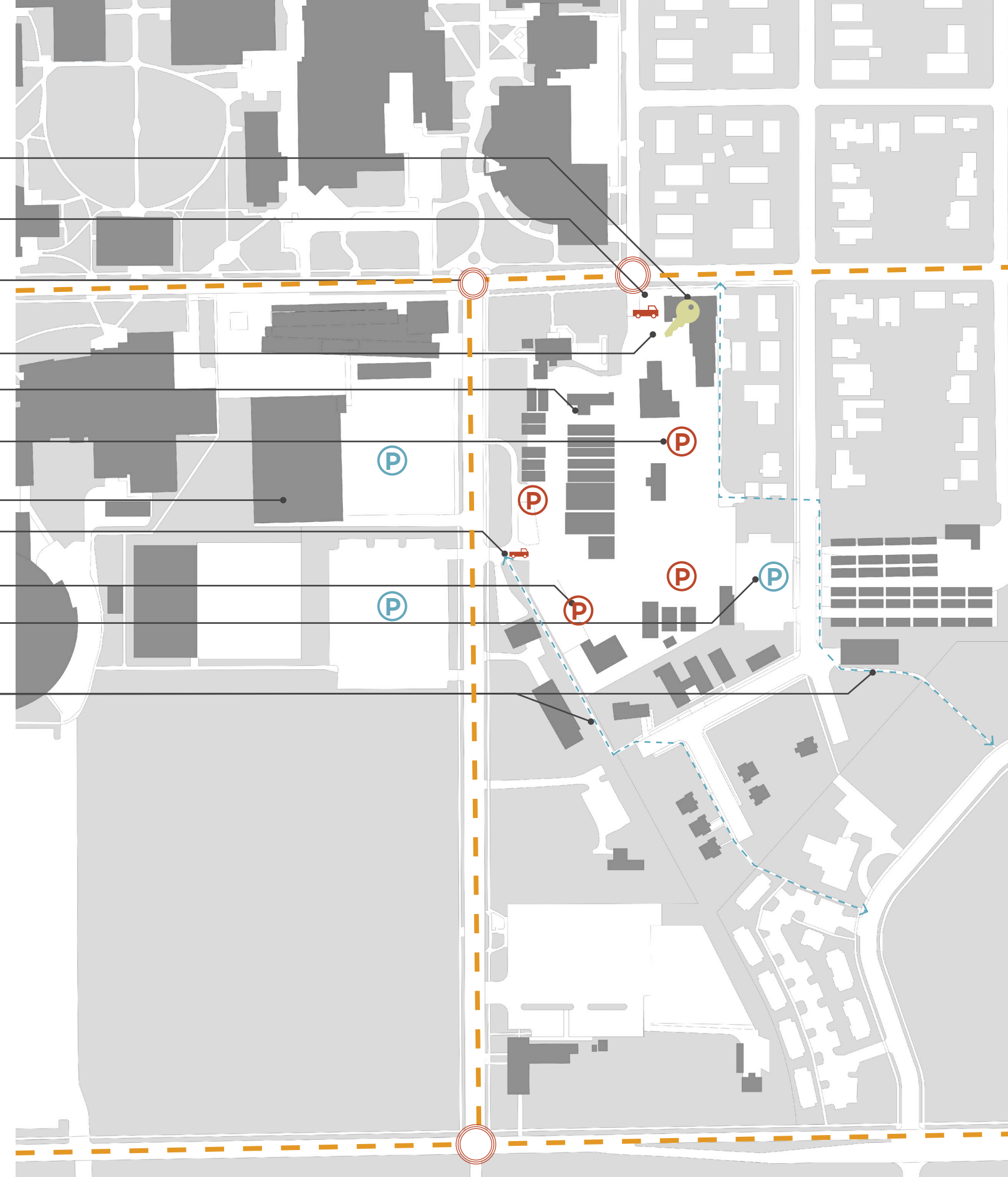
Path of Facilities vehicle and foot traffic



**PEDESTRIAN TRAFFIC**

Campus public foot traffic circulation

- Student, staff, & employee access
- Facilities #1 point-of-entry
- High traffic area pedestrians and bicycles crossing
- Facilities parking
- Pedestrians moving through the yard
- Facilities parking throughout grounds
- Parking garage
- Facilities #2 point-of-entry
- Rental car parking/dropoff
- Student parking with foot traffic through Facilities yard
- Student, staff, & employee pedestrian pathways from Greek Way.



# construction sequencing.

The conceptual layout and placement of the Facilities Management Building will require a sequence of steps toward the realization of the project. The existing site is currently occupied by houses and portable lab buildings within the Faculty Court, the Records Storage Building, 30 storage buildings, and the Grounds Shop along with four additional Grounds storage buildings. Of these buildings, eight of the Storage Buildings and the Records Storage building will be retained. The remainder of the buildings will be either demolished or moved.

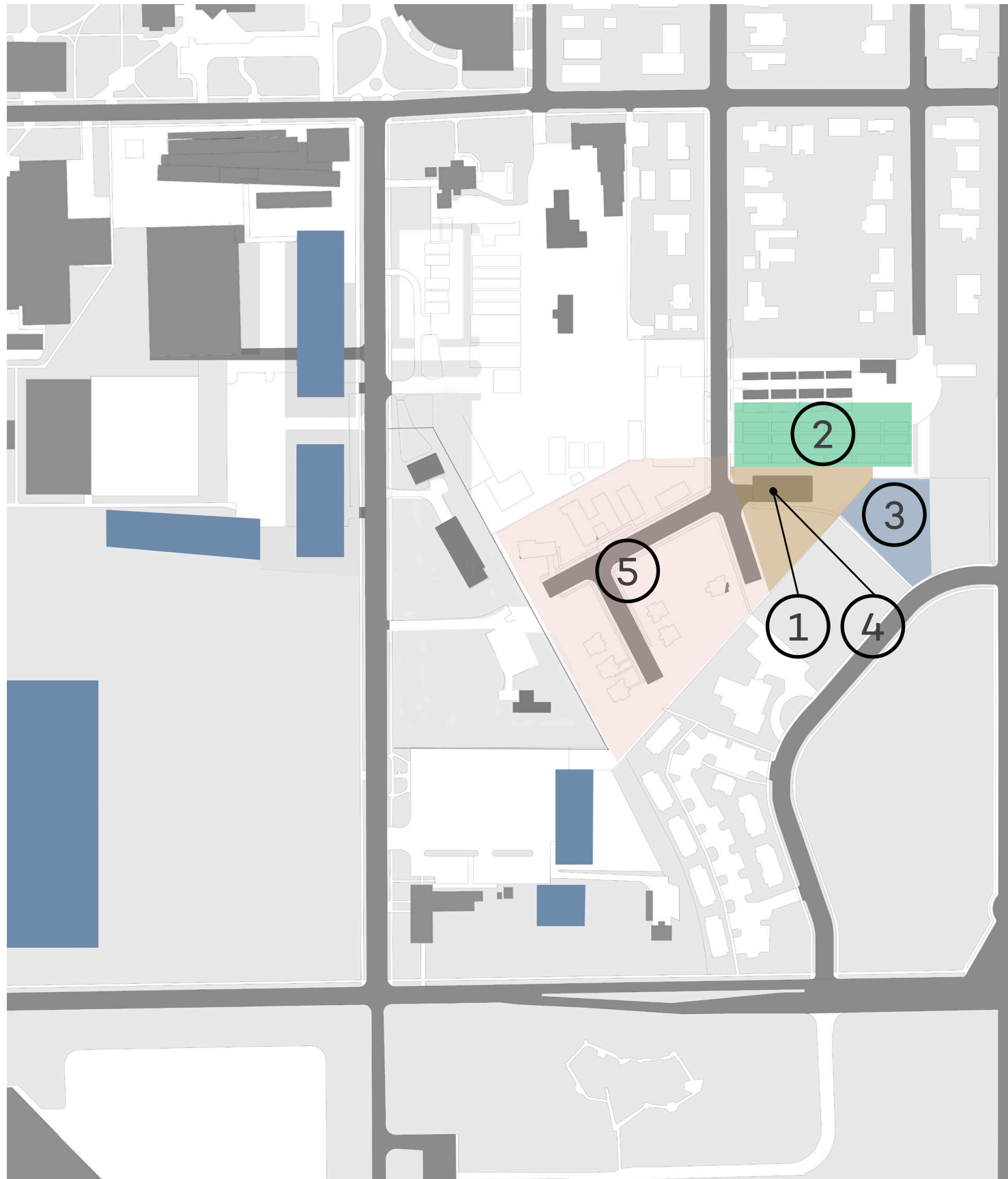
It is currently assumed that the sequencing of the construction of phase 1 and 2 of the Facilities Management Building includes the following: First, the Records Storage Building is vacated and a light remodel of this building is undertaken to accommodate Grounds. Grounds is then able to vacate their shop and storage buildings at the south end of the existing service yard. Concurrent with the Records Storage Building remodel will be the demolition of 22 of the 30 existing storage buildings. Once this is complete the Grounds storage adjacent to the stadium can be relocated to areas north and east of the Records Storage Building. At this point the existing Grounds Shop and the associated storage buildings can be demolished. Also concurrent with the above steps, the houses and portable labs of faculty court will all be vacated and then demolished or moved. Once the above steps are completed the site will be ready for construction of the phase 1 building.

Following construction of the phase 1 building: Engineering, Refrigeration Maintenance, Heat Maintenance, Custodial, Work Control, Painters, Carpenters, Lock Shop, Electricians, Plumbers and Laborers will all move into the new building. The vacated shops between 6th and 7th Avenues will be demolished. Mechanics, E-waste and the Metal Shop will remain in their current location. It is currently unknown if the vacated Work Control building will be demolished at the completion of Phase 1 or if it will remain with a new tenant.

The timing of the renovation of the Plew Building does not rely on any of the steps above.

The timing of the construction of Phase 2 relies on the same sequence as Phase 1. This work can be undertaken concurrent with Phase 1 or at a future date.

Following the completion of Phase 2: The Mechanics Shop and the Metal Shop would be vacated and demolished. The Plew Building would be vacated and returned to the University for an undetermined future use.



①

vacate record storage building; retrofit to accommodate environmental services needs and functions.

②

demolish storage sheds (22)

③

relocate Nursery and yard items

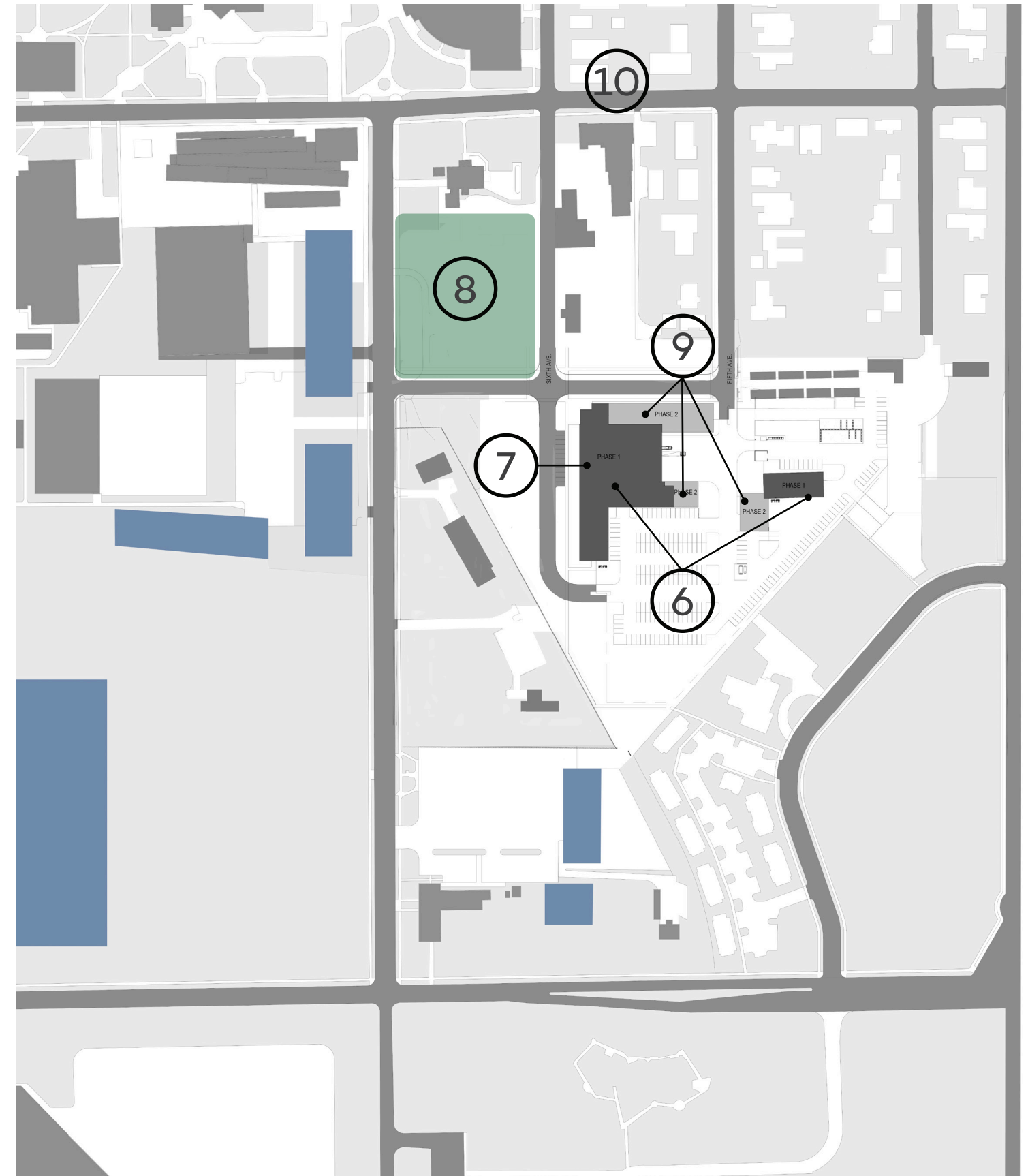
④

environmental services to move into former record storage building. relocate sewer line through butler building

⑤

relocate faculty court tenants then demolish faculty court.

- ⑥ construct phase one of new facilities maintenance and landscaping building
- ⑦ custodians, engineers, trades, stores, and work control to move to new building.
- ⑧ demolish all facilities buildings west of sixth avenue.
- ⑨ construct phase two of new facilities maintenance and landscaping building
- ⑩ \* remodel of plew building is independent from all sequences above.



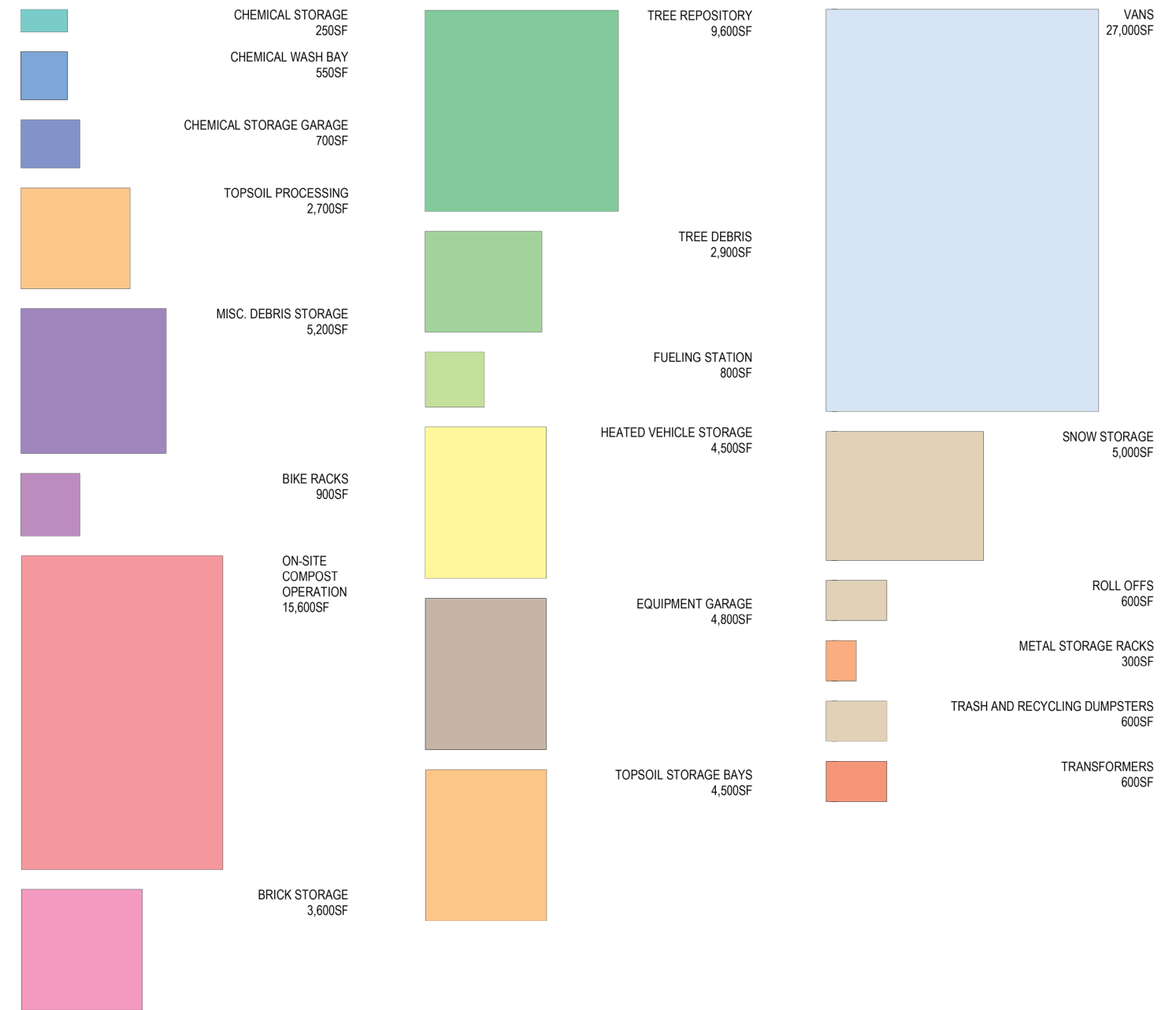


**service yard.**

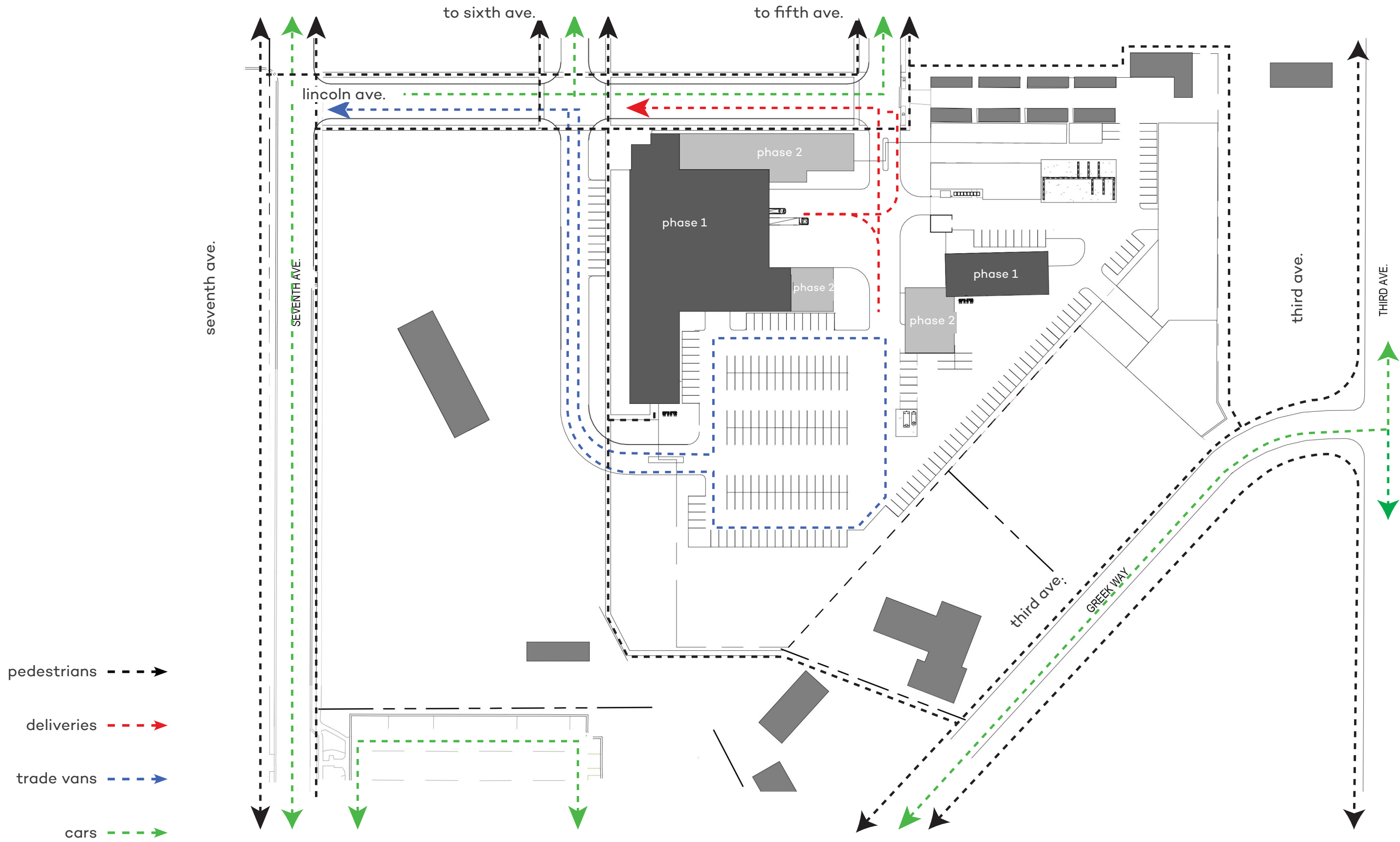
# service yard graphic program.

The service yard will be fenced area for the secure storage of university vehicles, equipment, and materials. The security fence will be attached to the building at two points creating a public side and a service side of the structure. There will be two card-access vehicular gates to facilitate deliveries and trades traffic to and from campus. It is assumed that public pedestrian traffic, which is allowed to cross the existing service yard, will not be able to traverse the yard. Pedestrian routes to facilitate traffic flow from 3rd Avenue and Greek Way around the east and west sides of the yard will be investigated in the design phase of the project.

The diagrams on the following pages show the area allocation of various site components a conceptual accommodation of those components and functions. This conceptual layout is sufficient to prove the ability of the proposed site to accommodate the site program as it is currently defined. Additional site layout options and refinements will be undertaken as part of the design phase of the project.

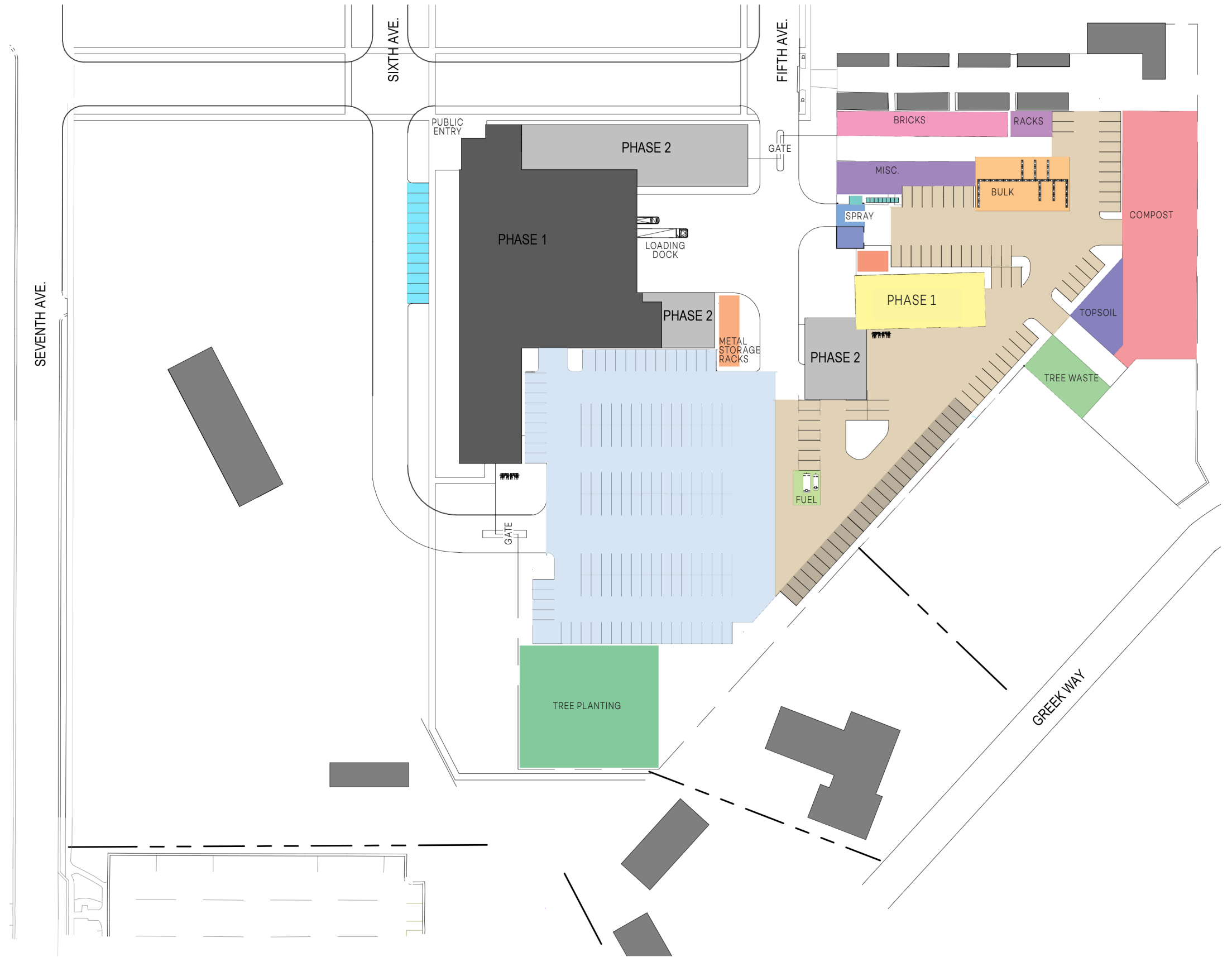


# conceptual site plan.



# site & yard.

- VISITOR PARKING**  
12 STALLS
- VAN PARKING**  
133 STALLS
- GROUNDS**  
62 UNCOVERED STALLS
- GROUNDS**  
25 COVERED STALLS



Midway through the programming process it was determined that an area of campus that Grounds had been utilizing for equipment storage, a composting operation, and the temporary location of spaded trees would need to be vacated to facilitate a future athletics project. The image to the right illustrates the areas that will need to be accommodated in the site design. It is acknowledged that there is some small amount of double-counting between the Grounds Equipment List and these gross area calculations, but this will allow additional space for future growth of the Grounds fleet. A conceptual test fit of the site program to the left demonstrates that the proposed site can accommodate this expanded program while leaving a buildable site along Third Avenue. This solution does require the removal of twenty (20) of the South Fifth Storage Units and the conversion of the Records Storage Building for use by Grounds.



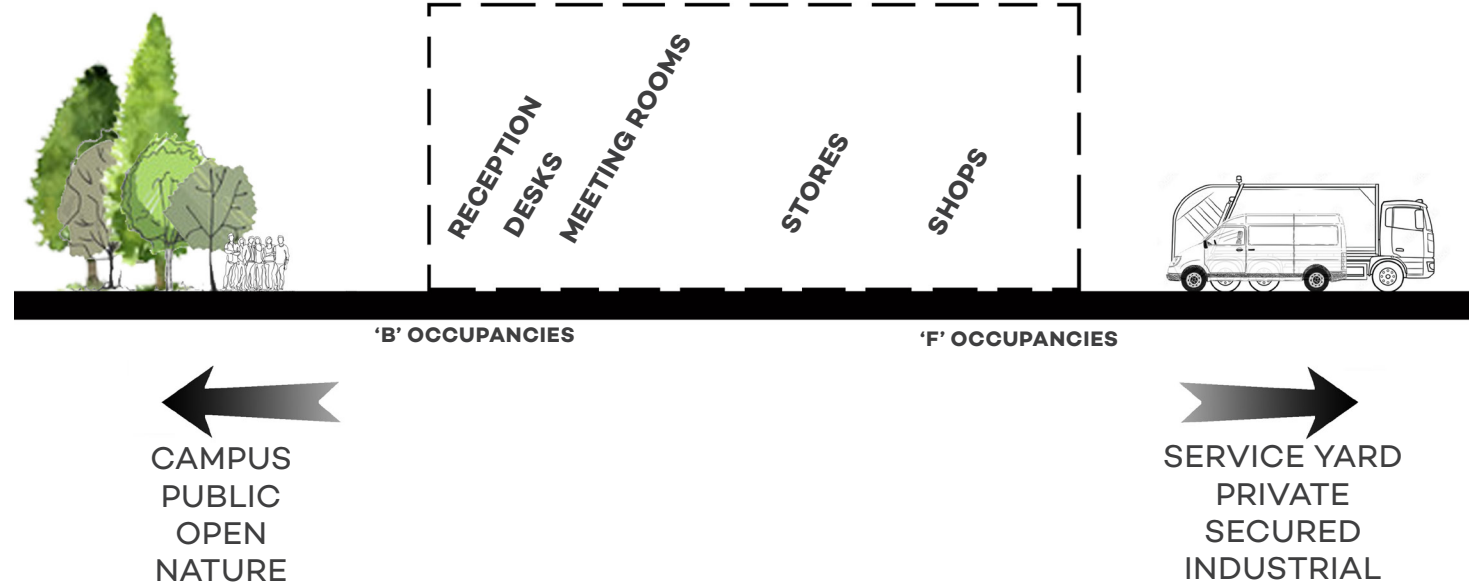


**building.**

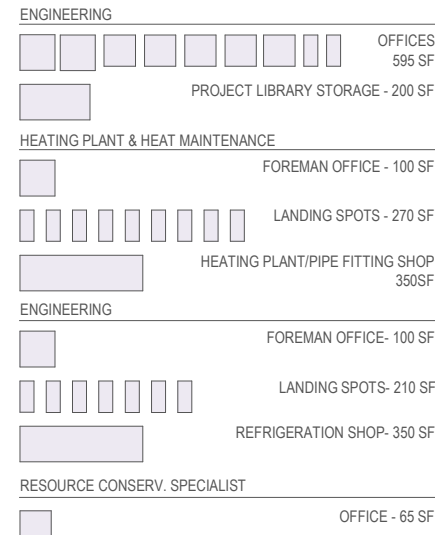
# graphic program.

## PHASE 1

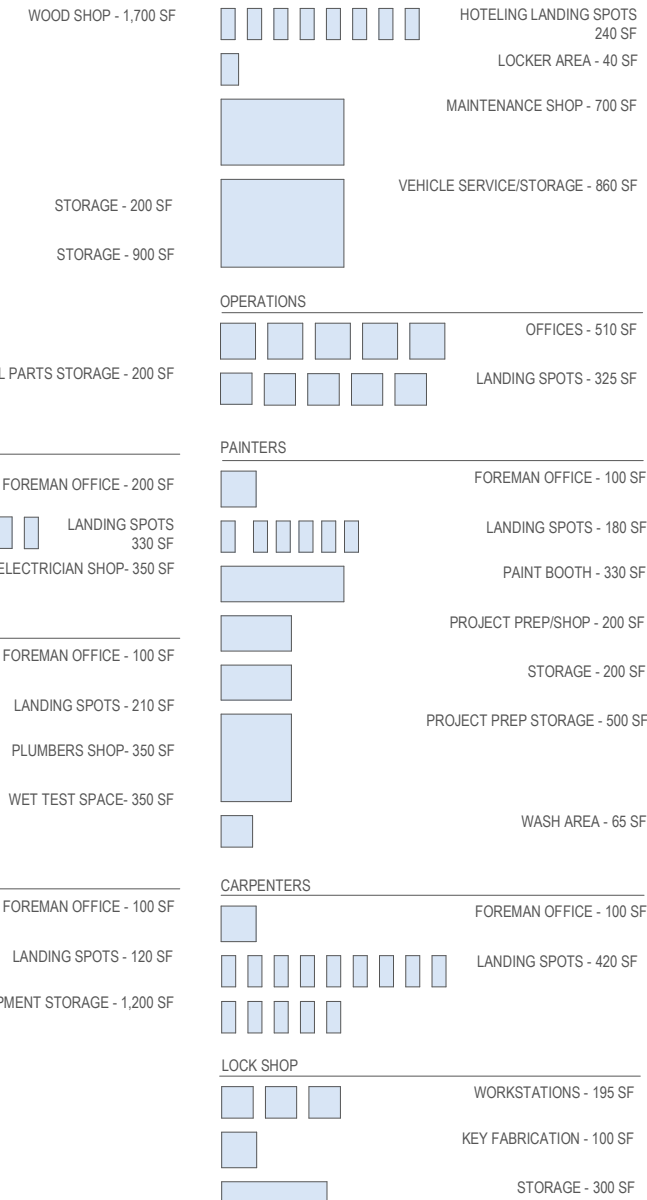
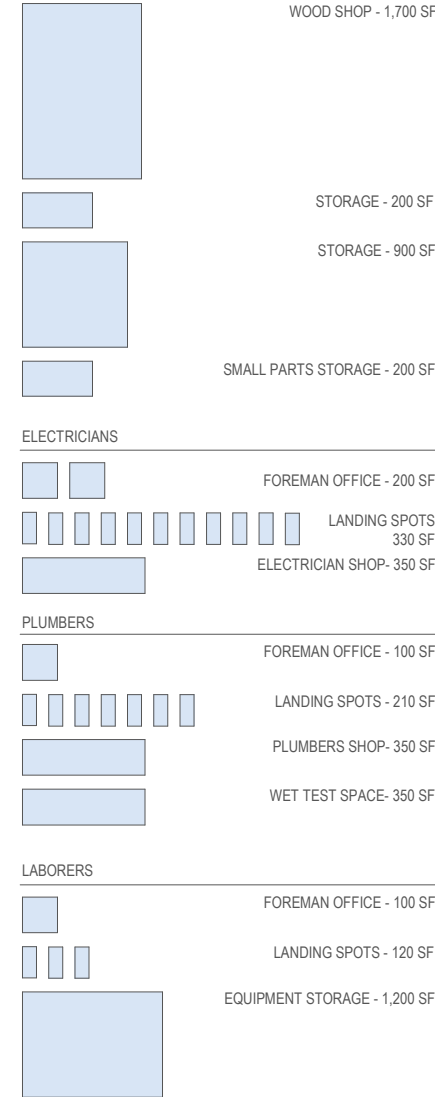
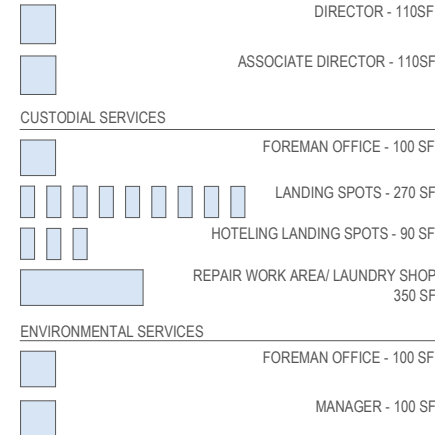
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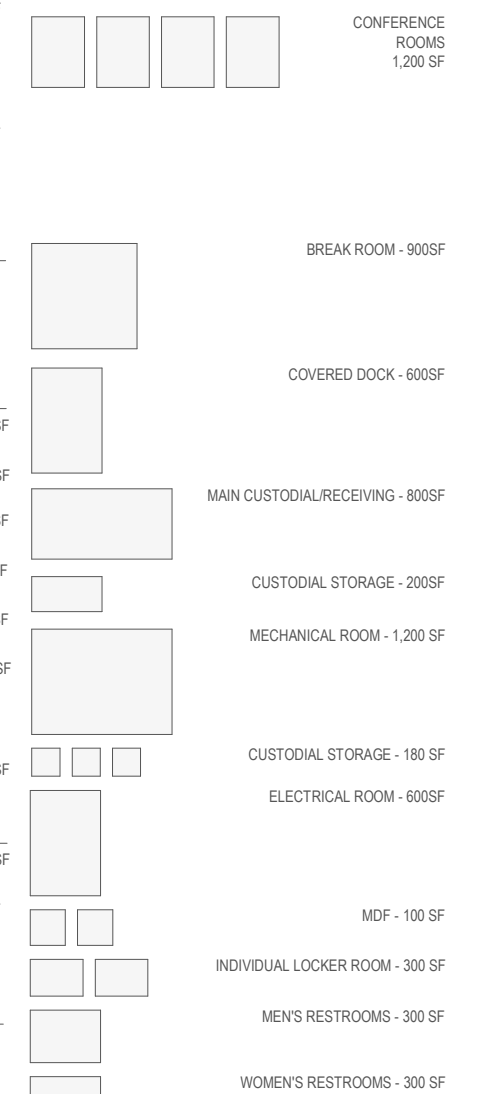
### ENGINEERING AND UTILITIES



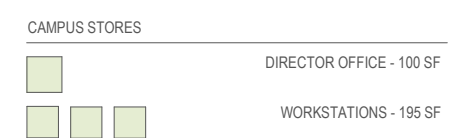
### FACILITIES SERVICES



### BUILDING SERVICE



### BUSINESS OPERATIONS



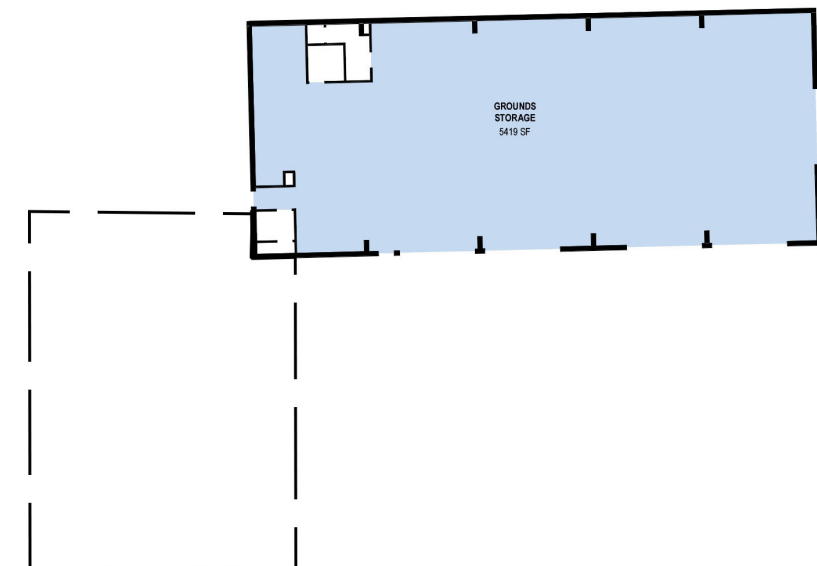


# conceptual floor plan.

## PHASE 1



## RENOVATED RECORDS STORAGE BUILDING FLOOR PLAN



# graphic program.

## PHASE 2

The 17,500 GSF Phase 2 would then include the construction of shop spaces for the Mechanics and E-waste as well as the construction of office space for PD&C, Business Operations, and Administration currently housed in the Plew Building, and Safety and Risk Management who are currently located west of 19th Avenue on Garfield.

**ADMINISTRATION**

- OFFICES - 60SF
- KEY DESK - 60SF

**PLANNING, DESIGN, AND CONSTRUCTION**

- ADMIN**
  - OFFICES - 210 SF
- PLANNING**
  - OFFICES - 680 SF
- DESIGN**
  - OFFICES - 395 SF
- CONSTRUCTION**
  - OFFICES - 685 SF

**FACILITIES SERVICES**

- E-WASTE**
  - OFFICES - 130 SF
  - E-WASTE SHOP/STORAGE - 600 SF
- MECHANICS**
  - FOREMAN OFFICE - 100 SF
  - WORKSTATIONS - 120 SF
  - MECHANIC SHOP - 3,500 SF
  - TIRE STORAGE - 600 SF

- PARTS STORAGE - 400 SF
- CARPENTERS
- WELDING/METAL SHOP - 900SF

**SAFETY AND RISK MANAGEMENT**

- OFFICES - 110 SF
- LANDING SPOTS - 520 SF

**BUSINESS OPERATIONS**

- BUDGET**
  - DIRECTOR OFFICE - 100 SF
  - WORKSTATIONS - 325 SF
- CAMPUS STORES**
  - DIRECTOR OFFICE - 100 SF
  - WORKSTATIONS - 195 SF
- IT**
  - DIRECTOR OFFICE - 100 SF
  - WORKSTATIONS - 195 SF
  - STUDENT INTERNS - 60 SF
- MAIL**
  - WORKSTATIONS - 195 SF
- CONTRACTS**
  - WORKSTATIONS - 195 SF
- REAL ESTATE**
  - MANAGER OFFICE - 100 SF

**BUILDING SERVICE**

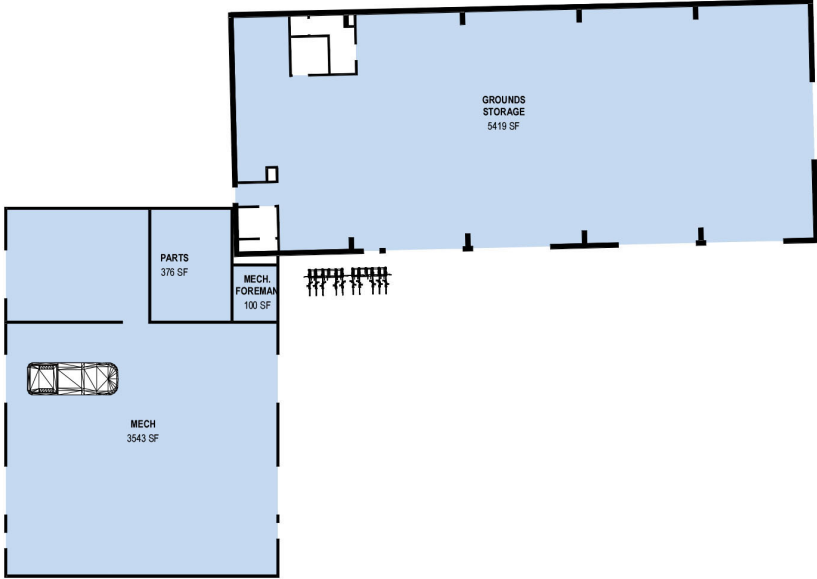
- CONFERENCE ROOMS - 1,500 SF
- LARGE CONFERENCE/TRAINING - 1,200 SF
- CUSTODIAL STORAGE - 100SF
- MDF - 200 SF
- MEN'S RESTROOMS - 600 SF
- WOMEN'S RESTROOMS - 600 SF

# conceptual floor plan.

## PHASE 2



RENOVATED RECORDS STORAGE BUILDING FLOOR PLAN



# component diagrams.

The following pages contain a series of images and diagrams illustrating the individual trade's shops. While these diagrams should not be considered a finalized design, there is an assumption that they do represent a workable solution to the needs of the individual trades.

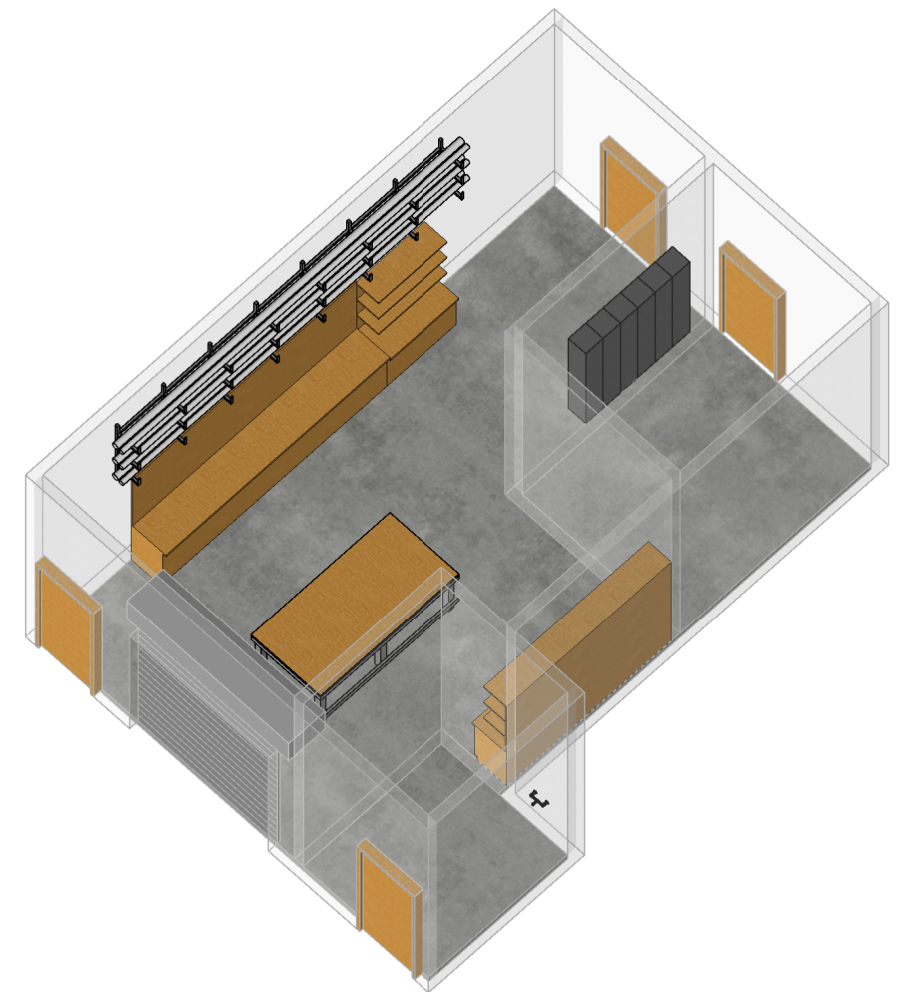
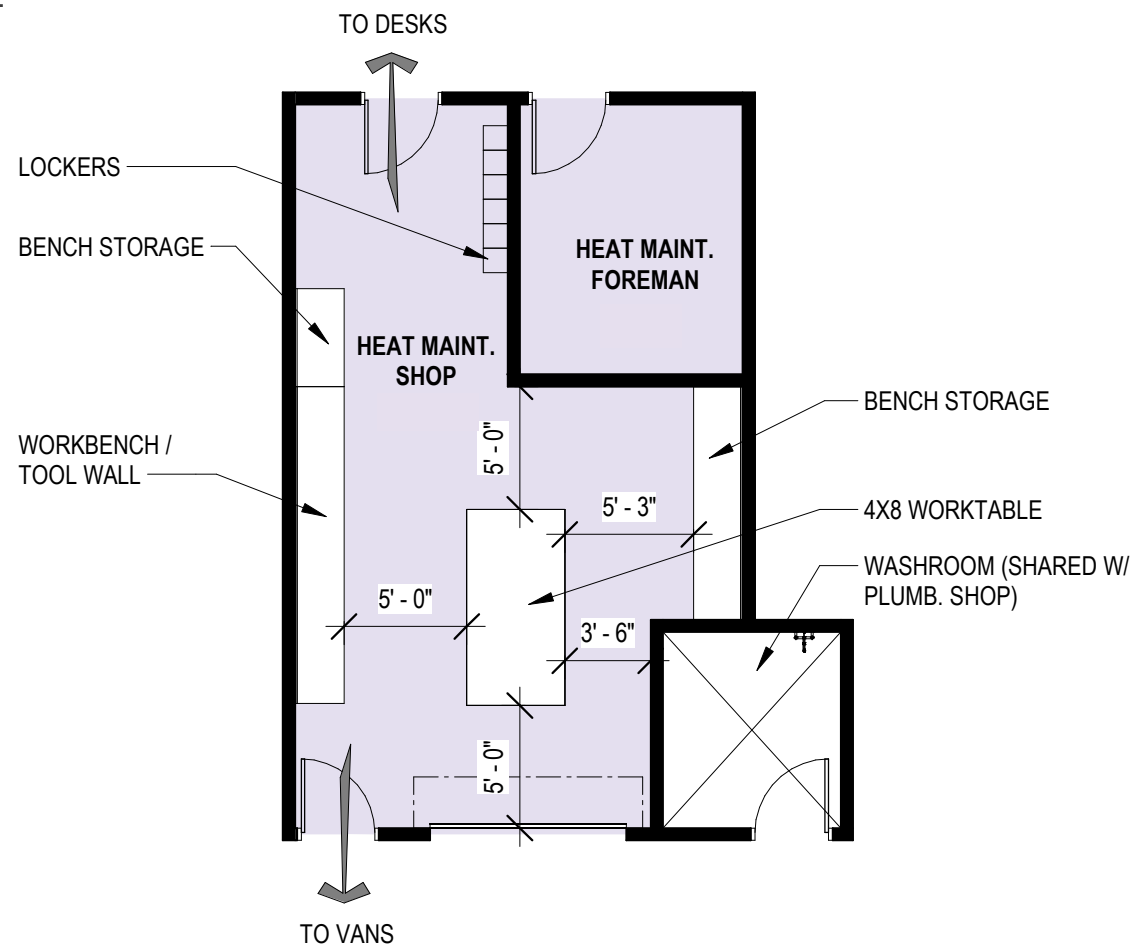


# HEAT MAINTENANCE SHOP

400SF SHOP  
100SF OFFICE

**TYPE OF WORK:** REPAIR OF EQUIPMENT & FABRICATION  
**KEY ADJACENCIES:** ACCESS TO METAL SHOP AND PIPE THREADER  
**M/P/E REQUIREMENTS:** SHOULD ACCOMODATE OCCASIONAL SOLDERING  
**OCCUPANCY TYPE:** F-1: MODERATE-HAZARD FACTORY INDUSTRIAL

**NEEDS:**  
 WORK TABLE  
 APPROX. 12' OF WORKBENCH WITH TOOL WALL  
 APPROX. 12' OF WORKBENCH WITH CASEWORK STORAGE  
 STAFF LOCKERS FOR (9) NINE  
 WHITEBOARD  
 UPPER RACKS FOR PIPE STORAGE  
 ACCESS TO WASH AREA

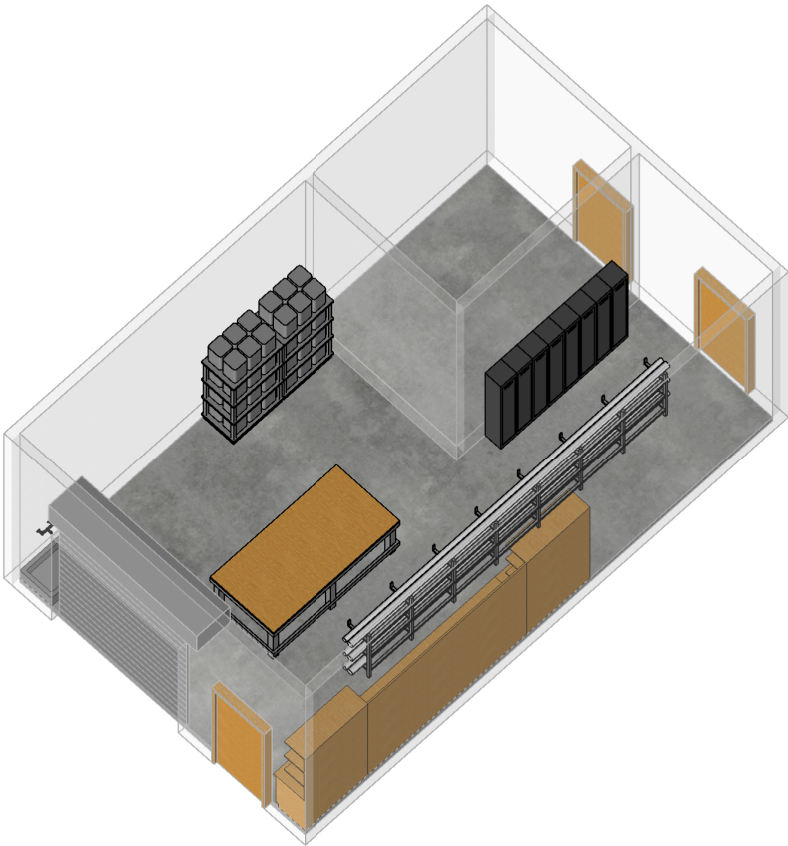
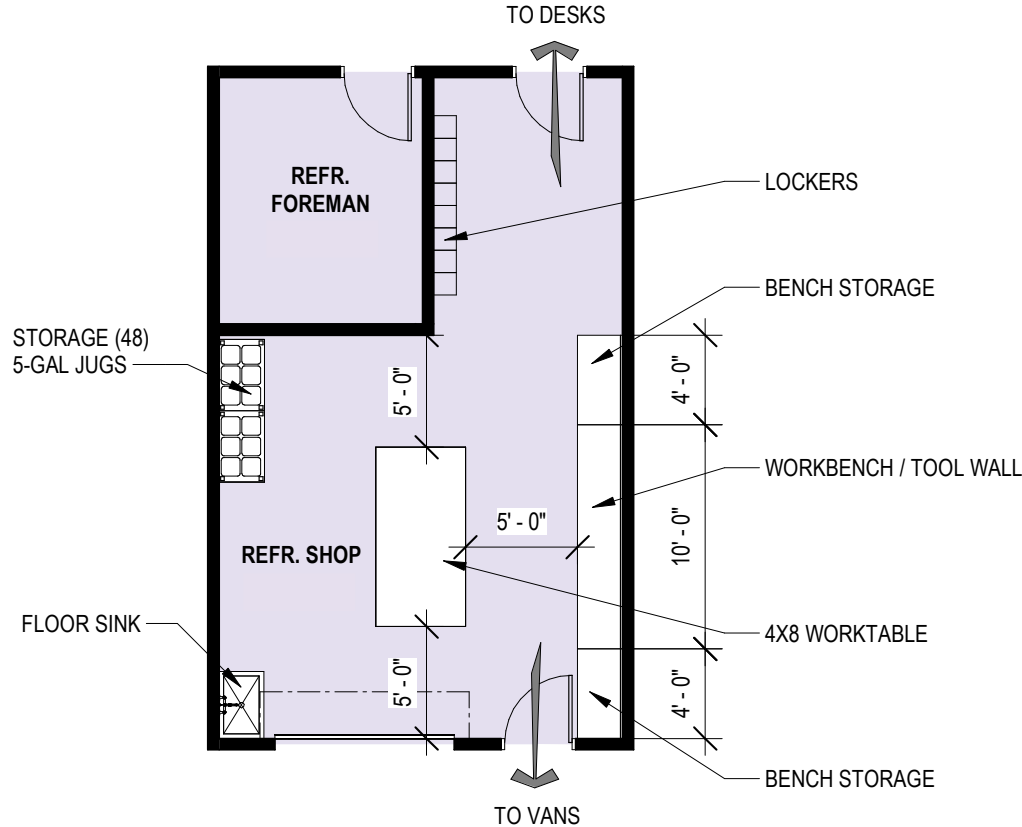


# REFRIGERATION

400SF SHOP  
 100SF OFFICE

**TYPE OF WORK:** REPAIR OF EQUIPMENT & FABRICATION  
**KEY ADJACENCIES:** ACCESS TO METAL SHOP AND PIPE THREADER  
**M/P/E REQUIREMENTS:** SHOULD ACCOMODATE OCCASIONAL SOLDERING  
**OCCUPANCY TYPE:** F-1: MODERATE-HAZARD FACTORY INDUSTRIAL

**NEEDS:**  
 STORAGE FOR APPROXIMATELY (50) 5-GALLON JUGS  
 WORKTABLE  
 APPROX. 10' OF WORKBENCH/TOOLWALL  
 APPROX. 8' OF WORKBENCH WITH CASEWORK STORAGE  
 VENTILATION TO ACCOMODATE SOME SOLDERING  
 STAFF LOCKERS FOR (7) SEVEN  
 ACCESS TO MEETING ROOMS  
 WALL MOUNTED TV FOR TRAINING

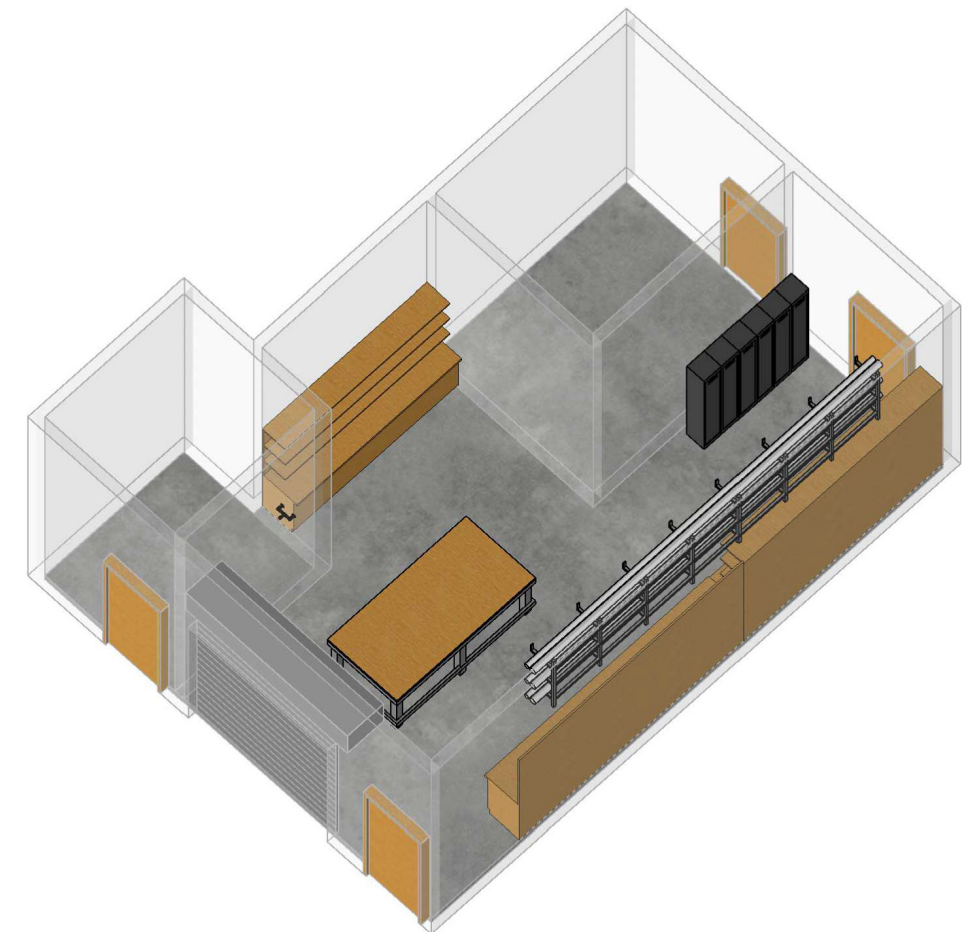
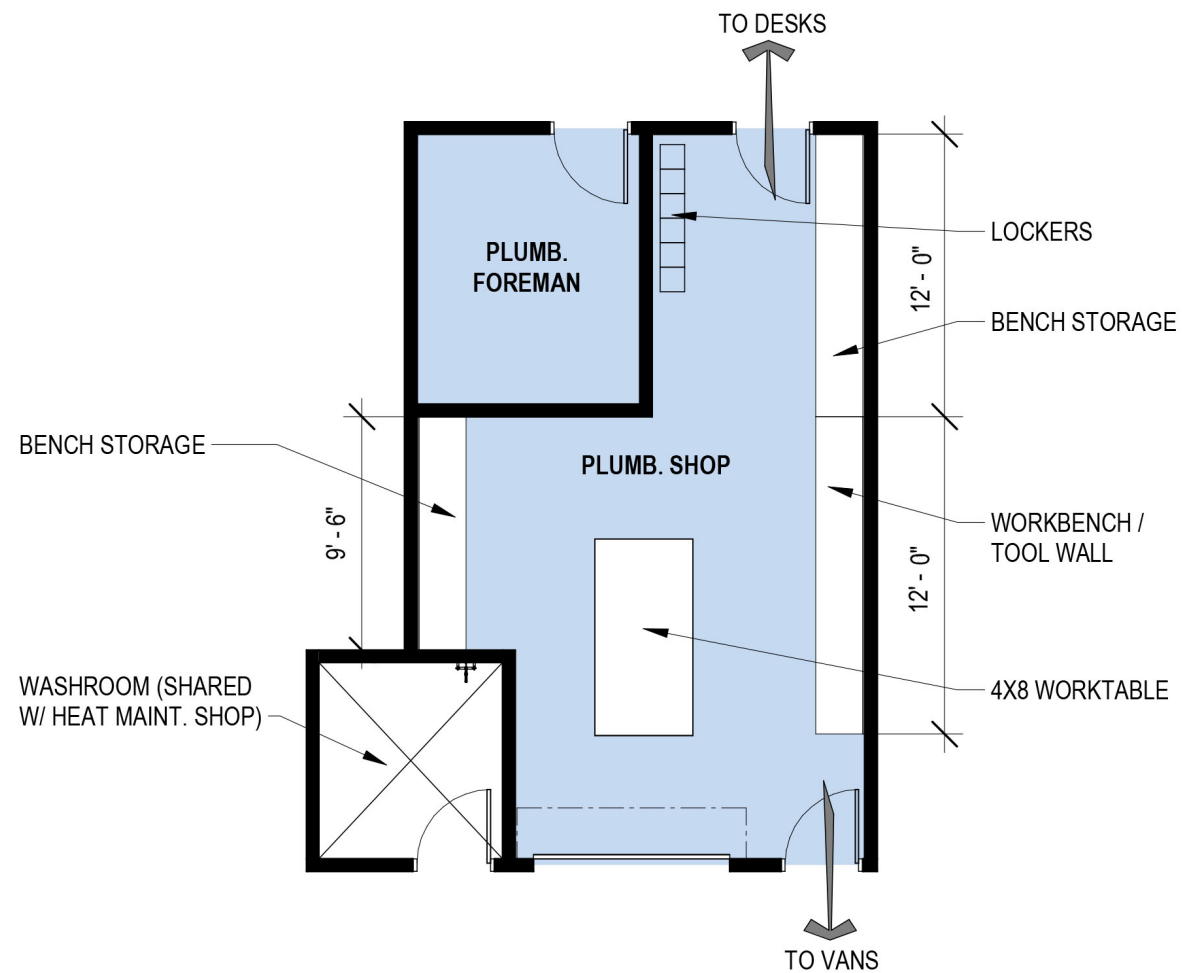


# PLUMBING SHOP

400SF SHOP  
100SF OFFICE

**TYPE OF WORK:** REPAIR OF EQUIPMENT & FABRICATION  
**KEY ADJACENCIES:** ACCESS TO METAL SHOP AND PIPE THREADER  
**M/P/E REQUIREMENTS:** HOT AND COLD WATER HOOKUPS FOR TESTING  
**OCCUPANCY TYPE:** F-1: MODERATE-HAZARD FACTORY INDUSTRIAL

**NEEDS:**  
 ACCESS TO WASH/TEST ROOM  
 TEST ROOM  
 WORK TABLE  
 APPROX. 12' OF WORKBENCH WITH TOOL WALL  
 APPROX. 12' OF WORKBENCH WITH CASEWORK STORAGE  
 STAFF LOCKERS FOR (7) SEVEN  
 WHITEBOARD  
 UPPER RACKS FOR PIPE STORAGE



# CUSTODIAL SHOP

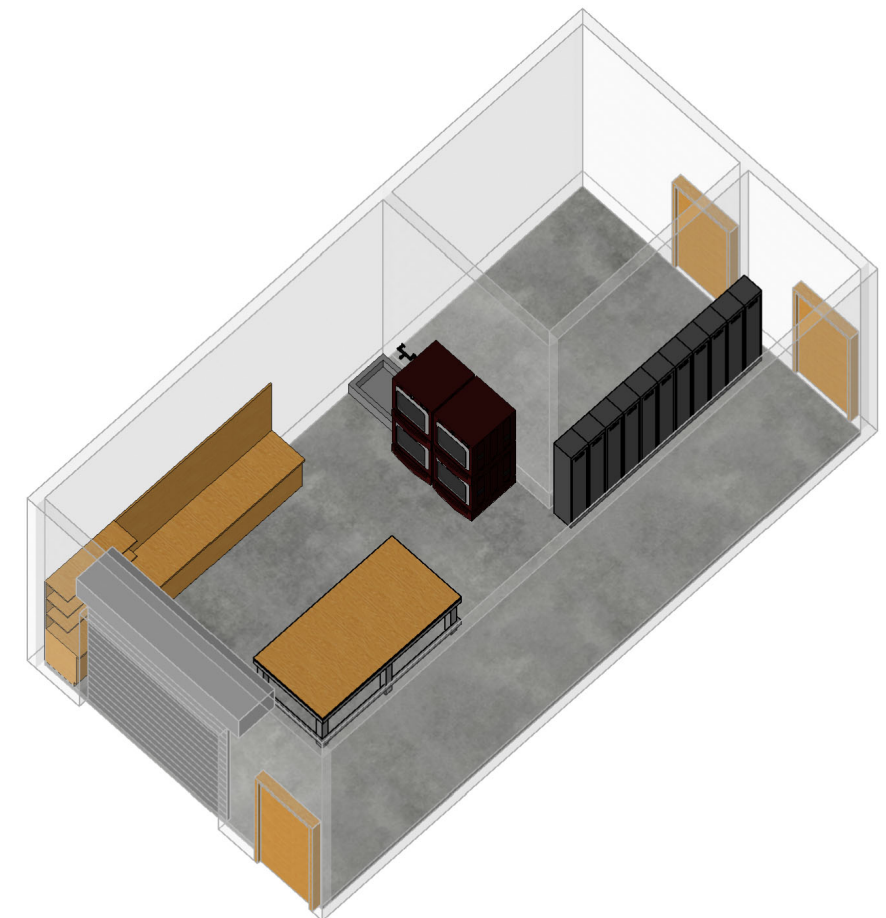
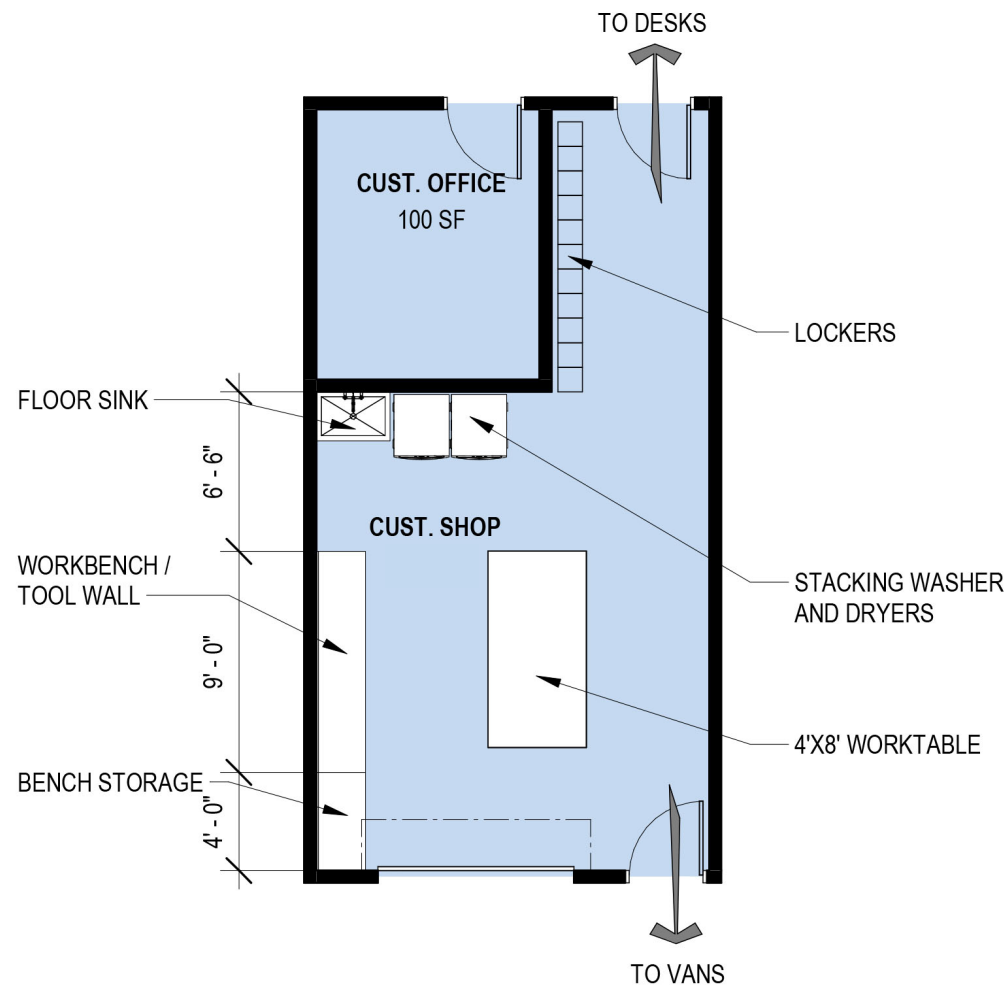
350SF SHOP  
100SF OFFICE

**TYPE OF WORK:** REPAIR OF EQUIPMENT  
**KEY ADJACENCIES:** NA  
**M/P/E REQUIREMENTS:** LAUNDRY FACILITIES / MOP SINK  
**OCCUPANCY TYPE:** F-1: MODERATE-HAZARD FACTORY INDUSTRIAL

**NEEDS:**  
 WORK BENCH  
 CATCARD ACCESS  
 APPROX. 9' OF WORKBENCH WITH TOOL WALL  
 APPROX. 4' OF WORKBENCH WITH CASEWORK STORAGE  
 FLOOR SINK  
 2x WASHER/DRYER  
 STAFF LOCKERS FOR (12) TWELVE  
 WHITEBOARD

THE CUSTODIAL SHOP IS PRIMARILY INTENDED TO FACILITATE THE DAY-TO-DAY MAINTENANCE AND REPAIR OF CUSTODIAL EQUIPMENT. THE RECEIVING/ CUSTODIAL STORAGE SPACE ADJACENT TO THE LOADING DOCK AND STORES WILL BE THE PRIMARY LOCATION FOR THE STORAGE AND SHIPPING OF CUSTODIAL SUPPLIES TO CAMPUS BUILDINGS. A SERIES OF THREE SMALLER CUSTODIAL ROOMS HAVE ALSO BEEN PROGRAMMED TO FACILITATE THE CLEANING AND SERVICING OF THIS BUILDING.

THE DAILY PROCESS OF DISTRIBUTING BUILDING KEYS TO EACH CUSTODIAN AT THE START OF THEIR SHIFT WAS DISCUSSED BY THE STEERING COMMITTEE. IT WAS DETERMINED THAT THIS PROCESS WOULD EVENTUALLY BE ABANDONED AND A KEY WINDOW WOULD NOT BE PROVIDED AS PART OF THE NEW BUILDING. A REPLACEMENT FOR THE CURRENT PROCESS WILL BE DETERMINED BY FACILITIES MANAGEMENT LEADERSHIP AT A FUTURE DATE.



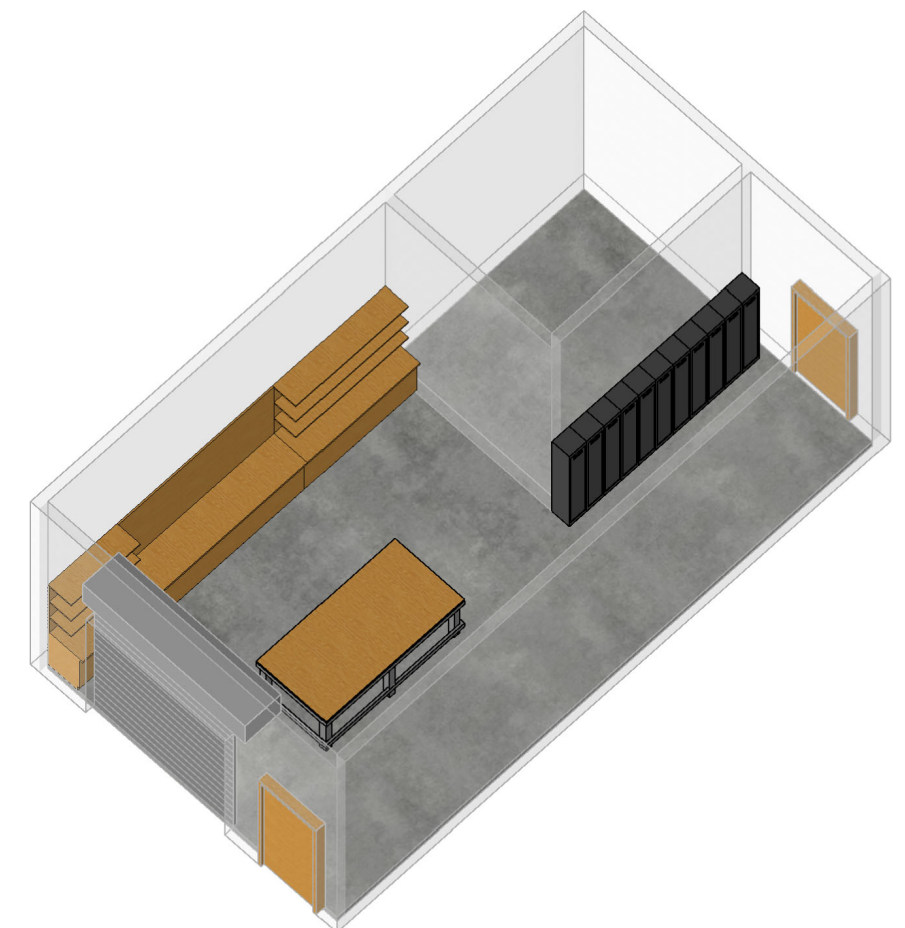
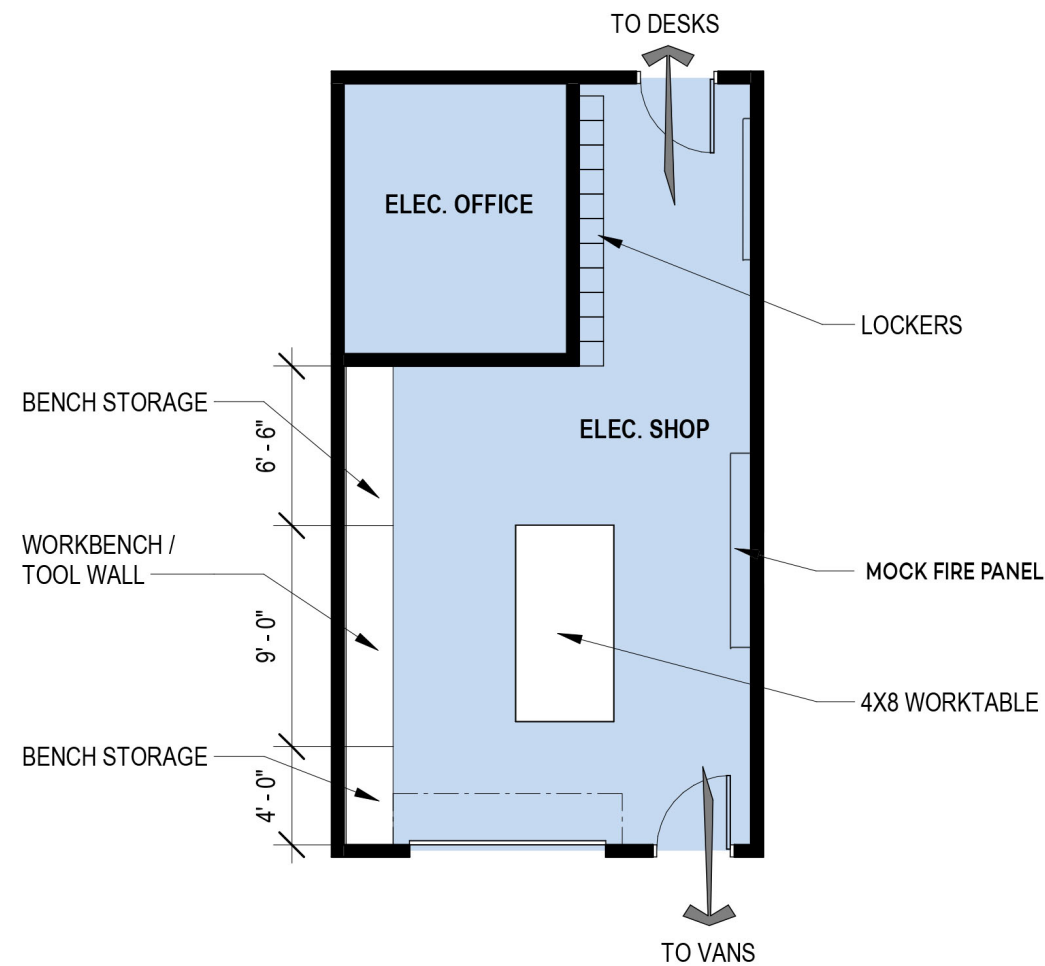


# ELECTRICAL SHOP

400SF SHOP  
100SF OFFICE

**TYPE OF WORK:** SMALL REPAIRS AND PREFABRICATION  
**KEY ADJACENCIES:** METAL SHOP  
**M/P/E REQUIREMENTS:** TESTING OUTLETS  
**OCCUPANCY TYPE:** F-1: MODERATE-HAZARD FACTORY INDUSTRIAL

**NEEDS:**  
MOCK FIRE PANEL CONTROL SYSTEM  
OVERHEAD OUTLETS ABOVE WORKTABLE  
(120/208/277 VOLT CONNECTIONS)  
WORK TABLE  
APPROX. 9' OF WORKBENCH WITH TOOL WALL  
APPROX. 9' OF WORKBENCH WITH CASEWORK STORAGE  
STAFF LOCKERS FOR (11) ELEVEN  
WHITEBOARD  
UPPER RACKS FOR PIPE STORAGE

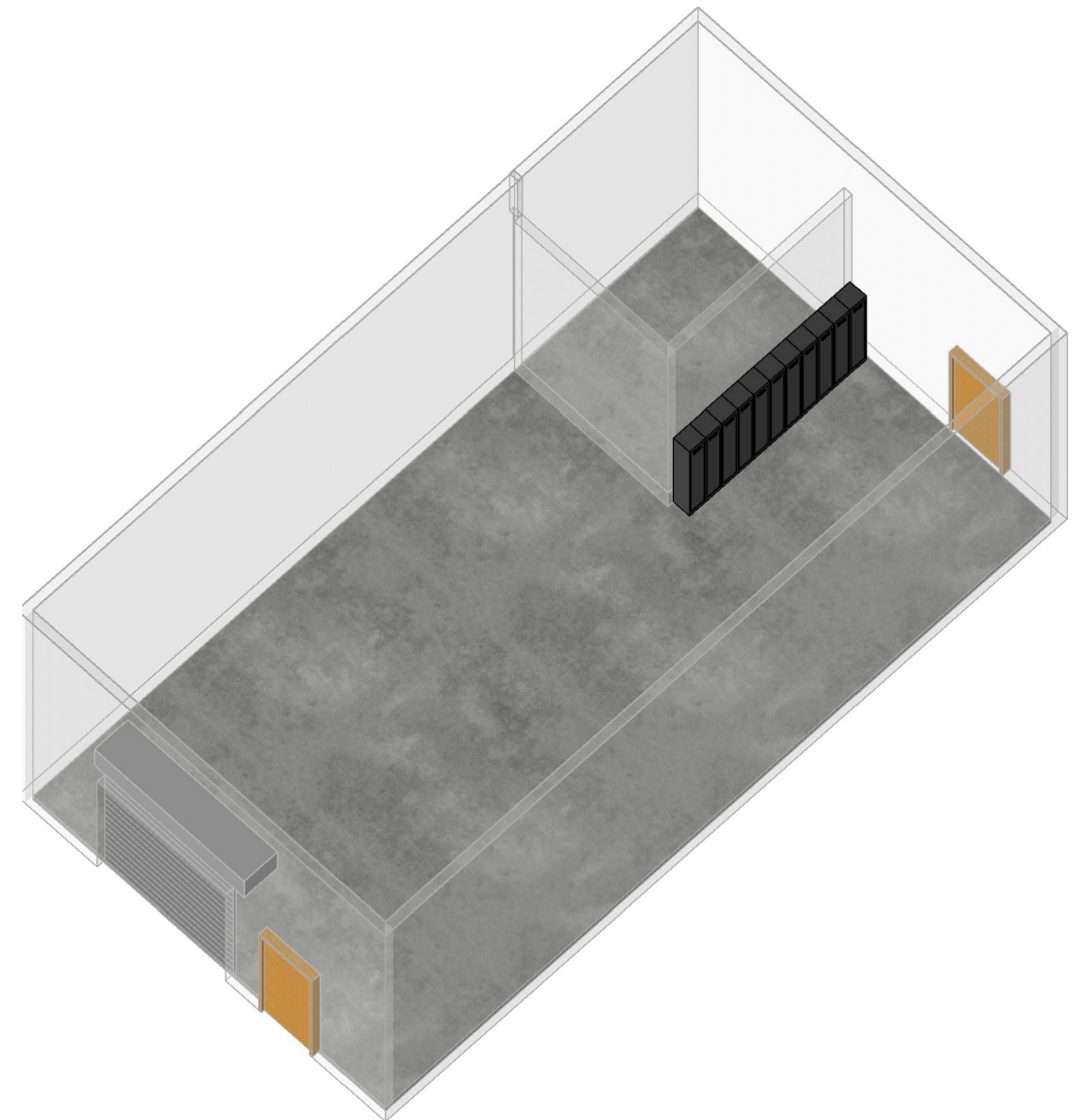
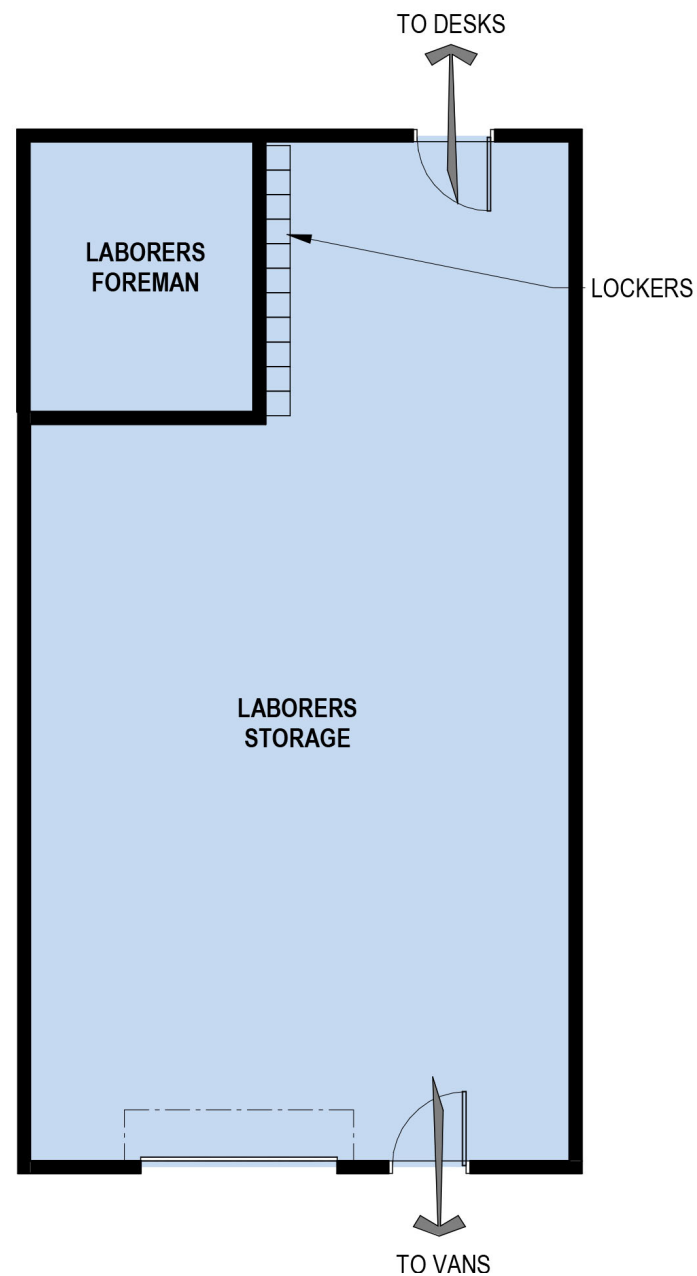


# LABORERS SHOP

800SF SHOP  
100SF OFFICE

**TYPE OF WORK:** STORAGE OF MOVING EQUIPMENT  
**KEY ADJACENCIES:** LOADING DOCK  
**M/P/E REQUIREMENTS:** STANDARD  
**OCCUPANCY TYPE:** S-2 STORAGE

**NEEDS:**  
EQUIPMENT STORAGE  
OVERHEAD STORAGE  
ACCESS TO LOADING DOCK  
SIGN ASSEMBLY WORK TABLE  
SCAFFOLDING STORAGE  
STAFF LOCKERS FOR (4) FOUR  
WHITEBOARD  
ADJACENCY TO COVERED DOCK  
OR CANOPY OVER GARAGE DOOR  
TO PROVIDE COVERED LOADING  
ACCESS TO PLUMBERS WASH ROOM FOR CAN WASH

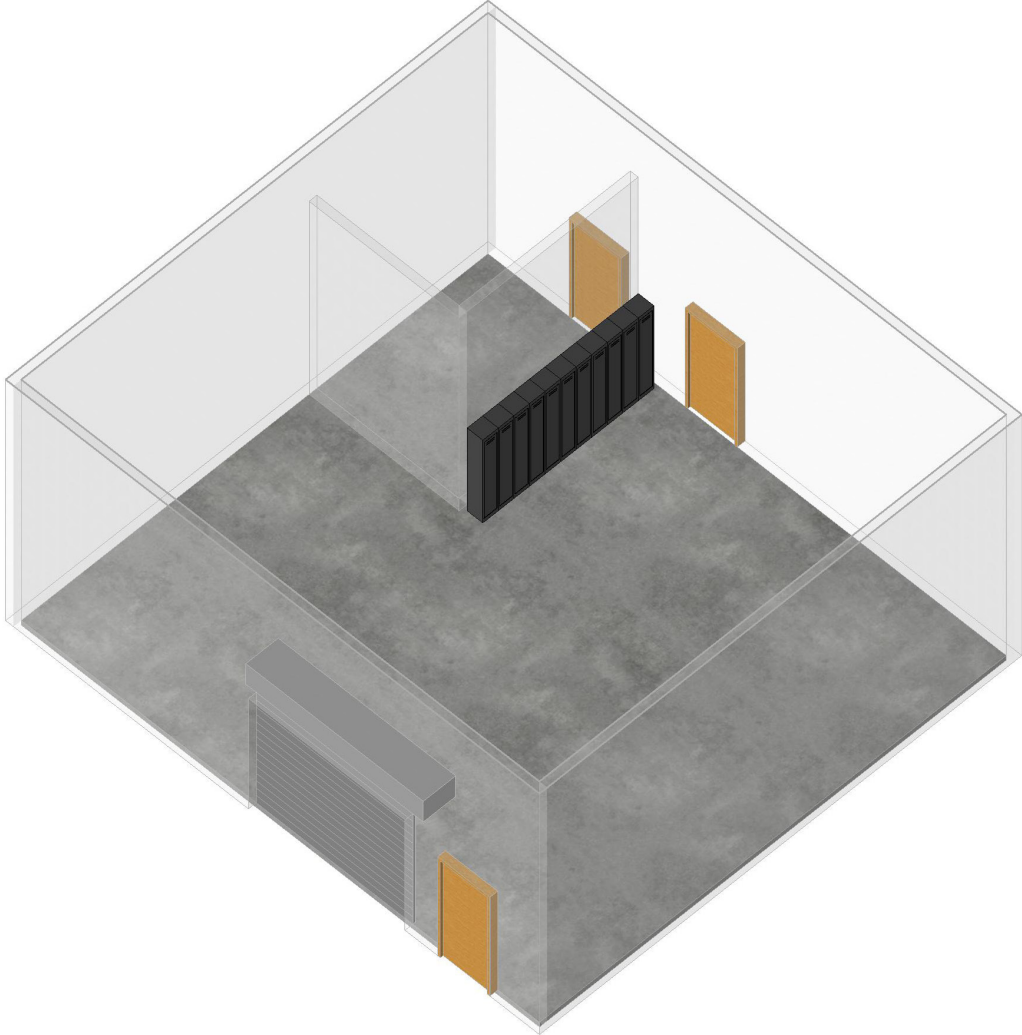
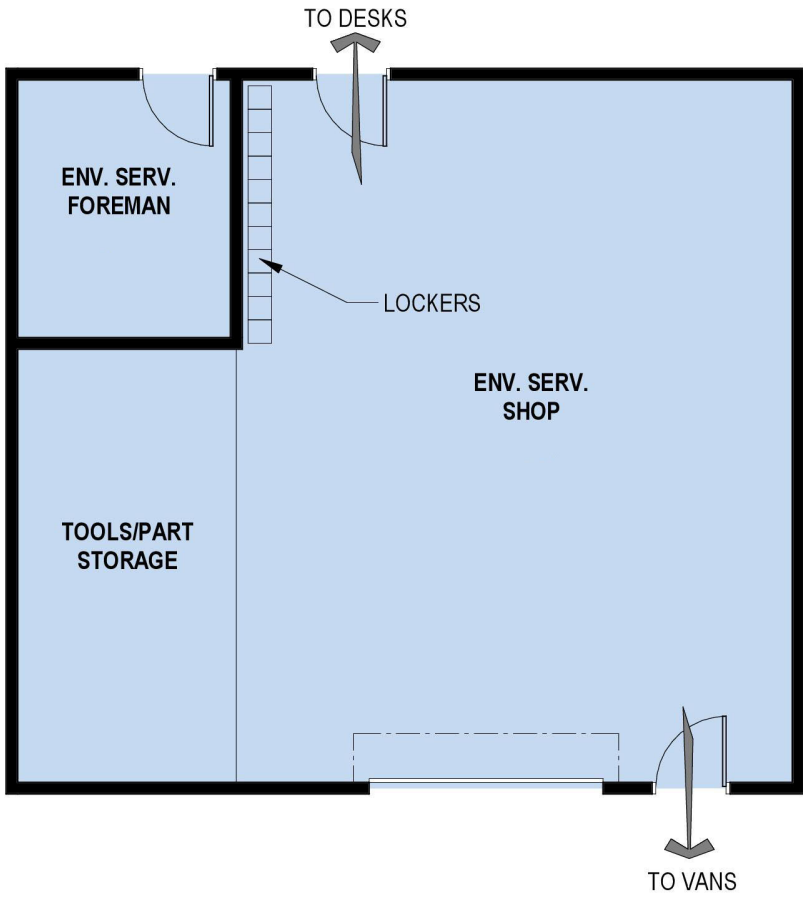


# ENVIRONMENTAL SERVICES (GROUNDS)

800SF SHOP  
200SF OFFICE

**TYPE OF WORK:** VEHICLE AND EQUIPMENT REPAIRS  
**KEY ADJACENCIES:** MECHANICS  
**M/P/E REQUIREMENTS:** TO ACCOMODATE VEHICLE EXHAUST AND WELDING  
**OCCUPANCY TYPE:** F-1: MODERATE-HAZARD FACTORY INDUSTRIAL

**NEEDS:**  
SMALL VEHICLE LIFT  
TOOL STORAGE  
WORK TABLE  
STAFF LOCKERS FOR (10) TEN  
WHITEBOARDz  
SIGHTLINE TO FUELING STATION

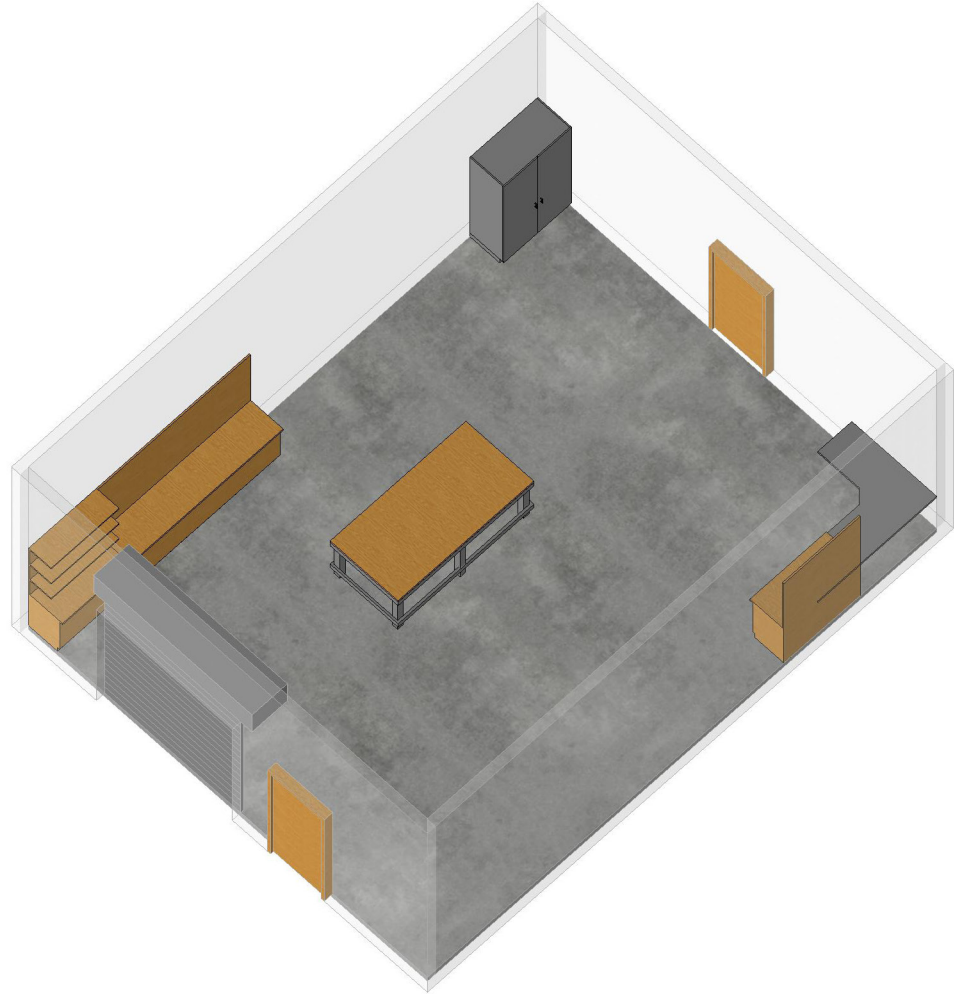
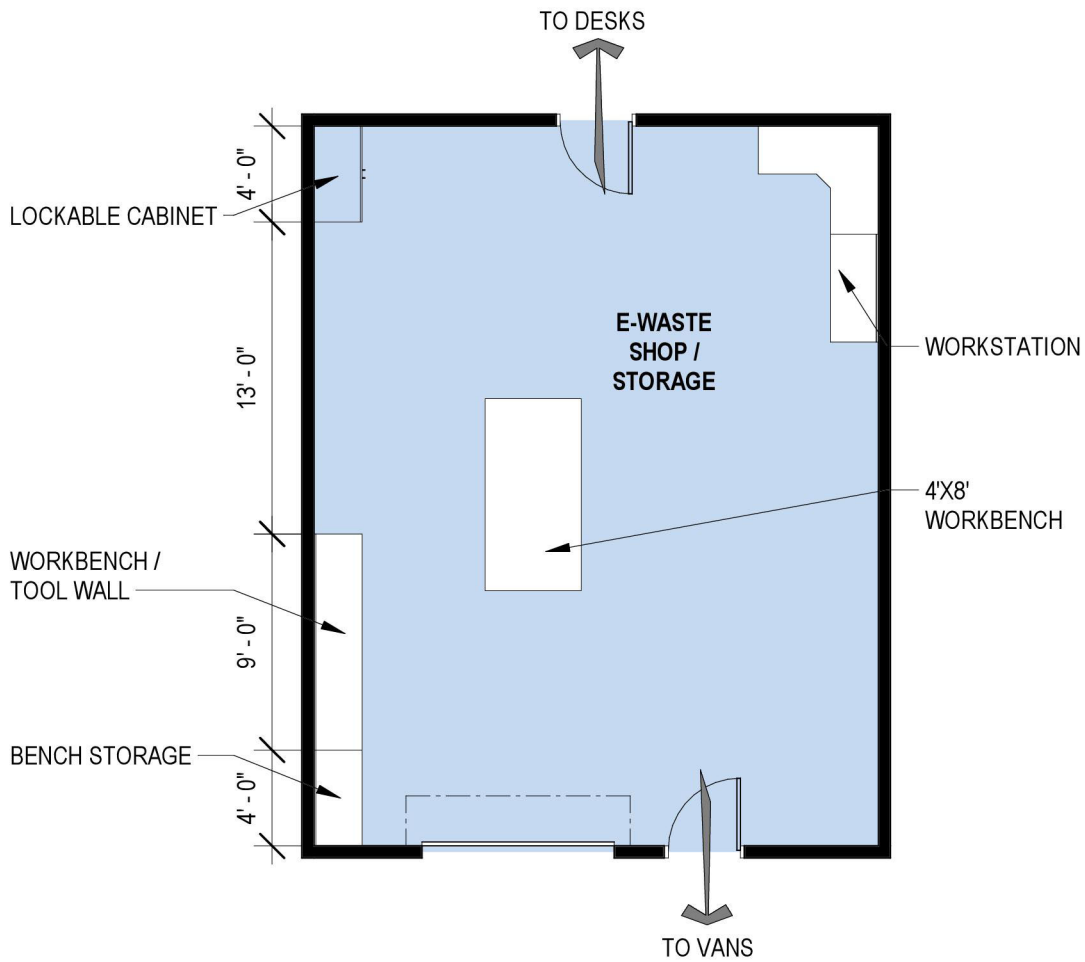


# ELECTRONIC WASTE

665SF SHOP

**TYPE OF WORK:** MOVING / STORAGE OF WASTE  
**KEY ADJACENCIES:** LOADING DOCK  
**M/P/E REQUIREMENTS:** STANDARD  
**OCCUPANCY TYPE:** F-1: MODERATE-HAZARD FACTORY INDUSTRIAL

**NEEDS:**  
 LOCKABLE COMPUTER TOWER STORAGE (FOR 20 TOWERS?)  
 HARD DRIVE WORK TABLE  
 PACKING FACILITIES  
 YARD SPACE FOR SEVEN 20-YARD ROLL-OFFS

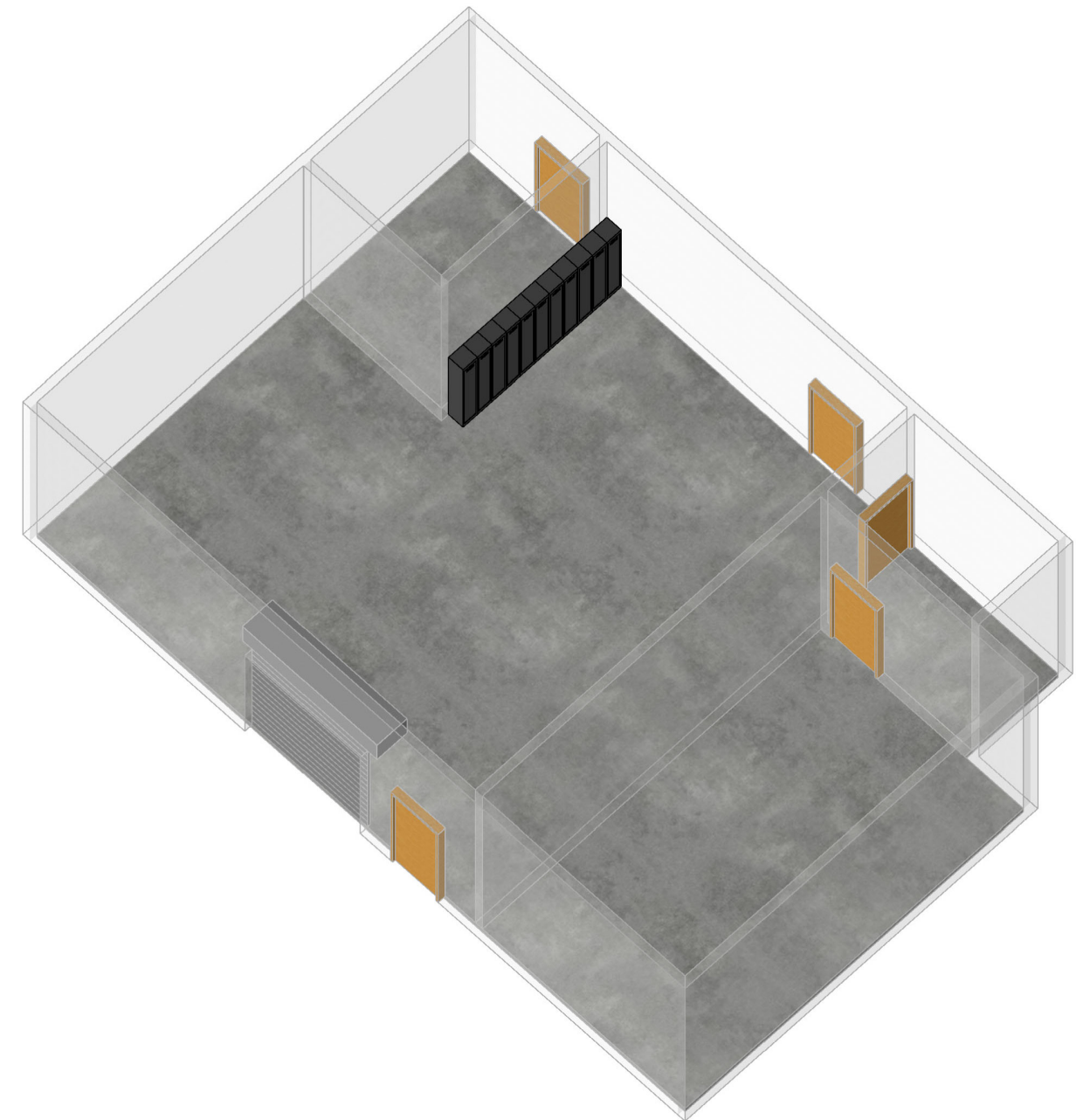
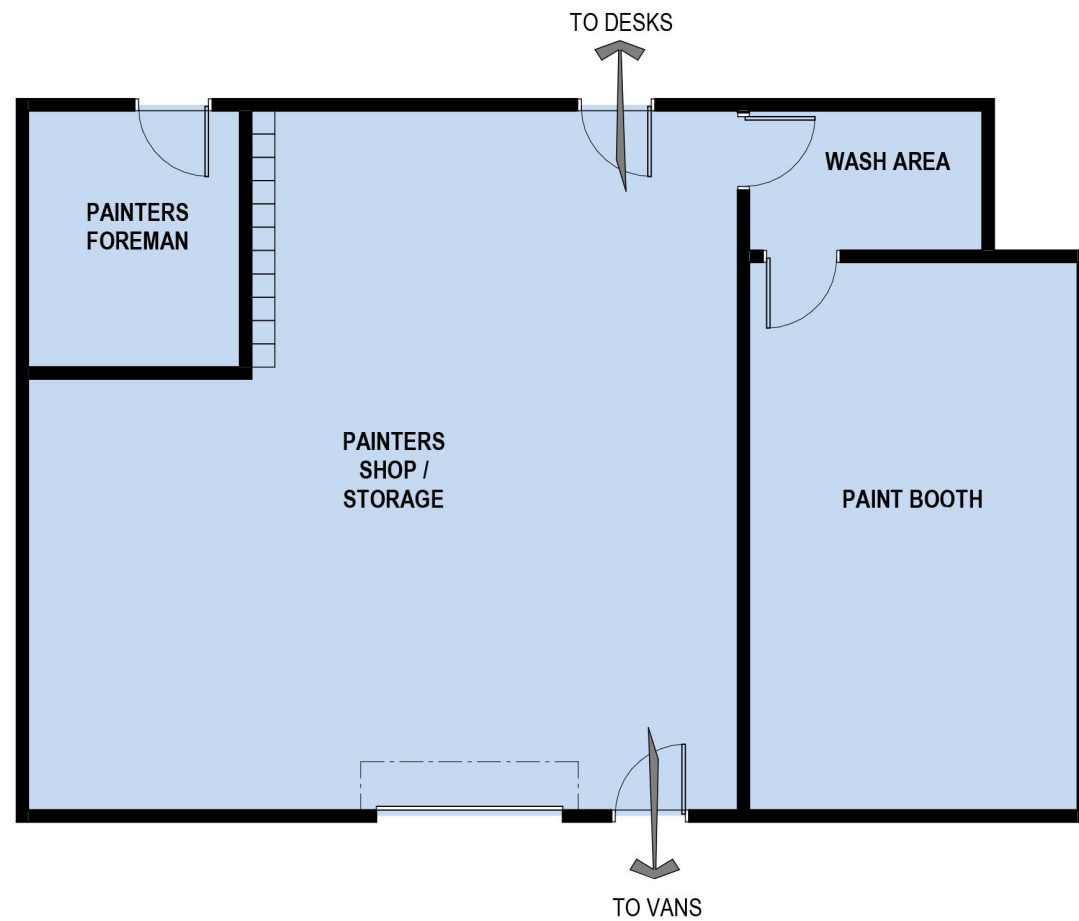


# PAINT

650SF SHOP  
100SF OFFICE

**TYPE OF WORK:** STORAGE AND PAINTING  
**KEY ADJACENCIES:** CARPENTERS  
**M/P/E REQUIREMENTS:** FUME MITIGATION & SOLVENT DRAIN  
**OCCUPANCY TYPE:** F-1: MODERATE-HAZARD FACTORY INDUSTRIAL

**NEEDS:**  
FIRE-SAFE SHELVING  
CONSUMABLE ITEMS STORAGE  
WASH AREA  
APPROPRIATE PLUMBING SOLUTIONS FOR CLEANING PAINT  
ACCESS TO PAINT BOOTH  
PAINT MIXER  
STAFF LOCKERS FOR (6) SIX

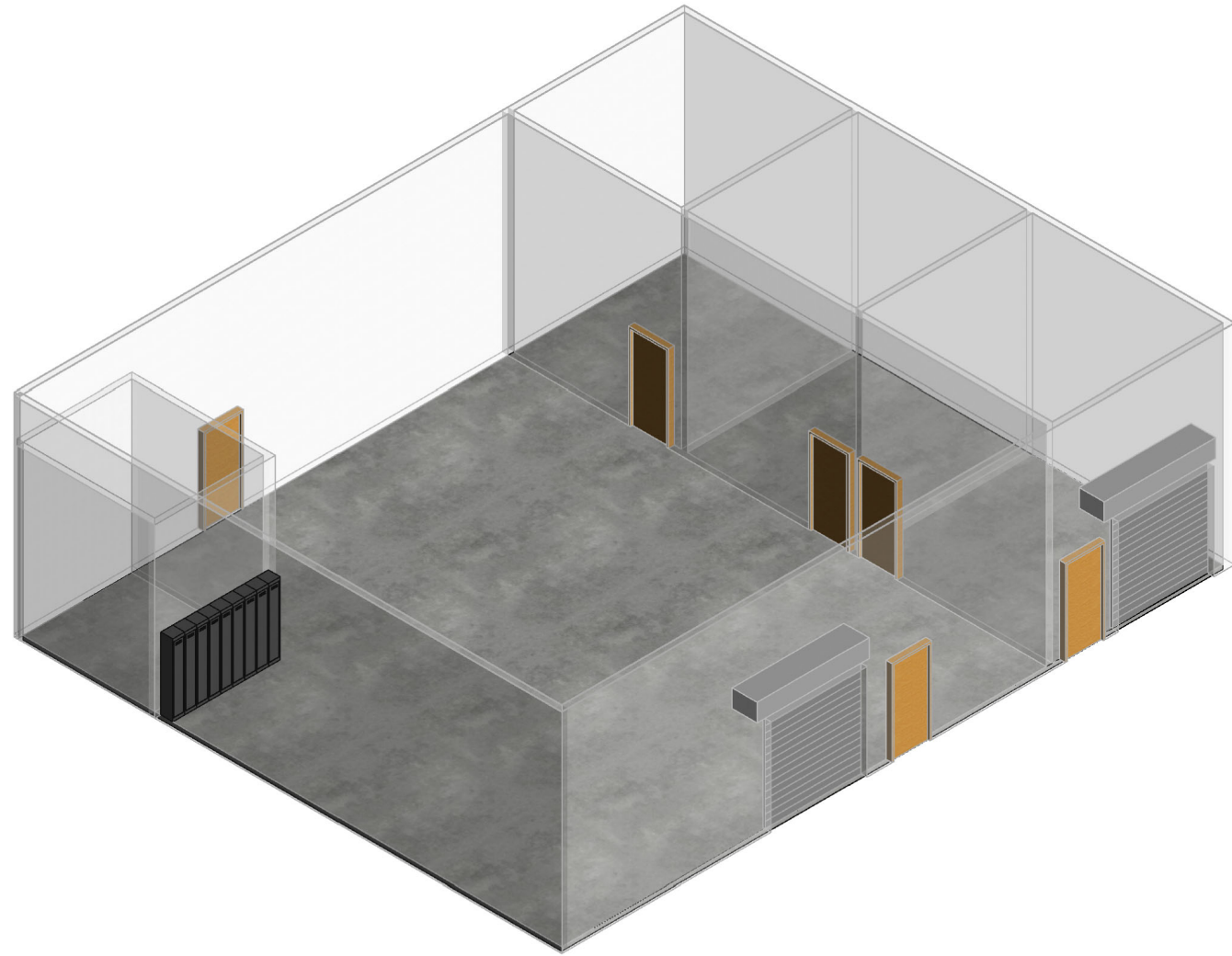
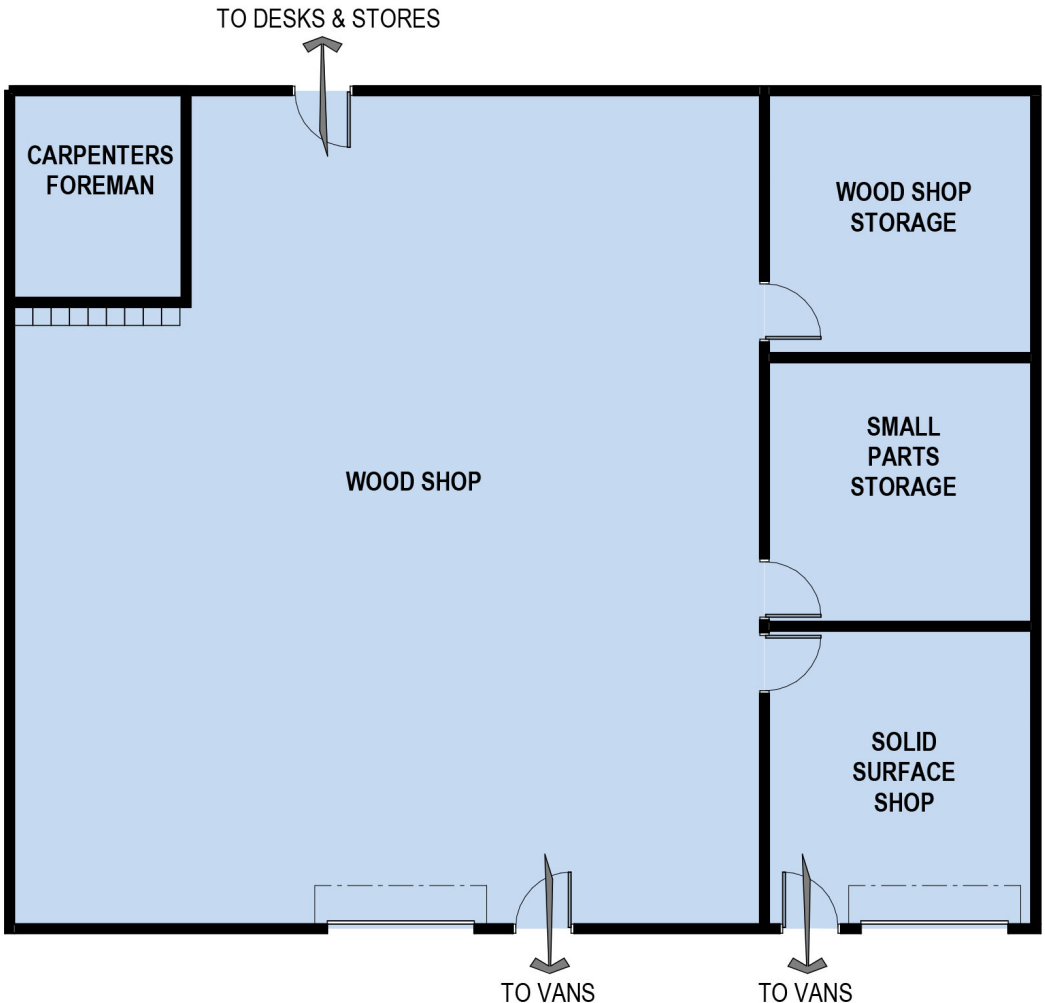


# CARPENTRY

- 2200SF SHOP
- 100SF OFFICE
- 200SF WOOD SHOP STORAGE
- 200SF SMALL PARTS STORAGE
- 300SF SOLID SURFACE SHOP

**TYPE OF WORK:** FABRICATION AND WOODWORK  
**KEY ADJACENCIES:** PAINT AND STORES  
**M/P/E REQUIREMENTS:** DUST COLLECTION SYSTEM  
**OCCUPANCY TYPE:** F-1: MODERATE-HAZARD FACTORY INDUSTRIAL

**NEEDS:**  
 CURRENT WOOD SHOP EQUIPMENT  
 SAFE CLEARANCES AROUND EQUIPMENT  
 STAFF LOCKERS FOR (14) FOURTEEN



## METAL SHOP

1200SF SHOP

**TYPE OF WORK:**

KEY ADJACENCIES:

M/P/E REQUIREMENTS:

OCCUPANCY TYPE:

METAL FABRICATION

USED BY MOST OF THE TRADES

FUME MITIGATION

F-2: HIGH-HAZARD FACTORY INDUSTRIAL

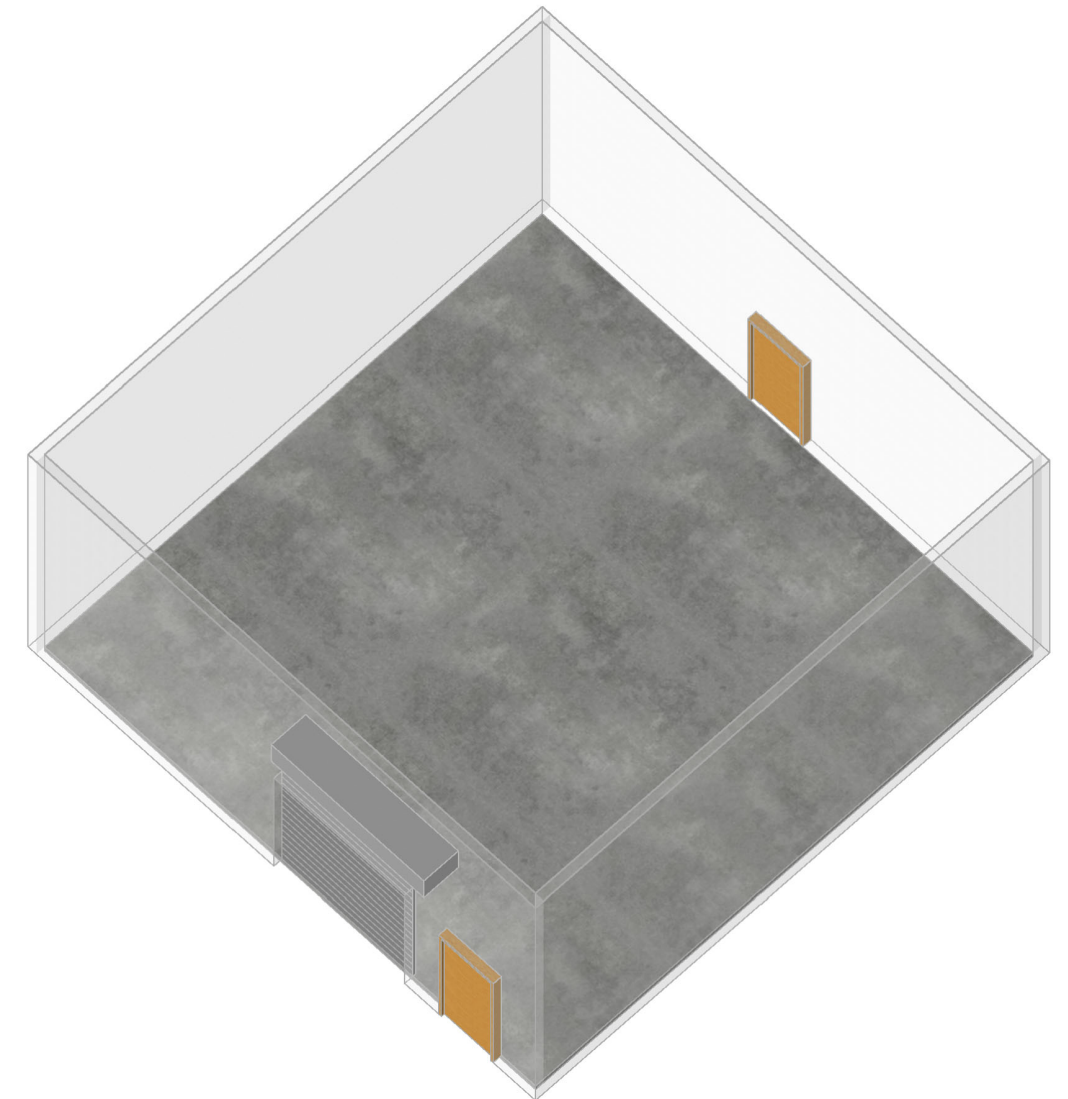
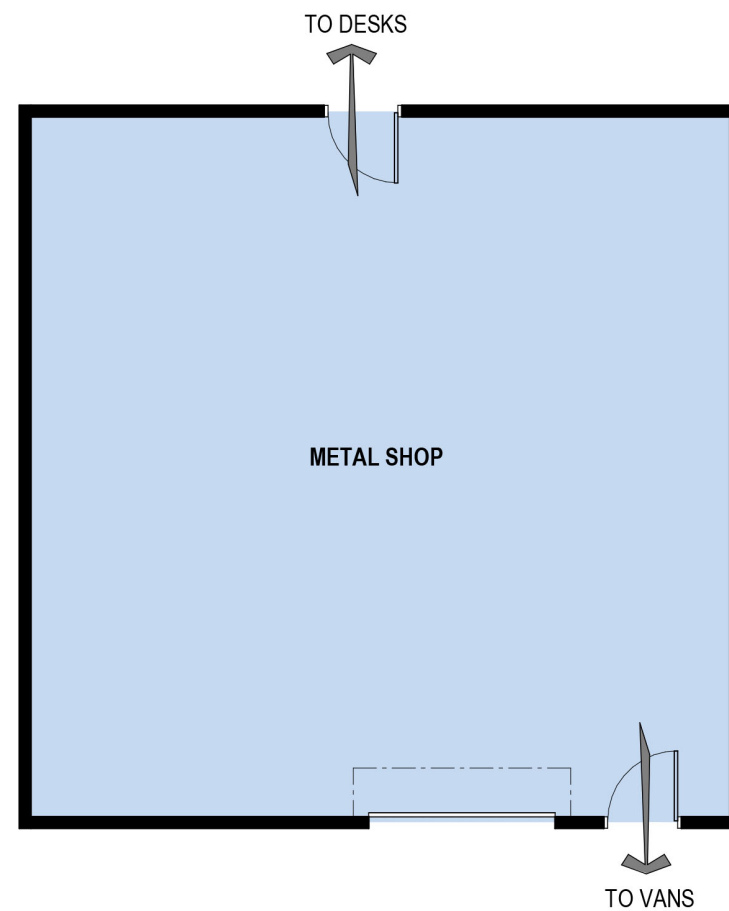
**NEEDS:**

INCLUSION OF EXISTING EQUIPMENT WITH SAFE CLEARANCES

INCLUDES 1 TON LIFT WHICH WILL REQUIRE FOUNDATION

ADDITION OF PIPE THREADER AND PIPE BENDER

CAT CARD ACCESS.

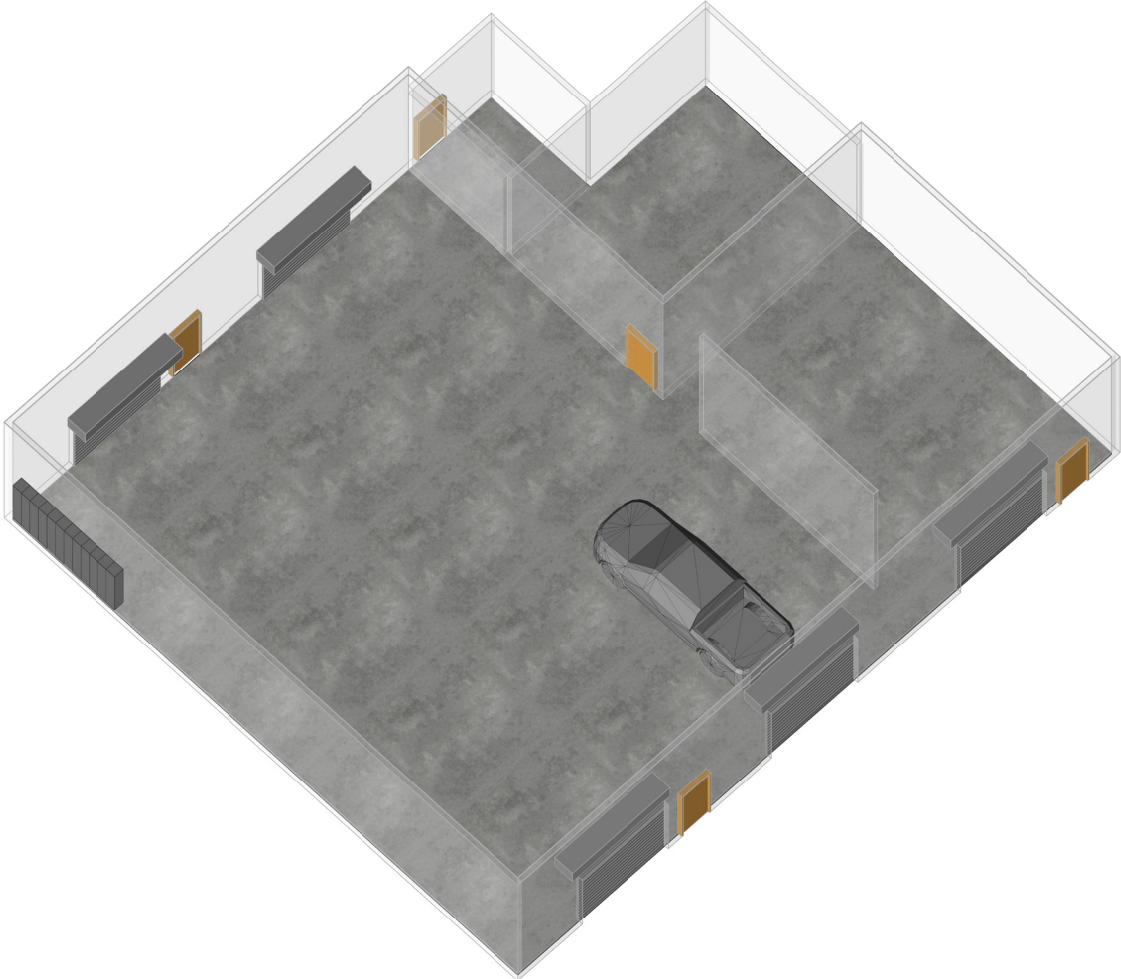
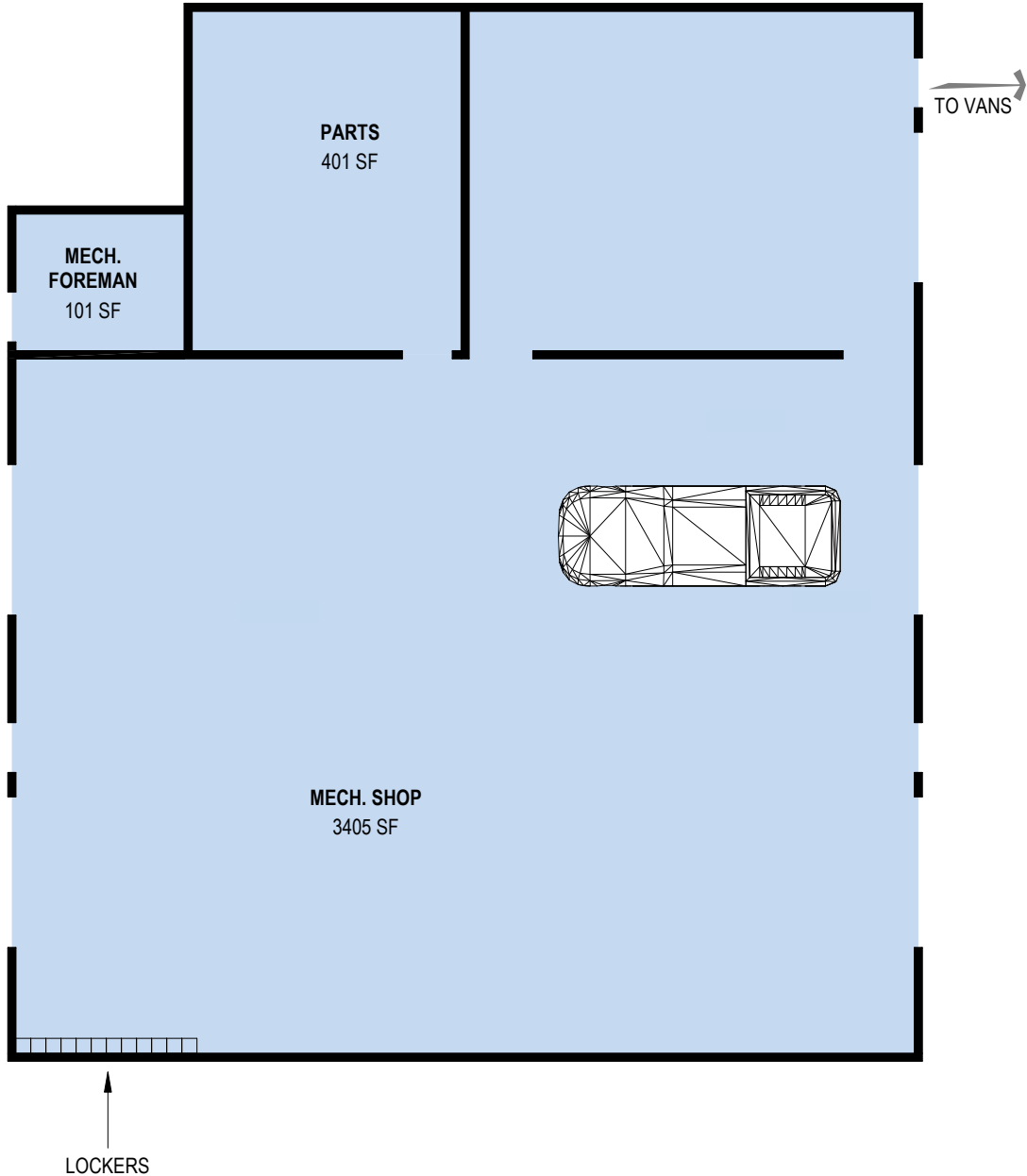


# MECHANICAL

3500SF SHOP  
100SF OFFICE  
400SF PARTS STORAGE  
- TIRE STORAGE IS ASSUMED TO BE OVERHEAD IN SHOP

**TYPE OF WORK:** VEHICLE REPAIR AND MAINTENANCE  
**KEY ADJACENCIES:** GROUNDS SHOP  
**M/P/E REQUIREMENTS:** EXHAUST MITIGATION  
**OCCUPANCY TYPE:** F-1: MODERATE-HAZARD FACTORY INDUSTRIAL

**NEEDS:**  
VEHICLE LIFTS (4)  
DRIVE THROUGH BAYS (4)  
SERVICE PIT IN ONE BAY  
SAFE FUEL HANDLING FACILITIES  
STAFF LOCKERS FOR (5) FIVE  
LAUNDRY DROP  
FUEL, TOOL, SMALL PARTS STORAGE.  
EXTERIOR TANKS FOR OIL STORAGE



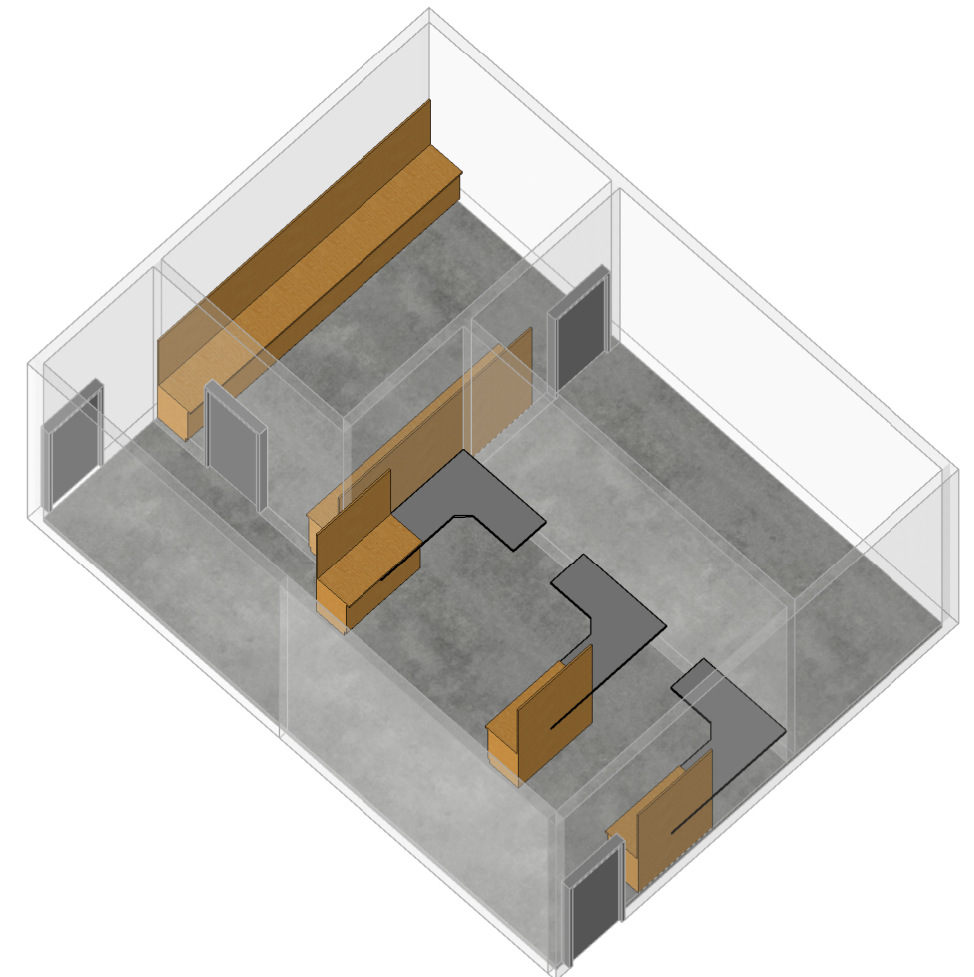
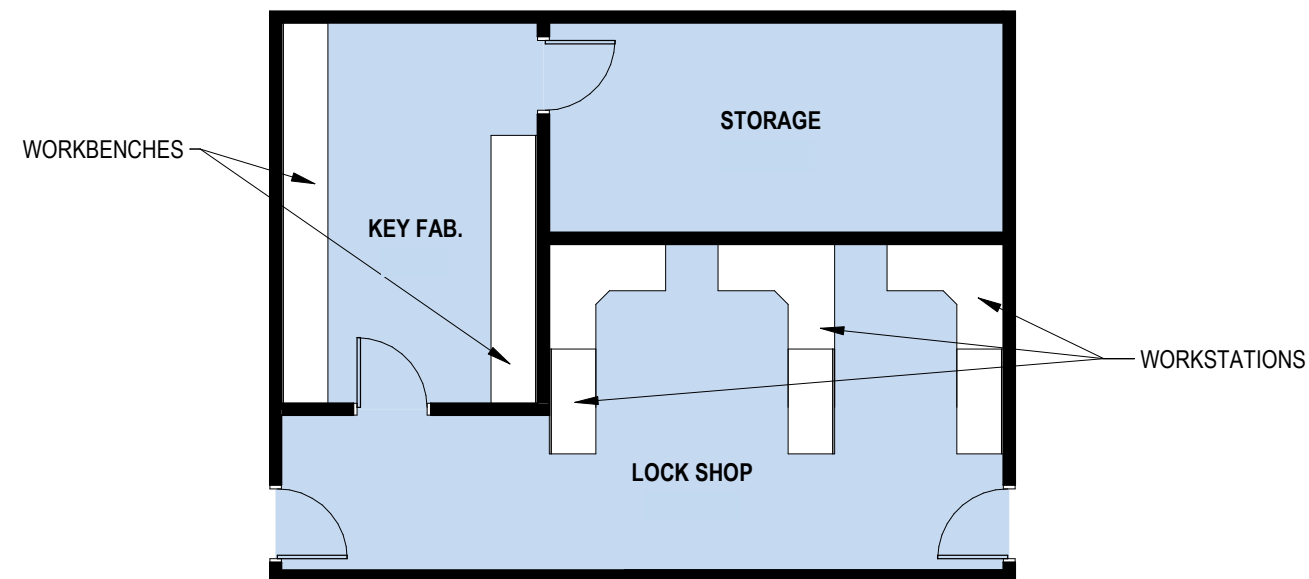


# LOCKSMITH

150SF KEY FABRICATION  
300SF OFFICE/STORAGE  
150SF SECURE STORAGE

**TYPE OF WORK:** KEY FABRICATION AND STORAGE  
**KEY ADJACENCIES:** RECEPTION, WORK CONTROL, CARPENTERS  
**M/P/E REQUIREMENTS:** TYPICAL  
**OCCUPANCY TYPE:** F-1: MODERATE-HAZARD FACTORY INDUSTRIAL

**NEEDS:**  
IN SHOP DESK SPACES  
SECURE KEY STORAGE ROOM  
WORKSTATIONS SHOULD HAVE ADJACENT BUT SEPARATE AREAS FOR COMPUTER WORK AND PHYSICAL WORK ON CORES AND LOCKSETS.  
REQUESTED REASONABLE PROXIMITY TO RESTROOM FOR HANDWASHING



# campus stores.

As it operates today, Campus Stores serves all specialty trades and university partners as a storefront for routinely needed equipment and materials. The building Campus Stores operates within is 4153 sf. In an effort to create efficiencies and to limit the total amount of storage space in the building, Stores will grow from its current size in order to consolidate storage space from the various trades. Campus Stores is being programmed at approximately 9,000SF with the intent of utilizing vertical palletized storage. This will allow Campus Stores to track inventory more efficiently, have the capacity to receive larger shipments of equipment and materials and will ultimately reduce the amount of space required by each trade.



Engineering & Utilities		
NSF	Qty	Total NSF
900	1	900
900	1	900
<b>Subtotal Administration</b>		<b>1,800</b>

Facilities Services		
NSF	Qty	Total NSF
900	1	900
900	1	900
900	1	900
300	1	300
350	1	350
<b>Subtotal Facilities Services</b>		<b>3,350</b>

Safety & Risk Management		
NSF	Qty	Total NSF
300	1	300
600	1	600
230	1	230
200	1	200
<b>Subtotal S&amp;RM Storage</b>		<b>1,330</b>

6,480 SF

66.7% 4,322 NSF

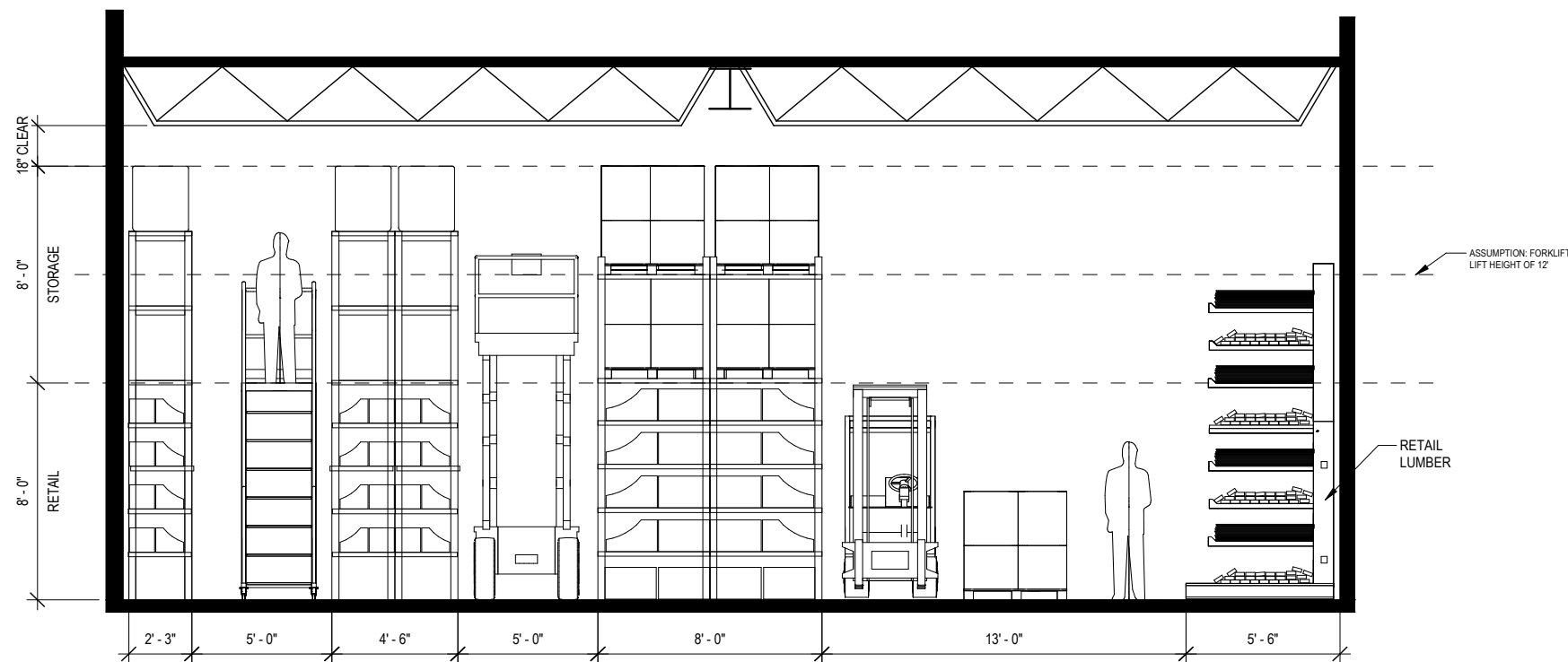
**TOTAL GSF 10,802**

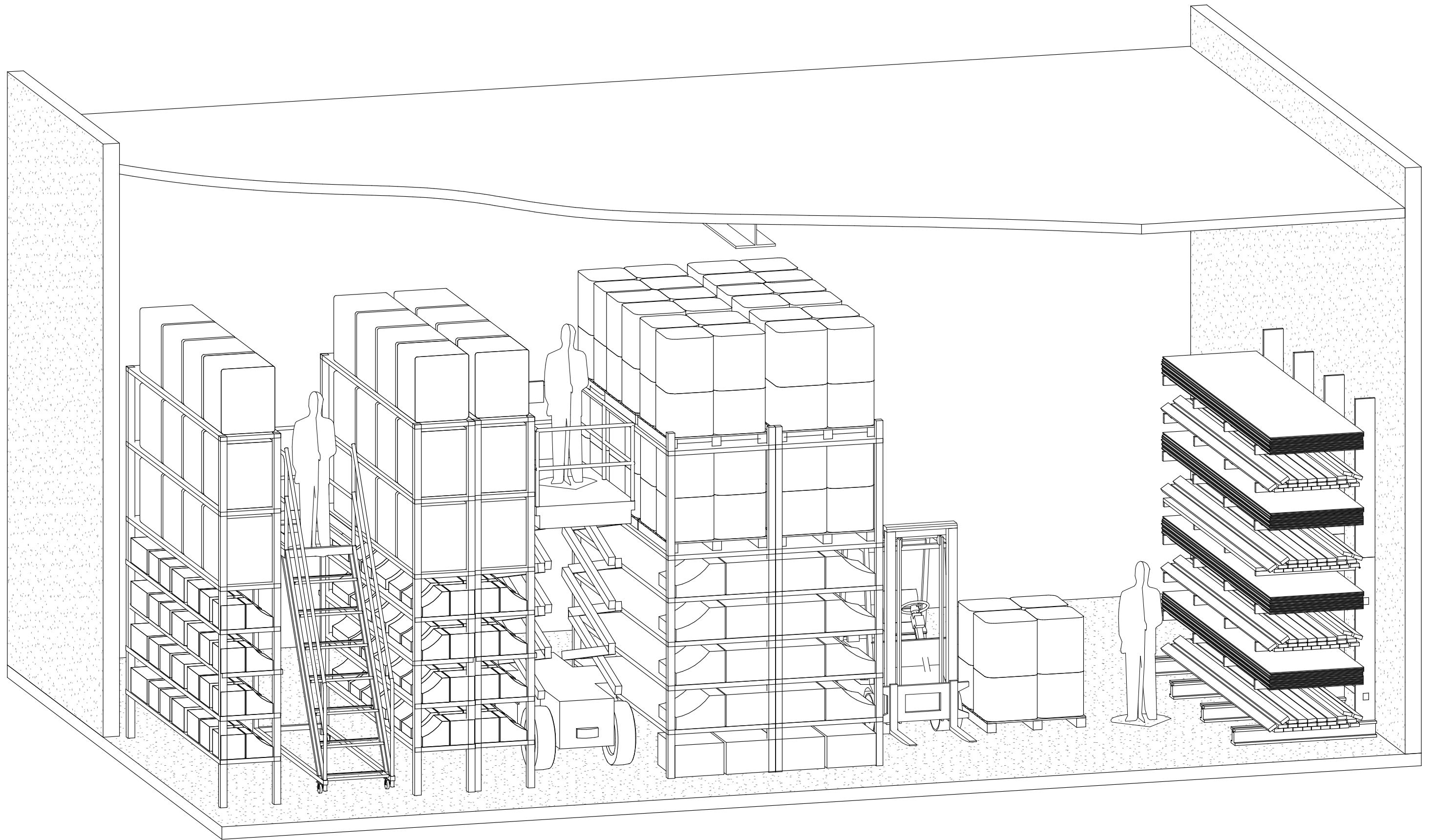
Business Operations		
NSF	Qty	Total NSF
3,600	1	3,600
3,360	1	3,360
<b>Subtotal Business Operations</b>		<b>6,960</b>

6,960 SF

66.7% 4,642 NSF

**TOTAL GSF 8,964**

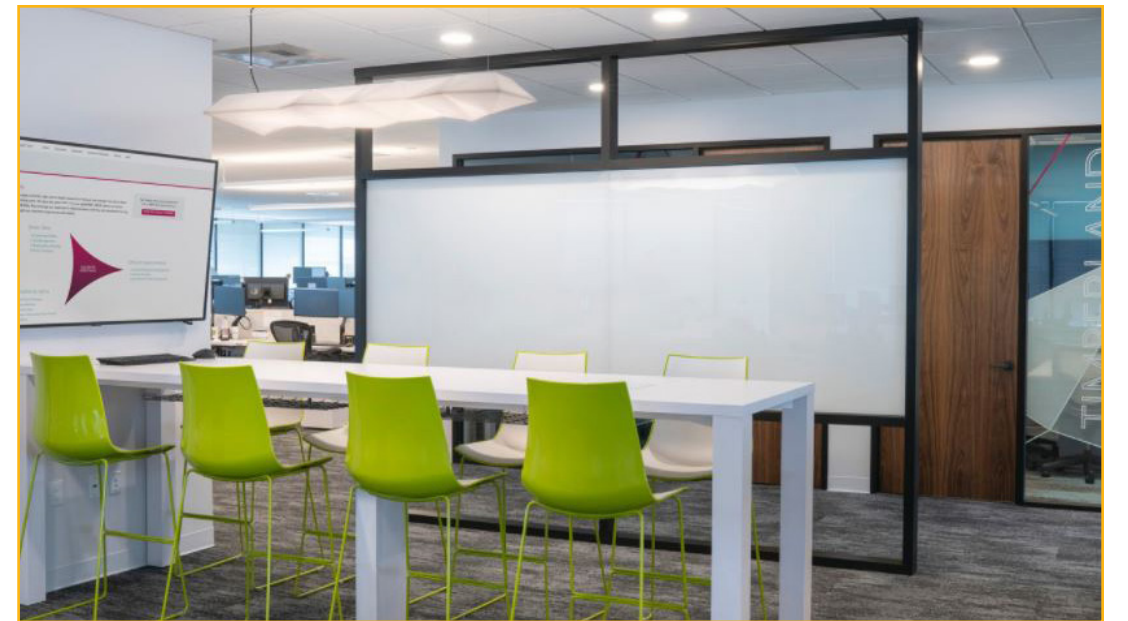




# office space.

One of the primary goals of the project is to reduce siloing between groups and to increase collaborative interactions. This alternative office layout will organize active solutions to be explored during schematic design. To address these priorities we are creating open office working environments where employees can interact actively and passively without the repetitive barriers of walls and doors. Private meeting rooms available throughout the office areas allow a more secluded environment to facilitate private conversation and opens the door to collaboration between the several different trade groups.





# code diagram.



**WOOD SHOP:**  
413.1.3: NEED TO PROVIDE INFORMATION TO THE BUILDING OFFICIAL TO SHOW THAT THE DUST COLLECTION SYSTEM DOES NOT PRESENT A FIRE OR EXPLOSION HAZARD. NOT SEEING A MAXIMUM AMOUNT IN TABLE 307.1(1), JUST WRITTEN DOCUMENTATION PER FOOTNOTE Q.

IF WE SATISFY THE BUILDING OFFICIAL- F-1 OCCUPANCY. IF NOT, H-2.

**STORES:**  
309.2: QUANTITY OF HAZARDOUS MATERIALS CANNOT EXCEED TABLE 414.2.5(1)

413: HIGH- PILED STOCK TO COMPLY WITH THE IFC

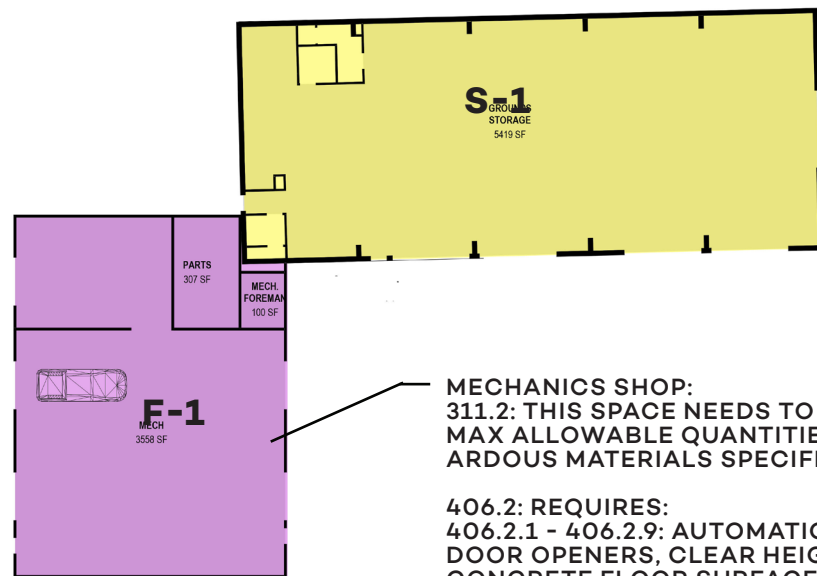
**PAINTERS SHOP:**  
307.1.1(1): APPLICATION OF FLAMMABLE FINISHES- NOT AN H OCCUPANCY AS LONG AS IT CONFORMS TO 416 AND THE IFC

ARE THERE ENOUGH FLAMMABLE LIQUIDS STORED HERE TO TRIGGER H OCCUPANCY?  
PAINT THINNERS? ACETONE? SIMILAR FLUIDS? SEE "COMBUSTIBLE LIQUID" IN TABLE 307.1(1). THE QUANTITY THRESHOLD IN THIS TABLE IS VERY HIGH, BUT IT IS WORTH ASKING THE QUESTION... SEE ALSO "FLAMMABLE LIQUID", "FLAMMABLE LIQUID, COMBINATION (IA, IB, IC)"

**PAINT BOOTH:**  
416.2: ENCLOSED WITH 1-HOUR FIRE BARRIER PER 707, OR HORIZONTAL ASSEMBLIES PER 711, OR BOTH. FLOOR SHALL BE WATER-PROOF AND DRAINED IN AN APPROVED MANNER. MUST COMPLY WITH SPECIAL SURFACES AND VENTILATION.

NEED TO VERIFY IF THIS IS A "SPRAY ROOM" PER 416.2 OR A "SPRAY BOOTH" PER 416.4. A SPRAY ROOM IS MORE RESTRICTIVE; THE 1 HOUR RATING IS NOT REQUIRED IF A "SPRAY BOOTH" IS PROVIDED.

**1 HR RATING PER TABLE 508.4, TYP.**



**MECHANICS SHOP:**  
311.2: THIS SPACE NEEDS TO COMPLY WITH MAX ALLOWABLE QUANTITIES OF HAZARDOUS MATERIALS SPECIFIED IN 307.1(1)

**406.2: REQUIRES:**  
406.2.1 - 406.2.9: AUTOMATIC GARAGE DOOR OPENERS, CLEAR HEIGHT > 7', CONCRETE FLOOR SURFACE SLOPED TO DRAIN, EV CHARGING PER NFPA 70 & UL 2202, UL 2594

**406.8:**  
406.8.1: VENTILATION PER IMC, CONTROLLED AT THE ENTRANCE OF THE GARAGE  
406.8.2: GAS DETECTION SYSTEM IS REQUIRED IF THERE IS ANY HYDROGEN, NON-ODORIZED LNG

**508.1**  
CHECK MIXED OCCUPANCIES- CAN WE COMBINE MECH SHOP WITH OTHER S-1 OCCUPANCIES? IS THERE AN ADVANTAGE TO DOING THIS?

# program spreadsheet.

## tabulated building program.

### PHASE 1

Engineering & Utilities			
	NSF	Qty	Total NSF
Director	110	1	110
Associate Director	100	1	100
<b>Engineering</b>			
University Engineer	65	1	65
Facilities Engineer	65	3	195
Growth Position	65	1	65
Student Intern	30	2	60
Project Library Storage	200	1	200
<b>Heating Plant &amp; Heat Maintenance</b>			
Heat Maintenance Foreman	100	1	100
Heating Plant Technicians Landing Spot	30	8	240
Growth Position	30	1	30
Heating Plant/Pipe Fitting Shop	400	1	400
Heating Plant/Pipe Fitting Storage	900	1	900
<b>Refrigeration Maintenance</b>			
Refrigeration Foreman	100	1	100
Refrigeration Workspaces	30	6	180
Growth Position	30	1	30
Refrigeration Shop	400	1	400
Refrigeration Storage	900	1	900
<b>Resource Management</b>			
Resource Conservation Specialist	65	1	65
<b>Subtotal Engineering &amp; Utilities</b>			<b>2,340</b>
In Consolidated Storage			1,800

Facilities Services			
	NSF	Qty	Total NSF
Director	110	1	110
Associate Director	100	1	100
<b>Custodial</b>			
Foreman	100	1	100
Workstations   Lockers	30	8	240
Growth Position	30	1	30
Hoteling Workstations	30	3	90
Chair Storage	900	1	900
Storage	900	1	900
Lamp Storage	900	1	900
Repair Work Area / Laundry	350	1	350
<b>Environmental Services</b>			
Environmental Services Manager	100	1	100
Foreman	100	1	100
Hoteling Workstations	30	8	240
Locker Area	50	1	50
Maintenance Shop	750	1	750
Equipment Garage	5,500	1	5,500

E-Waste			
	NSF	Qty	Total NSF
Recycling Coordinator	65	1	65
E-Waste	65	1	65
<b>Campus Maintenance</b>			
<b>Painters</b>			
Foreman	100	1	100
Workstations   Lockers	30	6	180
Paint Booth	330	1	330
Project Prep   Shop	200	1	200
Storage	200	1	200
Project Prep Storage	200	1	200
Wash Area	65	1	65
<b>Carpenters</b>			
Foreman	100	1	100
Workstations   Lockers	30	14	420
Wood Shop	2,200	1	2,200
Solid Surface Shop	300	1	300
Wood Shop Storage	200	1	200
Small Parts Storage	200	1	200
<b>Operations</b>			
Work Control Supervisor	110	1	110
Project Manager / Estimator	100	3	300
Maintenance Manager	100	1	100
Project Estimator	65	1	65
Preventative Maintenance Coordinator	65	1	65
AiM Coordinator	65	1	65
Dispatch / Contractor Key Check Out	65	2	130
<b>Electricians</b>			
Foreman	100	1	100
Workstations   Lockers	30	9	270
Growth Position	30	2	60
Electrician Shop	400	1	400
Storage	300	1	300
<b>Plumbers</b>			
Foreman	100	1	100
Workstations   Lockers	30	6	180
Growth Position	30	1	30
Plumbers Shop	400	1	400
Storage	350	1	350
Wet Test Space	85	1	85
<b>Laborers</b>			
Foreman	100	1	100
Workstations   Lockers	30	3	90
Equipment Storage	800	1	800
<b>Lock Shop</b>			
Workstations   Lockers	100	3	300
Key Fabrication	150	1	150
Storage	150	1	150
<b>Subtotal Facilities Services</b>			<b>16,635</b>
In Consolidated Storage			3,350

Safety & Risk Management			
	NSF	Qty	Total NSF
Storage 1 (Sharps)	300	1	300
Storage 2 (PPE)	600	1	600
Storage 4 (Back)	230	1	230
Storage 5 (Back)	200	1	200
<b>Subtotal Safety &amp; Risk Management</b>			<b>0</b>
In Consolidated Storage			1,330

Business Operations			
	NSF	Qty	Total NSF
<b>Campus Stores</b>			
Offices	100	1	100
Workstations	65	3	195
Inventory Storage	3,600	1	3,600
Warehouse Storage	3,360	1	3,360
<b>Subtotal Business Operations</b>			<b>295</b>
In Consolidated Storage			6,960

Building Services			
	NSF	Qty	Total NSF
Conference Room	300	4	1,200
Break Room	900	1	900
Covered Dock	600	1	600
Main Custodial / Receiving Room	800	1	800
Mechanical Room	1,000	1	1,000
Custodial	60	2	120
Electrical Room	600	1	600
MDF	100	1	100
Individual Locker Room	150	2	300
Restrooms (Men)	300	1	300
Restrooms (Women)	300	1	300
Toilet (Individual)	85	2	170
<b>Subtotal Building Services</b>			<b>6,390</b>

25,660 NSF

28.0% 7,185 SF

Storage SF 8,964

CONSTRUCTION COST

TOTAL GSF 41,809



# tabulated building program.

## PHASE 2

Planning, Design, & Construction			
	NSF	Qty	Total NSF
<b>Administration</b>			
Director	110	1	110
Associate Director	100	1	100
<b>Planning</b>			
Planning Manager	100	1	100
Campus Planner	65	3	195
GIS / CADD Technician	65	4	260
Student Intern	30	2	60
Space Planner	65	1	65
<b>Design</b>			
University Architect	100	1	100
Professional Design Staff	65	3	195
Sustainability Director	100	1	100
<b>Construction</b>			
Construction Manager	100	1	100
Project Manager	65	6	390
Project Coordinator	65	3	195
<b>Subtotal Planning, Design, &amp; Construction</b>			<b>1,970</b>
In Consolodated Storage			0

Facilities Services			
	NSF	Qty	Total NSF
<b>E-Waste</b>			
E-Waste Shop / Storage	600	1	600
Workstation	65	1	65
<b>Mechanics</b>			
Foreman	100	1	100
Workstations   Lockers	30	2	60
Hoteling Workstations	30	2	60
Mechanic Shop	3,500	1	3,500
Tire Storage	0	1	0
Parts Storage	400	1	400
<b>Carpenters</b>			
Welding/Metal Working Shop	1,200	1	1,200
<b>Subtotal Facilities Services</b>			<b>5,985</b>
In Consolodated Storage			0

Business Operations			
	NSF	Qty	Total NSF
<b>Budget</b>			
Director	110	1	110
Budget and Financial Services Manager	65	1	65
Budget Analyst	65	1	65
Workstations	65	3	195
<b>IT</b>			
Operations IT Manager	100	1	100
System Administrator	65	1	65
Computer Support	65	2	130
Programmer	65	1	65
Student Interns	30	2	60
<b>Fiscal Shared Services Oversight</b>			
Manager	65	1	65
Accountants	65	1	65
<b>Contracts</b>			
Contract Administrator	65	1	65
Contract Specialist	65	1	65
<b>Real Estate</b>			
Real Estate Manager	100	1	100
<b>Subtotal Business Operations</b>			<b>1,215</b>
In Consolodated Storage			0

Building Services			
	NSF	Qty	Total NSF
Conference Room	300	1	300
Large Conference   Training	1,200	1	1,200
Custodial	60	1	60
MDF	100	1	100
Restrooms (Men)	300	1	300
Restrooms (Women)	300	1	300
<b>Subtotal Building Services</b>			<b>2,260</b>

12,980 NSF

35.0% 4,543 SF

CONSTRUCTION COST

TOTAL GSF 17,523

# project estimate.

The design team has worked to define a phased approach to the project that will meet the University's immediate needs of; providing a utility tunnel for future development along 7th Avenue, removing all existing Facilities Management buildings from the area between 6th and 7th Avenues, and staying within a total project cost of \$25M.

Phase 1 includes:

- The construction of 700 linear feet of utility tunnel under 7th Avenue with a construction cost of approximately \$4,100,000
- The renovation of the existing 6,000 GSF Records Storage Building to accommodate Grounds with a construction cost of approximately \$200,000
- The construction of a 36,000 GSF Facilities Management building with a construction cost of approximately \$14,400,000. The design team has used the cost of \$400/SF to reach this rough order of magnitude cost.

Phase 2 includes:

- Approximately 17,500 GSF of additional space to accommodate all of the current residents of Plew, the office components of Safety and Risk Management, the Mechanics shop, and the Metal Shop.

The Project Cost Control spreadsheet to the right was prepared by McKinstry showing a detailed breakdown of the overall project cost.

PROJECT COST CONTROL		
Category of Work	Approved/Initial Budget	Notes
<b>Construction Costs</b>		
Permit Costs within Construction Estimate		
7th Tunnel Construction - 700 LF tunnel, 8'widex10'tall	\$3,528,000	
Tunnel Pipe Allowance - Geothermal + IT conduit + irrigation	\$585,200	
Demolition - Faculty Court Houses	\$143,000	
Demolition - Faculty Court Modulares (2) and Roads	\$122,000	
Relocation - Faculty Court Modulares (2)	\$49,500	
Demolition - 22 storage sheds, Relocate Nursery	\$0	\$196,800 paid for by Athletics
Demolition - Facilities Yard Buildings	\$0	\$498,000 paid for by Gallatin College
Facilities Yard - Infill Bldg Footprints w/Gravel	\$0	N/A assuming Gallatin College gets built
<b>FML Building</b>	\$0	
One Floor	\$14,000,000	
Plew Building Renovation	\$0	
Sitework	\$750,000	
Research Space Allowance/Moving Cost	\$200,000	
<b>Miscellaneous Construction Fees</b>		
IBC Special Inspections	\$35,000	
Pre-Construction Disposal Costs	\$20,000	
Commissioning	\$30,000	
<b>Facilities Services Trades</b>		
MSU Plan Review	\$20,000	
MSU Training budget & Construction Support	\$30,000	
<b>Technology Items</b>		
Digitize Records Building Contents	\$150,000	
UIT Construction Costs	\$50,000	
<b>Furniture Fixtures &amp; Equipment</b>		
FF&E budget	\$0	
<b>Consultant Fees</b>		
A&E Design(10% of construction)	\$1,886,320	
Historic Property Record Consultant	\$30,000	
<b>Miscellaneous Design Fees</b>		
Geotechnical Report	\$30,000	
Hazardous Materials Report/Construction Administration	\$52,500	
<b>Miscellaneous Project Expenses</b>		
Parking Displacement and Construction Staging	\$0	
DEQ fees/Environmental Fees	\$40,000	
Public Art	\$50,000	
MSU Building Signs (2)	\$8,000	
Construction Utilities	\$75,000	
Advertising GC/CM RFQ/P	\$500	
Moving Budget/Mergenthaler	\$80,000	
<b>Owner Permitting &amp; Fees</b>		
City of Bozeman Plan Review & Permit Fees	\$70,000	
City of Bozeman Impact Fees	\$117,000	\$39k fire impact fee, \$78k transportation
<b>Project Administration Fees</b>		
Owner's Representative (3.5% of total project)	\$875,000	
CPDC Supervision fee 1%	\$0	
<b>Contingency</b>		
Contingency 10%	\$1,886,320	
<b>TOTALS</b>	<b>\$24,913,340</b>	

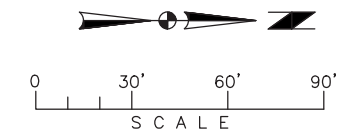
**tunnel.**

# tunnel location plan.

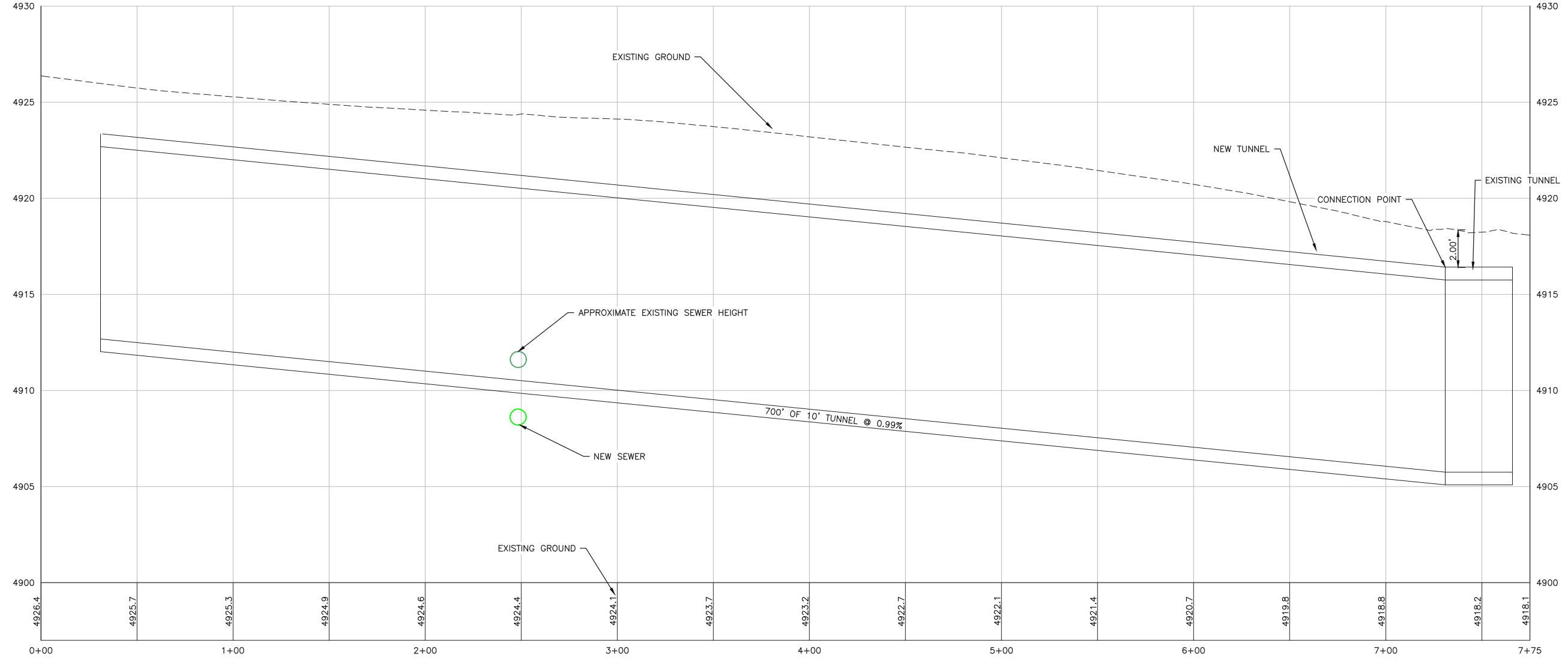
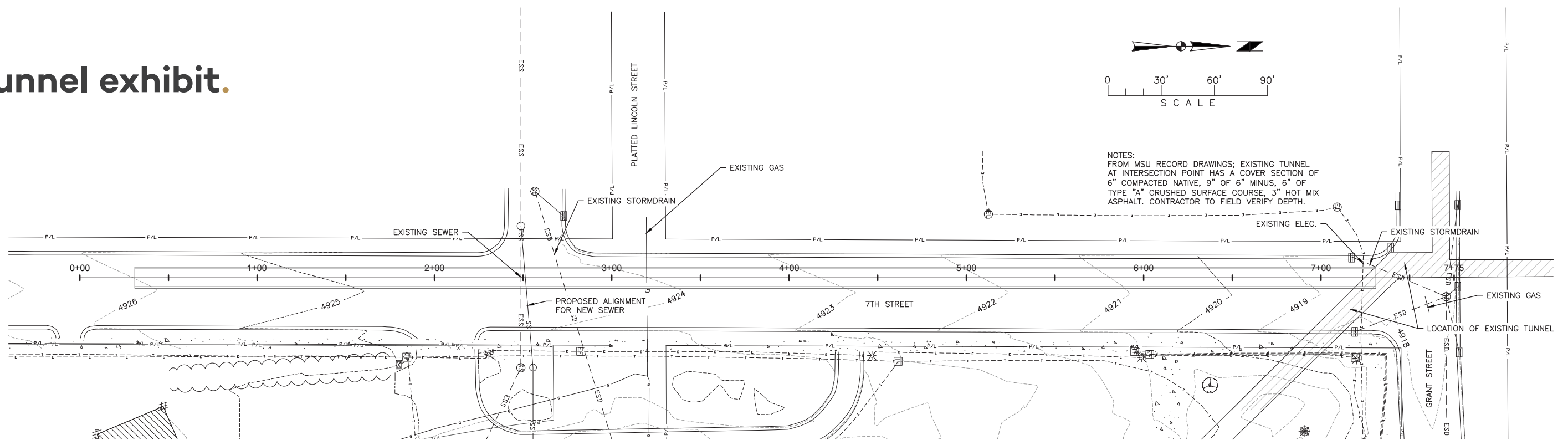
A conceptual design study for an expansion to the existing MSU tunnel system was completed by TD&H Engineering. The result of this study is the recommendation that there be a 700' long tunnel constructed under 7th Avenue extending south from the intersection with Grant Street. Conceptual design and the initial cost estimates are based on a tunnel that matches the existing Rendezvous tunnel in construction method, section and racking.



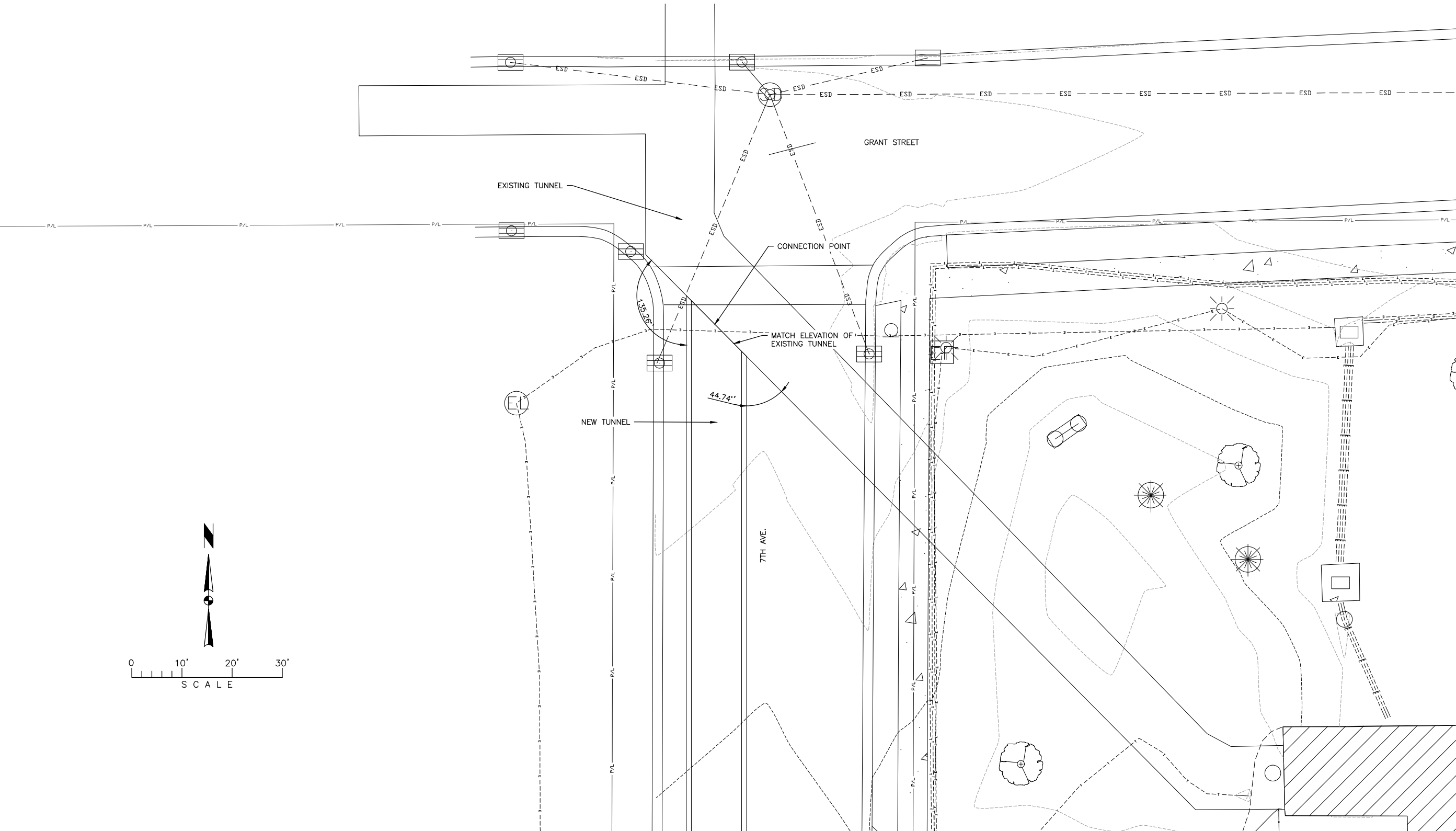
# tunnel exhibit.



NOTES:  
FROM MSU RECORD DRAWINGS; EXISTING TUNNEL  
AT INTERSECTION POINT HAS A COVER SECTION OF  
6" COMPACTED NATIVE, 9" OF 6" MINUS, 6" OF  
TYPE "A" CRUSHED SURFACE COURSE, 3" HOT MIX  
ASPHALT. CONTRACTOR TO FIELD VERIFY DEPTH.



# connection to existing tunnel.





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