# THE PRIMARY CHILDREN'S AND FAMILIES' CANCER RESEARCH CENTER

## AT HUNTSMAN CANCER INSTITUTE

**Program Document**

ARCHITECTURAL nexus
JACOBS Consultancy

**HUNTSMAN CANCER RESEARCH INSTITUTE PHASE IV**
**CHILDREN'S AND FAMILIES' CANCER RESEARCH CENTER**
**AT THE UNIVERSITY OF UTAH**
**DFCM #13336750**

## UNIVERSITY OF UTAH REVIEW SIGNATURES

We have reviewed the program and warrant that it adequately represents our request for a facility to fulfill our mission and programmatic needs. All appropriate parties in the agency have reviewed it for completeness and accuracy.

Mary Beckerle, PhD, Ralph E. & Willa T. Main Presidential Professor / CEO & Director, Huntsman Cancer Institute / Associate VP for Cancer Affairs, University of Utah — Date

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## DIVISION OF FACILITIES CONSTRUCTION AND MANAGEMENT REVIEW SIGNATURES

We have reviewed the program jointly prepared with the University of Utah and the Huntsman Cancer Institute, for completeness and accuracy. These signatures do not necessarily represent an endorsement for the need of this requested space at this time.

David A. McKay, Program Director DFCM — Date

# 0 Architectural Facilities Program

Participants

## PARTICIPANTS

The following is a list of various individuals and groups represented during the Programming Phase.

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## 1.1 HUNTSMAN CANCER INSTITUTE MISSION STATEMENT

*Huntsman Cancer Institute's mission is to understand cancer from its beginnings, to use that knowledge in the creation and improvement of cancer treatments, to relieve the suffering of cancer patients, and to provide education about cancer risk, prevention, and care.*

## 1.2 SUMMARY OF EXISTING FACILITIES AND PROGRAM

The following paragraphs highlight the history of development of the Huntsman Cancer Institute Facilities.

**Phase I (Research and Clinical Building)**
Planning started in 1994 with occupancy in early 1999. The building eventually included 30 investigator teams in the wet research laboratories and was supported by dry research groups and the institute's administrative offices. The building is supported by a large food services and dining facility. Phase I also houses the large 324 seat auditorium and an outpatient clinic center on level 2. Phase I consists of 238,000 GSF. A parking structure was built along with the Phase I building.

**Phase II (Cancer Hospital and Clinic Building)**
The Huntsman Cancer Institute phase II expansion planning started in 2000 with occupancy in 2003. The building expanded the institute's outpatient clinics and afforded the ability to provide full inpatient care. Phase II totaled 286,000 GSF. The building allowed for 50 inpatients, surgical services, Radiation Therapy, Imaging and food services. An additional conference center was added. This addition allowed for closer ties between research and clinical care of patients. Phases I and II are connected at the clinical floor and the sixth floor connecting the auditorium, food services and the conferencing center.

**Phase III (Cancer Hospital and Clinic Building Expansion)**
The Huntsman Cancer Institute and Hospital started a third building (expansion) in 2005 with occupancy in 2009. The expansion was 174,000 GSF. The expansion increased the inpatient component to 100 which included a bone marrow transplant unit and a critical care unit. Surgical capabilities were enhanced along with the expansion of imaging and clinical care areas.

**Proposed Phase IV (Research Building)**
The Huntsman Cancer Institute presently is looking to expand their research capabilities in Family and Pediatric cancer research. The proposed phase IV building will be 220,000 GSF and eventually house 30 new investigator teams and increase the dry research capabilities. The building occupancy presently is planned for April of 2017.

# 1 Executive Summary

Project Description

## 1.3 PROJECT DESCRIPTION

### 1.3.1 Total Facility Summary

The matrix below outlines the total facility net square feet (NSF) and designated gross square feet (DGSF) per level in the The Primary Children's & Families' Cancer Research Center at Huntsman Cancer Institute facility.

### 1.3.2 Space and Area Program Summary

The following pages include data for total net square feet (NSF) and designated gross square feet (DGSF) per space/area in the phase IV facility.

| Space Summary | | Phase IV New Construction | | | Renovation of Phase I | | | |
|---|---|---|---|---|---|---|---|---|
| No. | Unit | NSF | Factor | DGSF | NSF | Factor | DGSF | Comments |
| 1 | Level A | 29,766 | 1.20 | 35,720 | 3,632 | 1.10 | 4,000 | |
| 2 | Level 01 | 24,288 | 1.22 | 29,630 | 1,592 | 1.25 | 1,990 | |
| 3 | Level 02 | 25,735 | 1.18 | 30,370 | 5,285 | 1.20 | 6,340 | |
| 4 | Level 03 | 26,751 | 1.18 | 31,570 | 600 | 1.10 | 660 | |
| 5 | Level 04 | 26,691 | 1.18 | 31,500 | - | 1.20 | - | |
| 6 | Level 05 | 26,507 | 1.15 | 30,480 | - | 1.20 | - | |
| 7 | Level 06 | 27,806 | 1.10 | 30,590 | 600 | 1.10 | 660 | |
| | | NSF | | DGSF | NSF | | DGSF | |
| | **Totals** | **187,544** | | **219,860** | **11,709** | | **13,650** | |
| | **Circulation (main Corridors only)** | | 2% | **4,397** | | 2% | **273** | |
| | | | | | | | | |
| | **Building Gross Area** | | | **224,257** | | | **13,923** | |
| | | | | 1.20 | | | 1.19 | |

| Level A | | Phase IV New Construction | | | Renovation of Phase I | | | |
|---|---|---|---|---|---|---|---|---|
| **No.** | **Description** | **Qty** | **NSF** | **Total** | **Qty** | **NSF** | **Total** | **Comments** |
| | **Mechanical Spaces** | | | | | | | |
| 1 | High Temp Water Room | 1 | 800 | 800 | | | | 2 exits from room |
| 2 | Mechanical Room (pumps, heat exchangers, plate and frame exchangers and pure water systems | 1 | 8,000 | 8,000 | | | | Mech pumps, Heat exchangers, plate and frame exchangers and pure water systems |
| | **Electrical Spaces** | | | | | | | |
| 1 | Main Electrical Room | 1 | 1,200 | 1,200 | | | | 2 exits |
| 2 | Remote Electrical Panel Room | 1 | 110 | 110 | | | | |
| | **Informatics Spaces** | | | | | | | |
| 1 | Level A IT Room | 2 | 120 | 240 | | | | |
| | | | | | | | | |
| | | 1 | 110 | 110 | | | | |
| | **Subtotal** | | | **10,460** | | | | |
| | **Dock Spaces (Interior)** | | | | | | | |
| 1 | Exterior upper dock and ramp | 1 | 800 | 800 | | | | |
| 2 | Dock Office | 1 | 130 | 130 | | | | |
| 3 | Mail Room | 1 | 64 | 64 | | | | |
| 4 | Receiving area | 1 | 1,300 | 1,300 | | | | |
| 5 | Cryo Storage (Freezer Room) | 1 | 800 | 800 | | | | |
| 6 | Stock Room | 1 | 600 | 600 | | | | |
| 7 | Furniture Storage | 0 | 600 | 600 | | | | |
| 8 | Delivery cart storage space | 1 | 100 | 100 | | | | |
| 9 | Toilet Room | 1 | 56 | 56 | | | | |
| 10 | Secure mechanics work area, tool storage | 1 | 700 | 700 | | | | |
| 11 | Gas Cylinder Storage Out Going | 1 | 120 | 120 | | | | |
| 13 | Hazardous Material Storage | 1 | 200 | 200 | | | | |
| 12 | Gas Cylinder Room | 1 | 200 | 200 | | | | |

# 1 Executive Summary

## Project Description

| Level A | | Phase IV New Construction | | | Renovation of Phase I | | | |
|---|---|---|---|---|---|---|---|---|
| No. | Description | Qty | NSF | Total | Qty | NSF | Total | Comments |
| 13 | Equipment Area | 1 | 400 | 400 | | | | |
| 14 | Rebuild Cooling Towers PH 1 | | | | 2 | 816 | 1632 | Built at east side of dock |
| | **Subtotal** | | | **6,070** | | | | |
| | **Dock Spaces (Exterior)** | | | | | | | |
| 1 | Truck Area | | | - | | | | 6000 SF exterior space |
| 2 | Generator Space | | | - | | | | 400 SF (Possible 2000KW Generator) Exterior space |
| | **Vivarium Spaces** | | | | | | | |
| 1 | Vivarium Zebra Fish holding and injection area | 1 | 1,540 | 1,540 | | | | |
| 2 | Zebra Fish Procedure Rooms | 2 | 120 | 240 | | | | |
| 3 | Zebra Fish Equipment Room | 1 | 410 | 410 | | | | |
| 4 | Zebra Fish Kitchen | 1 | 320 | 320 | | | | |
| 5 | Zebra Fish Storage | 1 | 170 | 170 | | | | |
| 6 | Imaging MRI | 1 | 400 | 400 | | | | |
| 7 | Imaging MRI Observation Console | 1 | 100 | 100 | | | | |
| 8 | Imagining MRI Equipment Room | 1 | 150 | 150 | | | | |
| 9 | Imaging MRI Prep | 1 | 150 | 150 | | | | |
| 10 | Imaging Micro CT | 1 | 120 | 120 | | | | |
| 11 | Imaging Imcro Spec | 1 | 120 | 120 | | | | |
| 12 | Imaging Intravital Microscopy | 1 | 200 | 200 | | | | |
| 13 | Imaging Ultrasound | 1 | 120 | 120 | | | | |
| 14 | Imaging Computer Room | 1 | 200 | 200 | | | | |
| 15 | Imaging PET | 1 | 330 | 330 | | | | |
| 16 | Imaging Hot Holding | 1 | 70 | 70 | | | | |
| 17 | Imaging Hot Procedure | 1 | 120 | 120 | | | | |
| 18 | Imaging General Lab | 1 | 500 | 500 | | | | |

| Level A | | Phase IV New Construction | | | Renovation of Phase I | | | |
|---|---|---|---|---|---|---|---|---|
| No. | Description | Qty | NSF | Total | Qty | NSF | Total | Comments |
| 19 | Imaging Office | 1 | 120 | 120 | | | | |
| 20 | Imaging Mice Holding | 3 | 150 | 450 | | | | |
| 21 | Imaging Internal Circulation | 1 | 600 | 600 | | | | |
| 22 | Imaging Gas Cylinder Closet | 1 | 50 | 50 | | | | |
| 23 | Break Room | 1 | 320 | 320 | | | | |
| 24 | House Keeping | 1 | 80 | 80 | | | | |
| 25 | Toilet Rooms/Locker Room | 2 | 189 | 378 | | | | Male and Female includes lockers and one shower each |
| 26 | Vivarium Tunnel Connection | | | | 1 | 2,000 | 2,000 | Connecting tunnel for Phase 1 Vivarium |
| 27 | Imaging Gas Cylinder Circulation | 1 | 50 | 50 | | | | |
| | **Subtotal** | | | **7,308** | | | | |
| | **Cyclotron Space** | | | | | | | |
| 1 | Cyclotron Room | 1 | 820 | 820 | | | | |
| 2 | Hot Cell / Lab Room | 1 | 560 | 560 | | | | |
| 3 | Clean Room Ante Room | 1 | 80 | 80 | | | | |
| 4 | Clean Room | 1 | 190 | 190 | | | | |
| 5 | Shipping Room | 1 | 240 | 240 | | | | |
| 6 | Ante Room to Cell Lab and Clean Room | 1 | 80 | 80 | | | | |
| 7 | Lab | 1 | 200 | 200 | | | | |
| 8 | Tank Room | 1 | 150 | 150 | | | | |
| 9 | Electronics Room | 1 | 290 | 290 | | | | |
| 10 | QC Lab | 2 | 330 | 660 | | | | |
| 11 | Clean Storage | 1 | 260 | 260 | | | | |
| 12 | Entry Area to Unit | 1 | 150 | 150 | | | | |
| 13 | Offices | 1 | 140 | 140 | | | | |
| 14 | Toilet Room | 2 | 80 | 160 | | | | |
| 15 | House Keeping | 1 | 60 | 60 | | | | |

# 1 Executive Summary

## Project Description

| Level A | | Phase IV New Construction | | | Renovation of Phase I | | | |
|---|---|---|---|---|---|---|---|---|
| **No.** | **Description** | **Qty** | **NSF** | **Total** | **Qty** | **NSF** | **Total** | **Comments** |
| 16 | Radioactive Decay Storage Room | 1 | 80 | 80 | | | | Vented to roof |
| | **Subtotal** | | | **4,120** | | | | |
| | **Common Spaces** | | | | | | | |
| 1 | Passenger Elevators | 4 | 80 | 320 | | | | Full Height |
| 2 | Freight Elevators | 2 | 120 | 240 | | | | One full height and one to level four |
| 3 | Stair Towers | 4 | 312 | 1,248 | | | | Two full height and two to level four |
| | **Subtotal** | | | **1,808** | | | | |
| | | | | | | | | |
| | **SUBTOTAL LEVEL 'A'** | | | **29,766** | | | **3,632** | |
| | | | | | | | | |
| | **Sub Total Net SF (NSF)** | | | **29,766** | | | **3,632** | **33,398** |
| | **Net to Gross Ratio** | | | **1.20** | | | **1.10** | **1.23** |
| | **Department Gross SF (DGSF)** | | | **35,720** | | | **4,000** | **40,860** |

| Level 1 | | Phase IV New Construction | | | Renovation of Phase I | | | |
|---|---|---|---|---|---|---|---|---|
| No. | Description | Qty | NSF | Total | Qty | NSF | Total | Comments |
| | **Lab Support Space** | | | | | | | |
| 1 | Glass Washing | 1 | 1600 | 1,600 | | | | Central Glass Wash for Phase IV |
| 2 | General Storage | 1 | 500 | 500 | | | | General laboratory supplies |
| 3 | Micro Array | 1 | 440 | 440 | | | | |
| 4 | Chemical Storage | 1 | 300 | 300 | | | | Central for Phase IV, vented flammable cabinets and corrosive storage cabinets |
| | **Subtotal** | | | **2,840** | | | | |
| | **Coffee Shop/Grab and Go Station** | | | | | | | |
| 1 | Backbar Counter Area/Cashier Stand | 1 | 270 | 270 | | | | Secured in off hours |
| 2 | Workroom | 1 | 180 | 180 | | | | |
| 3 | Storage Room | 1 | 380 | 380 | | | | |
| 4 | Office | 1 | 120 | 120 | | | | |
| 5 | Interior Seating Area | 60 | 20 | 1,200 | | | | Seating for up to sixty |
| 6 | Grab and Go Cases | 1 | 100 | 100 | | | | Secured in off hours |
| | **Subtotal** | | | **2,250** | | | | |
| | **Mechanical Spaces** | | | | | | | |
| 1 | Return Air Shafts | 1 | 32 | 32 | | | | |
| 2 | Supply Air Shafts | 2 | 56 | 112 | | | | |
| 3 | Exhaust Air Shafts | 2 | 32 | 63 | | | | |
| 4 | Pipe Chases | 1 | 240 | 240 | | | | |
| | **Subtotal** | | | **447** | | | | |
| | **Electrical Spaces** | | | | | | | |
| 1 | Electrical Room | 2 | 90 | 180 | | | | |
| | **Informatics Spaces** | | | | | | | |
| 1 | Support IT Room | 1 | 1000 | 1,000 | | | | |
| 2 | Central Server Room | 1 | 1000 | 1,000 | | | | |
| 3 | Communications Rooms | 2 | 120 | 240 | | | | |
| 4 | Office | 1 | 120 | 120 | | | | IT Support Manager Office |

# 1 Executive Summary

## Project Description

| Level 1 | | Phase IV New Construction | | | Renovation of Phase I | | | |
|---|---|---|---|---|---|---|---|---|
| **No.** | **Description** | **Qty** | **NSF** | **Total** | **Qty** | **NSF** | **Total** | **Comments** |
| 6 | Shared Office | 1 | 160 | 160 | | | | Support Shared Office 2 Engineers |
| 7 | Cubicles | 2 | 64 | 128 | | | | Customer Technicians Cubicles |
| | | | | | 6 | 120 | 720 | IT Existing Offices |
| | | | | | 8 | 64 | 512 | IT Existing Cubicles |
| | | | | | 1 | 160 | 160 | IT Existing Shared Office |
| | | | | | 1 | 200 | 200 | IT Tech and equipment receiving existing |
| | **Subtotal** | | | **2,828** | | | | |
| | **Common Spaces** | | | | | | | |
| 1 | Lobby Space | 1 | 2000 | 2,000 | | | | |
| 2 | Auditorium | 1 | 2085 | 2,085 | | | | Seats 110 |
| 3 | House Keeping Wet | 2 | 80 | 160 | | | | |
| 4 | House Keeping Dry | 1 | 200 | 200 | | | | |
| 5 | Fire Command Room | 1 | 200 | 200 | | | | High Rise Fire Command Room |
| 6 | Security Reception Desk | 1 | 150 | 150 | | | | |
| 7 | Bike Storage | 1 | 790 | 790 | | | | Secured room with storage for 90 bikes |
| 8 | Locker/toilet/shower rooms for employees | 2 | 577 | 1,154 | | | | Central employee use |
| 9 | Workout room | 1 | 1000 | 1,000 | | | | Workout equipment for room adjacent to locker and shower rooms |
| 10 | Breakroom | 1 | 320 | 320 | | | | |
| 11 | Toilet Rooms | 2 | 232 | 464 | | | | |
| 12 | Passenger Elevators | 4 | 80 | 320 | | | | |
| 13 | Freight Elevators | 2 | 120 | 240 | | | | |
| 14 | Stair Towers | 4 | 312 | 1,248 | | | | |
| 15 | Vestibule entry | 2 | 120 | 240 | | | | |
| | **Subtotal** | | | **10,571** | | | | |

| Level 1 | | Phase IV New Construction | | | Renovation of Phase I | | | |
|---|---|---|---|---|---|---|---|---|
| No. | Description | Qty | NSF | Total | Qty | NSF | Total | Comments |
| | **Dry Lab/Office Space** | | | | | | | |
| | Closed Offices | 17 | 120 | 2,040 | | | | Unassigned at this time |
| | Open Office Space Cubicles | 37 | 64 | 2,368 | | | | Unassigned at this time |
| | Storage Work room space | 1 | 944 | 944 | | | | General office supplies and records |
| | **Subtotal** | | | **5,352** | | | | |
| | | | | | | | | |
| | **SUBTOTAL LEVEL '1'** | | | **24,288** | | | **1,592** | |
| | | | | | | | | |
| | **Sub Total Net SF (NSF)** | | | **24,288** | | | **1,592** | **25,880** |
| | **Net to Gross Ratio** | | | **1.22** | | | **1.25** | **1.24** |
| | **Department Gross SF (DGSF)** | | | **29,630** | | | **1,990** | **31,960** |

# 1 Executive Summary

## Project Description

| Level 2 | | Phase IV New Construction | | | Renovation of Phase I | | | |
|---|---|---|---|---|---|---|---|---|
| No. | Description | Qty | NSF | Total | Qty | NSF | Total | Comments |
| | **Office Space** | | | | | | | |
| 1 | Return Air Shafts | 1 | 103 | 103 | | | | |
| 2 | Supply Air Shafts | 1 | 175 | 175 | | | | |
| 3 | Exhaust Air Shafts | 1 | 103 | 103 | | | | |
| 4 | Pipe Chases | 2 | 60 | 120 | | | | |
| | **Subtotal** | | | **501** | | | | |
| | **Electrical Spaces** | | | | | | | |
| 1 | Electrical Panel Room | 2 | 90 | 180 | | | | |
| | **Informatics Spaces** | | | | | | | |
| 1 | Communications Rooms | 2 | 120 | 240 | | | | |
| | **Subtotal** | | | **420** | | | | |
| | **Laboratory Spaces** | | | | | | | |
| 1 | Investigators Offices | 10 | 140 | 1,400 | | | | |
| 2 | Staff Offices | 4 | 120 | 480 | | | | Additional offices, possible lab manager spaces |
| 3 | Open Office | 2 | 1531 | 3,062 | | | | Write up desks, open cubicles |
| 4 | Research Laboratory | 10 | 650 | 6,500 | | | | |
| 5 | Laboratory Entry area | 2 | 110 | 220 | | | | Cubicle/lockers for lab techs |
| 6 | Laboratory Support | 10 | 620 | 6,200 | | | | |
| | **Subtotal** | | | **17,862** | | | | |
| | **Common Spaces** | | | | | | | |
| 1 | Large Conference room | 1 | 800 | 800 | | | | Up to 30 Occupants |
| 2 | Small multi Conference Room | 2 | 600 | 600 | | | | 16-24 Occupants |
| 3 | Small Conference Rooms | 2 | 280 | 560 | | | | 8-12 Occupants |
| 4 | Toilet Rooms | 2 | 232 | 464 | | | | |
| 5 | House Keeping | 2 | 80 | 160 | | | | |
| 6 | Breakrooms | 2 | 280 | 560 | | | | |
| 7 | Passenger Elevators | 4 | 80 | 320 | | | | |
| 8 | Freight Elevators | 2 | 120 | 240 | | | | |
| 9 | Stair Tower | 4 | 312 | 1,248 | | | | |

| Level 2 | | Phase IV New Construction | | | Renovation of Phase I | | | |
|---|---|---|---|---|---|---|---|---|
| **No.** | **Description** | **Qty** | **NSF** | **Total** | **Qty** | **NSF** | **Total** | **Comments** |
| 10 | Common Public Space | 1 | 2000 | 2,000 | | | | |
| | **Subtotal** | | | **6,952** | | | | |
| | **Phase I Clinic Remodel** | | | | | | Remodel in Point of Phase 1 Office to Clinic, not in Phase IV Budget | |
| 1 | Waiting | | | | 20 | 20 | 400 | 20 seats in waiting room |
| 2 | Reception | | | | 1 | 280 | 280 | remodeled space |
| 3 | Treatment Rooms | | | | 2 | 196 | 392 | remodeled space |
| 4 | Exam Rooms | | | | 11 | 170 | 1,870 | remodeled space |
| 5 | Soiled | | | | 1 | 110 | 110 | remodeled space |
| 6 | Clean | | | | 1 | 145 | 145 | remodeled space |
| 7 | Vitals | | | | 1 | 60 | 60 | remodeled space |
| 8 | Patient Toilets | | | | 3 | 60 | 180 | remodeled space |
| 9 | House Keeping | | | | 1 | 42 | 42 | remodeled space |
| 10 | Work Stations | | | | 4 | 24 | 96 | remodeled space |
| 11 | Staff Workroom | | | | 1 | 880 | 880 | Existing Space, no remodel |
| 12 | MD Workroom | | | | 1 | 600 | 600 | Existing Space, no remodel |
| 13 | Small Conference Room | | | | 1 | 230 | 230 | 8 to 10 occupants. Existing Space, no remodel |
| | **Subtotal** | | | | | | | |
| | | | | | | | | |
| | **SUBTOTAL LEVEL '2'** | | | **25,735** | | | **5,285** | |
| | | | | | | | | |
| | **Sub Total Net SF (NSF)** | | | **25,735** | | | **5,285** | |
| | **Net to Gross Ratio** | | | **1.18** | | | **1.20** | **-** |
| | **Department Gross SF (DGSF)** | | | **30,370** | | | **6,340** | **-** |

# 1 Executive Summary

## Project Description

| Level 3 | | Phase IV New Construction | | | Renovation of Phase I | | | |
|---|---|---|---|---|---|---|---|---|
| No. | Description | Qty | NSF | Total | Qty | NSF | Total | Comments |
| | **Mechanical Spaces** | | | | | | | |
| 1 | Return Air Shafts | 1 | 142 | 142 | | | | |
| 2 | Supply Air Shafts | 1 | 233 | 233 | | | | |
| 3 | Exhaust Air Shafts | 1 | 142 | 142 | | | | |
| 4 | Pipe Chases | 2 | 60 | 120 | | | | |
| | **Subtotal** | | | **637** | | | | |
| | **Electrical Spaces** | | | | | | | |
| 1 | Electrical Panel Room | 2 | 90 | 180 | | | | |
| | **Informatics Spaces** | | | | | | | |
| 1 | Communications Rooms | 2 | 120 | 240 | | | | |
| | **Subtotal** | | | **420** | | | | |
| | **Laboratory Spaces** | | | | | | | |
| 1 | Investigators Offices | 10 | 140 | 1,400 | | | | |
| 2 | Staff Offices | 4 | 120 | 480 | | | | Additional offices, possible lab manager spaces and associated dry lab workers working with lab groups |
| 3 | Open Office | 2 | 1531 | 3,062 | | | | Write up desks, open cubicles |
| 4 | Research Laboratory | 10 | 650 | 6,500 | | | | |
| 5 | Laboratory Entry area | 2 | 110 | 220 | | | | Cubicle/lockers for lab techs |
| 6 | Laboratory Support | 10 | 620 | 6,200 | | | | |
| | **Subtotal** | | | **17,862** | | | | |
| | **Common Spaces** | | | | | | | |
| 1 | Large Conference room | 1 | 800 | 800 | | | | Up to 30 Occupants |
| 2 | Small multi Conference Room | 2 | 600 | 1,200 | | | | 16-24 Occupants |
| 3 | Small Conference Rooms | 2 | 280 | 560 | | | | 8-12 Occupants |
| 4 | Toilet Rooms | 2 | 232 | 464 | | | | |
| 5 | House Keeping | 2 | 80 | 160 | | | | |

| Level 3 | | Phase IV New Construction | | | Renovation of Phase I | | | |
|---|---|---|---|---|---|---|---|---|
| No. | Description | Qty | NSF | Total | Qty | NSF | Total | Comments |
| 6 | Dry Storage House Keeping | 1 | 200 | 200 | | | | |
| 7 | Breakrooms | 2 | 320 | 640 | | | | |
| 8 | Passenger Elevators | 4 | 80 | 320 | | | | |
| 9 | Freight Elevators | 2 | 120 | 240 | | | | |
| 10 | Stair Towers | 4 | 312 | 1,248 | | | | |
| 11 | Common Public Space | 1 | 2000 | 2,000 | | | | |
| 12 | Bridge Connection | 0 | 0 | - | 1 | 600 | 600 | |
| | **Subtotal** | | | **7,832** | | | **600** | |
| | | | | | | | | |
| | **SUBTOTAL LEVEL '3'** | | | **26,751** | | | **600** | |
| | | | | | | | | |
| | **Sub Total Net SF (NSF)** | | | **26,751** | | | **600** | **-** |
| | **Net to Gross Ratio** | | | **1.18** | | | **1.10** | |
| | **Department Gross SF (DGSF)** | | | **31,570** | | | **660** | **-** |

# 1 Executive Summary

## Project Description

| Level 4 | | Phase IV New Construction | | | Renovation of Phase I | | | |
|---|---|---|---|---|---|---|---|---|
| **No.** | **Description** | **Qty** | **NSF** | **Total** | **Qty** | **NSF** | **Total** | **Comments** |
| | **Mechanical Spaces** | | | | | | | |
| 1 | Return Air Shafts | 1 | 181 | 181 | | | | |
| 2 | Supply Air Shafts | 1 | 295 | 295 | | | | |
| 3 | Exhaust Air Shafts | 1 | 181 | 181 | | | | |
| 4 | Pipe Chases | 2 | 60 | 120 | | | | |
| | **Subtotal** | | | **777** | | | | |
| | **Electrical Spaces** | | | | | | | |
| 1 | Electrical Panel Room | 2 | 90 | 180 | | | | |
| | **Informatics Spaces** | | | | | | | |
| 1 | Communications Rooms | 2 | 120 | 240 | | | | |
| | **Subtotal** | | | **420** | | | | |
| | **Laboratory Spaces** | | | | | | | |
| 1 | Investigators Offices | 10 | 140 | 1,400 | | | | |
| 2 | Staff Offices | 4 | 120 | 480 | | | | Additional offices, possible lab manager spaces, use for investigators working with the lab investigators |
| 3 | Open Office | 2 | 1531 | 3,062 | | | | Write up desks, open cubicles |
| 4 | Research Laboratory | 10 | 650 | 6,500 | | | | |
| 5 | Laboratory Entry area | 2 | 110 | 220 | | | | Cubicle/lockers for lab techs |
| 6 | Laboratory Support | 10 | 620 | 6,200 | | | | |
| | **Subtotal** | | | **17,862** | | | | |
| | **Common Spaces** | | | | | | | |
| 1 | Large Conference room | 1 | 800 | 800 | | | | Up to 30 Occupants |
| 2 | Small multi Conference Room | 2 | 600 | 1,200 | | | | 16-24 Occupants |
| 3 | Small Conference Rooms | 2 | 280 | 560 | | | | 8-12 Occupants |
| 4 | Toilet Rooms | 2 | 232 | 464 | | | | |
| 5 | House Keeping | 2 | 80 | 160 | | | | |

| Level 4 | | Phase IV New Construction | | | Renovation of Phase I | | | |
|---|---|---|---|---|---|---|---|---|
| No. | Description | Qty | NSF | Total | Qty | NSF | Total | Comments |
| 6 | Breakrooms | 2 | 320 | 640 | | | | |
| 7 | Passenger Elevators | 4 | 80 | 320 | | | | |
| 8 | Freight Elevators | 2 | 120 | 240 | | | | |
| 9 | Stair Towers | 4 | 312 | 1,248 | | | | |
| 10 | Common Public Space | 1 | 2000 | 2,000 | | | | |
| | **Subtotal** | | | **7,632** | | | | |
| | | | | | | | | |
| | **SUBTOTAL LEVEL '4'** | | | **26,691** | | | **-** | |
| | | | | | | | | |
| | **Sub Total Net SF (NSF)** | | | **26,691** | | | **-** | **26,691** |
| | **Net to Gross Ratio** | | | **1.18** | | | **1.20** | **1.19** |
| | **Department Gross SF (DGSF)** | | | **31,500** | | | **-** | **31,760** |

# 1 Executive Summary

## Project Description

| Level 5 | | Phase IV New Construction | | | Renovation of Phase I | | | |
|---|---|---|---|---|---|---|---|---|
| **No.** | **Description** | **Qty** | **NSF** | **Total** | **Qty** | **NSF** | **Total** | **Comments** |
| | **Mechanical Spaces** | | | | | | | |
| 1 | Return Air Shafts | 1 | 258 | 258 | | | | |
| 2 | Supply Air Shafts | 1 | 415 | 415 | | | | |
| 3 | Exhaust Air Shafts | 1 | 258 | 258 | | | | |
| 4 | Pipe Chases | 2 | 60 | 120 | | | | |
| | **Subtotal** | | | **1,051** | | | | |
| | **Electrical Spaces** | | | | | | | |
| 1 | Electrical Panel Room | 2 | 100 | 200 | | | | |
| | **Informatics Spaces** | | | | | | | |
| 1 | Communications Room | 2 | 120 | 240 | | | | |
| | **Subtotal** | | | **440** | | | | |
| | **Dry Lab/Office Areas** | | | | | | | |
| 1 | Closed Offices | 58 | 120 | 6,960 | | | | |
| 2 | Open Offices | 172 | 64 | 11,008 | | | | |
| 3 | Storage Area | 4 | 200 | 800 | | | | |
| | **Subtotal** | | | **18,768** | | | | |
| | **Common Spaces** | | | | | | | |
| 1 | Large Conference Room | 1 | 800 | 800 | | | | |
| 2 | Small Multi Conference Room | 2 | 600 | 1,200 | | | | |
| 3 | Small Conference Rooms | 2 | 280 | 560 | | | | |
| 4 | Toilet Rooms | 2 | 196 | 392 | | | | |
| 5 | House Keeping | 1 | 80 | 80 | | | | |
| 6 | Break Rooms | 2 | 320 | 640 | | | | |
| 7 | Passenger Elevators | 4 | 80 | 320 | | | | |
| 8 | Freight Elevator | 1 | 120 | 120 | | | | |
| 9 | Stair Towers | 3 | 312 | 936 | | | | |
| 10 | Common Public Space | 1 | 1200 | 1,200 | | | | |
| | **Subtotal** | | | **6,248** | | | | |
| | **SUBTOTAL LEVEL '5'** | | | **26,507** | | | | |
| | **Sub Total Net SF (NSF)** | | | 26,507 | | | | **26,507** |
| | **Net to Gross Ratio** | | | **1.15** | | | | **1.15** |
| | **Department Gross SF (DGSF)** | | | **30,480** | | | **-** | **30,480** |

| Level 6 | | Phase IV New Construction | | | Renovation of Phase I | | | |
|---|---|---|---|---|---|---|---|---|
| No. | Description | Qty | NSF | Total | Qty | NSF | Total | Comments |
| | **Mechanical Spaces** | | | | | | | |
| 1 | Air handling Penthouse | 1 | 20684 | 20,684 | | | | Supply & Exhaust Air |
| 2 | Return Air shafts | 1 | 0 | - | | | | |
| 3 | Supply Air Shafts | 1 | 0 | - | | | | |
| 4 | Exhaust Air Shafts | 1 | 0 | - | | | | |
| | **Subtotal** | | | **20,684** | | | | |
| | **Electrical Spaces** | | | | | | | |
| 1 | Electrical Panel Room | 1 | 100 | 100 | | | | Electrical Panel Room |
| | **Informatics Spaces** | | | | | | | |
| 2 | Communications Room | 1 | 120 | 120 | | | | Stacked |
| | **Subtotal** | | | **220** | | | | |
| | **Office Areas** | | | | | | | |
| 1 | Closed Offices | 16 | 120 | 1,920 | | | | |
| 2 | Open Office (Cubicles) | 40 | 64 | 2,560 | | | | |
| | **Subtotal** | | | **4,480** | | | | |
| | **Common Spaces** | | | | | | | Stairs in Net to Gross |
| 1 | Conference Room Small | 1 | 300 | 300 | | | | 8 to 12 Occupants |
| 2 | Toilet Rooms | 2 | 173 | 346 | | | | Male / Female Rooms |
| 3 | House Keeping Room | 1 | 80 | 80 | | | | |
| 4 | Break Room | 1 | 320 | 320 | | | | |
| 5 | Passenger elevators | 4 | 80 | 320 | | | | Connects all levels |
| 6 | Freight Elevators | 1 | 120 | 120 | | | | Connects all levels |
| 7 | Stair Towers | 3 | 312 | 936 | | | | Connects all levels |
| 8 | Bridge Connection | | | - | 1 | 600 | 600 | Bridge Connection to phase 1 |
| | **Subtotal** | | | **2,422** | | | | |
| | | | | | | | | |
| | **SUBTOTAL LEVEL '6'** | | | **27,806** | | | **600** | |
| | | | | | | | | |
| | **Sub Total Net SF (NSF)** | | | **27,806** | | | **600** | **28,406** |
| | **Net to Gross Ratio** | | | **1.10** | | | **1.10** | **1.10** |
| | **Department Gross SF (DGSF)** | | | **30,590** | | | **660** | **31,250** |

### 1.3.3 Cost Summary

The current CBE construction budget is $78,227,964. This present preliminary estimate is slightly over the budget. A CM/GC selection process has commenced. Upon selection, the CM/GC will verify the construction budget. If the budget is still over at that time value engineering will occur.

**Notes:**
- Costs are for construction only
- Costs are based on an open competitive bid basis
- Costs are based upon construction start of May 2014
- Costs include contractor mark-ups
- Costs DO NOT include contingency

**Master Summary**

| SECTION | | | COST / SF | COST |
|---|---|---|---|---|
| Building and Site | 222,130 | GSF | 361.00 | $80,166,000 |
| | | | | |
| Additional Scope Cyclotron Shell | 5,043 | GSF | 314.00 | $1,583,000 |
| | | | | |
| Additional Scope Renovation of Phase I | | To Be Determined | | |

**Cost Summary**

| SECTION | | | COST / SF | COST |
|---|---|---|---|---|
| **Building** | | | | |
| Level A | 30,775 | GSF | 352.00 | $10,819,000 |
| Level 1 | 29,630 | GSF | 349.00 | $10,345,000 |
| Level 2 | 30,370 | GSF | 388.00 | $11,771,000 |
| Level 3 | 31,570 | GSF | 386.00 | $12,184,000 |
| Level 4 | 31,500 | GSF | 385.00 | $12,136,000 |
| Level 5 | 30,480 | GSF | 299.00 | $9,111,000 |
| Level 6 | 30,590 | GSF | 181.00 | $5,548,000 |
| Connections to Phase I | 2,860 | GSF | 362.00 | $1,034,000 |
| Circulation | 4,355 | GSF | 265.00 | $1,154,000 |
| | | | | |
| **TOTAL (Building)** | **222,130** | **GSF** | **334.00** | **$74,102,000** |
| | | | | |
| **Site** | | | | |
| Site Improvements | 130,000 | SF | 38.00 | $4,964,000 |
| Site Utilities | 130,000 | SF | 8.00 | $1,100,000 |
| | | | | |
| **TOTAL (Site)** | **130,000** | **SF** | **47.00** | **$6,064,000** |
| | | | | |
| **TOTAL (Site and Building)** | **222,130** | **GSF** | **361.00** | **$80,166,000** |

### 1.3.4 Project Schedule Summary

We propose completing the schematic design and then immediately moving into construction documents for the site package as we start the design development phase of the project. This will require that special attention to be paid during schematics to any and all site implications. Putting out the site package phase one cooling tower movement bid package along with the underground utility package would allow us to start construction by May 1, 2014. A complete core and shell building package including the structure would be completed by June 24, 2014 allowing the construction to not be delayed. The final bid package would be completed by September 30, 2014. This puts more pressure on the Architectural / Engineering Team to coordinate all issues early on in the project. The team assembled for this project used this scenario successfully on the last two Huntsman Phases which had greater complexities due to the site conditions.

It should be noted that the goal is to have the project completed and occupied by December 1, 2016 to align with the movement of Huntsman spaces out of the present School of Medicine. The Bid Packages allows this to occur without creating time issues for the CMGC.

*A proposed Design & Construction Schedule is included in section 6.0 Project Schedule for further details.*

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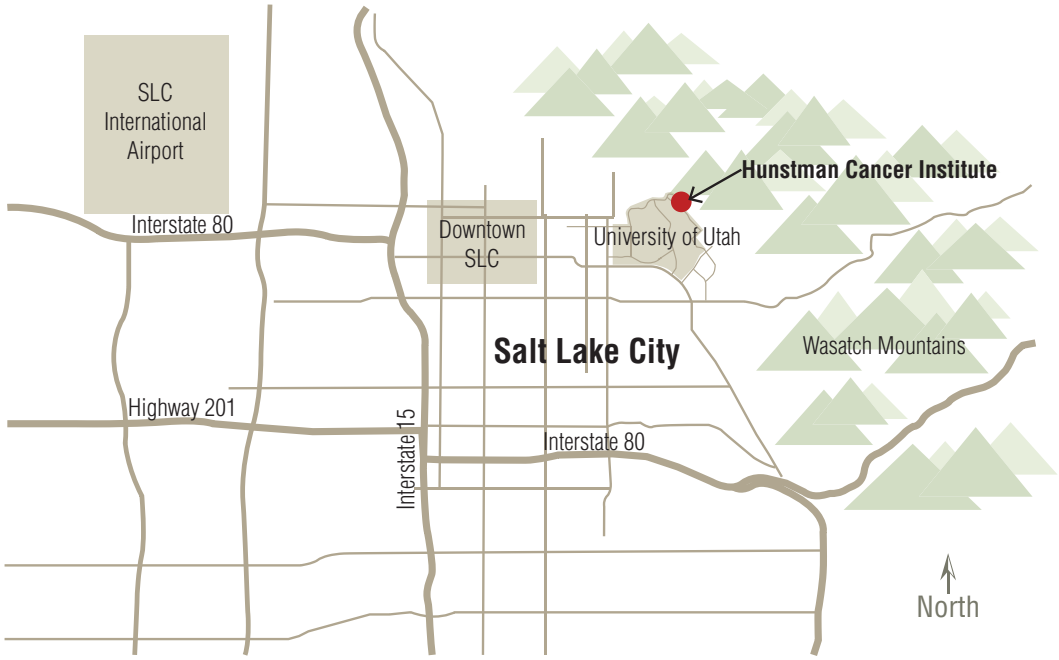
## 2.1 SITE LOCATION AND ACCESS

**Site Location**

The Huntsman Cancer Institute (HCI) is located on the University of Utah Health Sciences Center campus, approximately three miles east of downtown Salt Lake City. The phase IV addition will extend to the south from the southeast wall of the existing phase I facility. The site is bordered to the east by federal land.

**Site Location**



# 2 Site Analysis

## Site Location and Access

**Site Access**

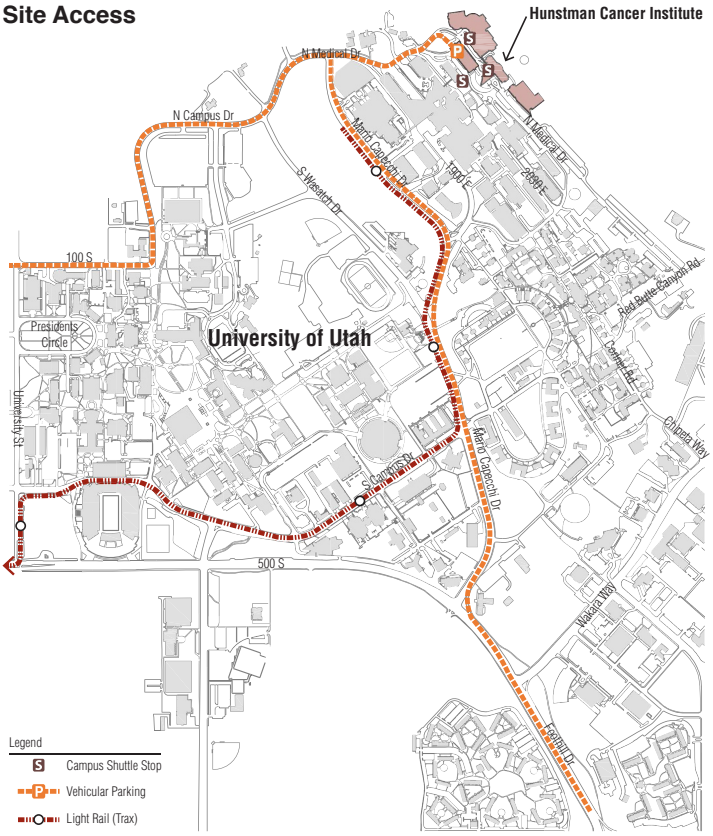
Traveling to the Huntsman Cancer Institute can be done via automobile, campus shuttle, or public transportation (light rail). If travelling by automobile from the south, head north toward the University of Utah on Foothill Drive. At Mario Cappecchi Drive, turn right and continue to the intersection with North Medical Drive. Turn right at the intersection, continue to Circle of Hope Drive and turn left. Continue up Circle of Hope Drive, following the public parking signs. Public parking is located in the parking structure adjacent to the institute. Indicate to the parking attendant you are a visitor to gain access into the structure.

If travelling to HCI from downtown Salt Lake City, take 100 South east to North Campus Drive. The intersection is a left-hand turn at which the road changes names from 100 South to North Medical Drive. Continue on North Campus Drive. It will change names to North Medical Drive. Continue to Circle of Hope Drive and turn left. Continue up Circle of Hope Drive, following the public parking signs. Public parking is located in the parking structure adjacent to the institute. Indicate to the parking attendant you are a visitor to gain access into the structure.

The University of Utah campus shuttle has eight shuttle routes. Of these routes the red, blue, black, VA, and HCI/HCH routes stop at the HCI facilities between the hours of 6am to 6pm. A live shuttle tracker website can be viewed at http://www.uofubus.com/ for real-time shuttle information.

The Utah Transit Authority (UTA) light rail system (Trax) has a destination stop at the Moran Eye Center along Mario Cappecchi Drive. Refer the section 2.3.3 Transit for further information on accessing HCI on foot.

**Site Access**



## 2.2 SITE CONSIDERATIONS

### 2.2.1 Climate

The climate of the Wasatch Front Region is referred to as semi-arid. Average daily mean temperatures range from 28°F in the January to 78°F in July. The record high temperature is 107°F and the low is -30°F. Temperatures routinely rise above 100°F in the summer and will stay below freezing for long stretches during the winter. Temperatures rarely fall below 0°F in the winter. Typical relative humidity is considered low, ranging from 15 to 30 percent. The average annual precipitation is 16.5 inches. Average annual snowfall ranges from 80 to 100 inches. Prevailing winds are from the northwest. Winter storms typically follow the prevailing wind pattern and come from the northwest. These storms are preceded by strong winds from the south and then changing winds from the north as the cold front moves from north to south along the Wasatch Front. This condition is reversed occasionally each winter season with storms moving from south to north.

Considerations in project design include

> The setting sun in summer months induces a solar heat gain which makes occupied spaces adjacent to west facing windows problematic unless mitigated by architectural or mechanical systems.
>
> Pedestrian safety in winter months is at risk where sidewalks are shaded by structures or landscaping. Steep grades are also a risk factor in snowy and icy conditions.

### 2.2.2 Views

Huntsman Cancer Institute's location on the foothill bench of the Wasatch Mountains provides unimpeded panoramic western views of Salt Lake City, The Great Salt Lake, and the Oquirrh Mountains which frame the western side the Salt Lake Valley. Views to the north and to the east are of federal lands that intend to preserve the existing natural environment. Immediate views to the south are of the Health Sciences Center campus and University of Utah. The background views to the south are of the Wasatch Mountains, notably Mount Olympus.

Views into the site are found as far away as the SLC international airport and the Sugar House neighborhood. The elevated location high up on the bench perches the Institute above the surrounding buildings. Approaching the Institute from the valley floor is rather dramatic as one climbs the foothills to arrive at the Institute.

The following pages include photos of views from the phase IV addition site to the north, south, east and west.

# 2 Site Analysis

Site Considerations

**View Looking North**

**View Looking South**

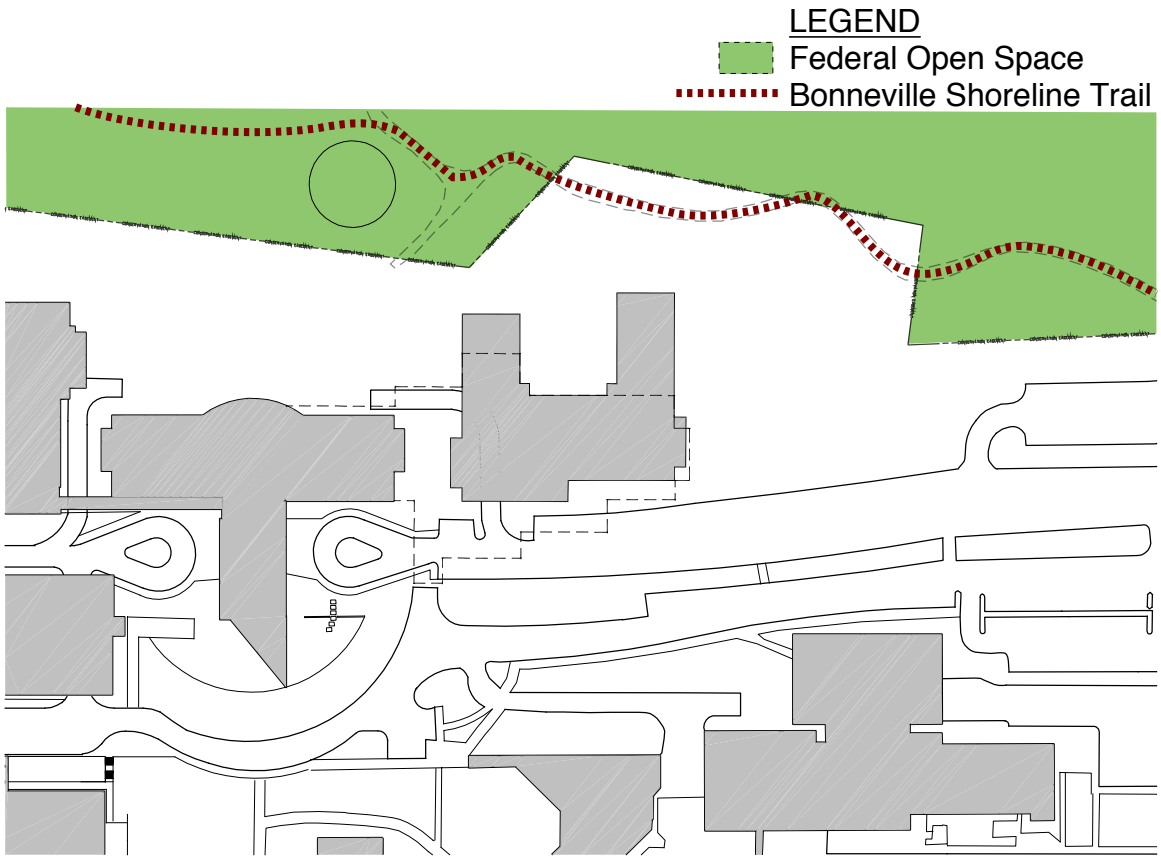
**View Looking East**

**View Looking West**

### 2.2.3 Key Open Spaces

The key open space at HCI is the adjacent federal lands to the east. Views into this open space should be preserved and utilized in the design of the site and space arrangement of the building. The Bonneville Shoreline Trail runs through the federal lands that parallel HCI. The research user group indicated a strong desire for a connection to the trail. Employees currently commute by bicycle on the trail and will benefit from a more direct point of access to the trail. Also, many employees use the trail during lunch hours to exercise and get outside for picnics. Pedestrian access into the federal lands is desired for these reasons.

**Key Open Spaces Diagram**



### 2.2.4 Drainage

A substantial gulch drains across the site in which the phase IV building expansion is planned. The gulch drains approximately 75.4 acres through 9,830 linear feet of mountainous terrain. By comparison, the gulch above the phase III building drained about 73.8 acres over 10,600 linear feet. Due to the larger area and the shorter distance, the potential for large storm events to cause damage is slightly higher with the phase IV building than with the phase III building.

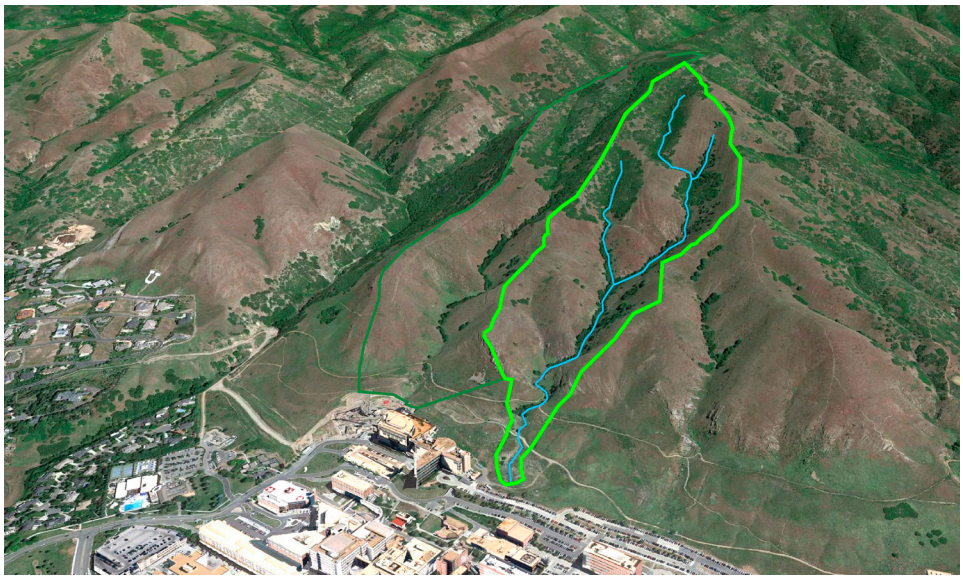
The gulch above phase IV is outlined on the graphic below. The boundaries of the gulch are delineated with a green line and the flow paths are shown with a blue line. Existing grading funnels storm flows down the gulch and terminates in a natural basin located above the parking lot for the phase I building. The natural basin has a capacity of roughly 1,900 cubic feet. Storm water that terminates in this basin percolates directly into the soil because there are no other available outlets.

The phase IV building will be located in the vicinity of the existing natural basin. For this reason, a debris basin will be constructed upstream of the phase IV building. The new basin will be designed to capture sediments and vegetative wastes that may migrate down the gulch during storm events. The basin will have to be periodically maintained to remove trapped sediments and plant material. A concrete apron may be designed into the basin to protect it from damage from heavy maintenance equipment.

Additionally, the basin will be designed to capture storm flows up to and including the 10-year storm. These flows will be discharged into the proposed storm sewer for the project (see Section 2.4.9). Flows above the 10-year storm and up to the 100-year storm will be channeled around the building via overland flow and will be controlled through grading design.

Lastly, the basin may be designed to serve as a flood deterrent for the existing water tank. The same system that routes storm flows through the storm sewer system and associated overflows in a channelized fashion around the building can mitigate the event of a leak in the water tank. Some additional grading between the existing tank and the proposed debris basin may be required in order to properly direct a potential leak.

**Drainage**



### 2.2.5 Soils Report

A geotechnical study will be included as an addendum to the final draft of this program document. This study is being provided under contract with the State of Utah, Division of Facilities Construction and Management by Gordon Geotechnical Engineering and is ongoing. The study is to be used for informative direction during the design and construction phases of this project. When the configurations of the project buildings become more defined during later stages of design, additional test holes may be necessary. The study will be updated and distributed if and when additional test holes are required.

### 2.2.6 Topographic Survey

A topographic survey is included in the appendix of this program. Refer to Appendix 7.2 "Topographic Survey". The survey was provided under contract with the State of Utah, Division of Facilities Construction and Management by James D. Pitkin, PLS with Dominion Engineering Associates, L.C. This survey shows the existing surface and subsurface attributes of the site. This survey is to be used for the definition of existing site conditions during the design and construction phases of this project. The Appendix contains a reduced scale hard copy. A full scale hard copy and digital copy are available through DFCM.

### 2.2.7 Environmental Impact Issues

To the knowledge of the University of Utah and Huntsman Cancer institute, this site has not been used for any other purpose while the University or HCI have been in existence and therefore no known environmental problems exist. The Owner may choose to have a Level I Environmental Assessment conducted by an environmental engineer to verify that the site contains no environmental issues.

### 2.2.8 University of Utah Long Range Development Plan

The University of Utah is currently working with planning consultants to update the Health Sciences Campus Master Plan. The master plan update will have many implications to the HCI regarding: utilities systems, pedestrian circulation, vehicular circulation, parking, and future adjacent buildings. The final draft of the plan is anticipated to be complete January, 2014. HCI leaders and the planning team developing this program document are aware of some of the more immediate projects included in the master plan update and have responded to the known information within this program. Contact the University of Utah Campus Planning Department for further information in January, 2014.

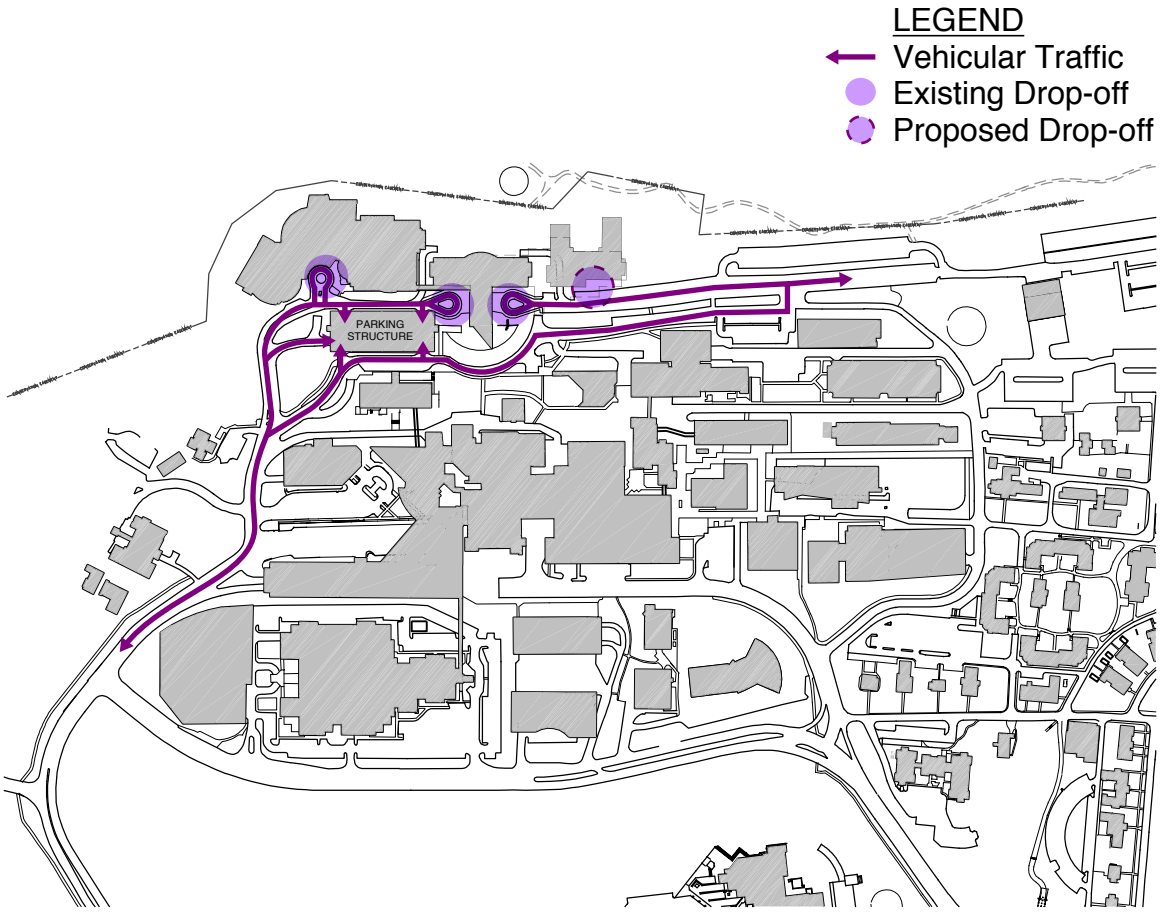
## 2.3 CIRCULATION CONSIDERATIONS

### 2.3.1 Traffic

Vehicular Traffic surrounding HCI is predominantly on North Medical Drive, which wraps around the west edge of HCI. From North Medical Drive, Circle of Hope Drive provides vehicular access and visitor drop-off to phases I, II, and III. The phase IV expansion's main entry will be located on North Campus Drive. A visitor drop-off is proposed at the main entry of phase IV. The rotunda style drop-off on the southern side of phase I will be utilized by phase IV traffic to turn around and exit.

There are existing issues with pedestrian/vehicular conflicts along North Campus Drive (which changes name to East Medical Drive as one moves east on the road). The conflicts are due to circumstance of double loaded parking with no sidewalks along the road. People who have parked are forced to walk within the drive aisle as they make their way to and from HCI. Provision of sidewalks along North Campus Drive is highly recommended to help reduce pedestrian/ vehicular conflicts.

**Traffic Diagram**



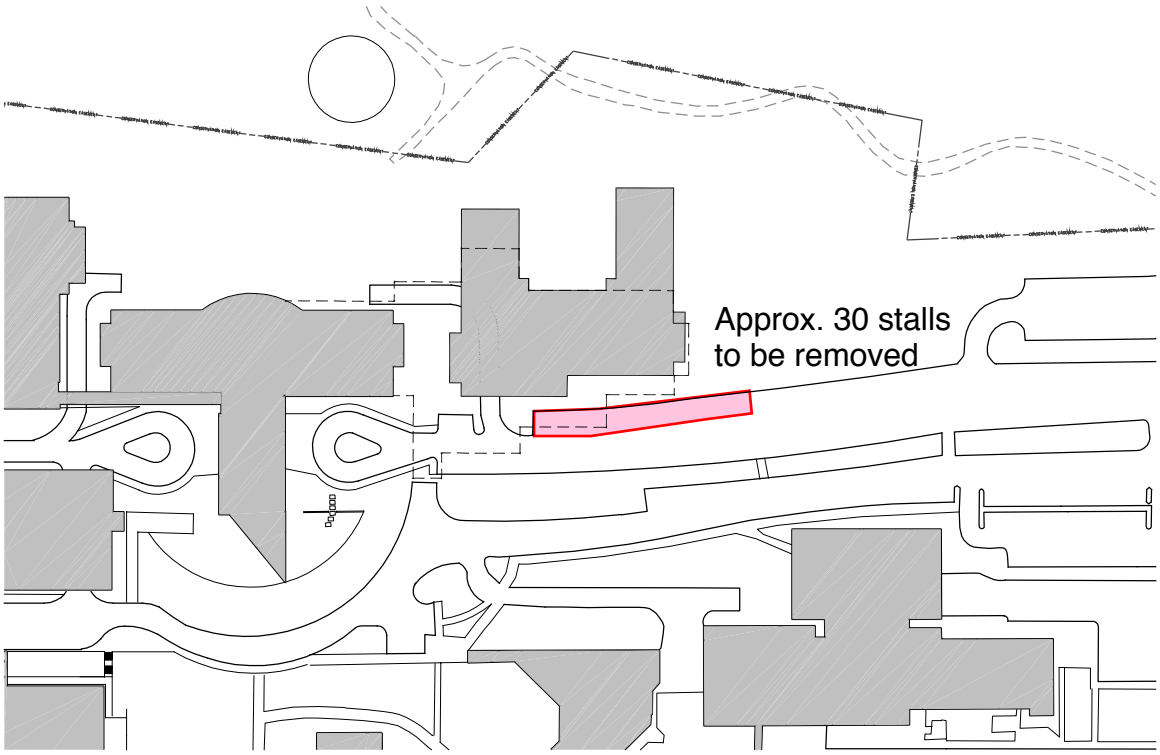
### 2.3.2 Parking

HCI employees and visitors are currently under served by the available parking. There is a waiting list of HCI employees wanting to lease a parking stall. The majority of parking that is available to HCI is in three areas: the adjacent HCI parking structure, the seminary parking structure on the south side of the university campus, and along North Campus Drive/East Medical Drive.

The Health Sciences Campus Master Plan update includes an in depth parking study that analyzes HCI within a larger study of all facility needs on the Health Sciences Campus. The preliminary draft of the master plan update proposes two parking structures that provide additional parking to HCI employees and visitors. One of the structures is planned to be constructed adjacent to the phase IV expansion. It will provide approximately 340 new parking stalls. The other proposed parking structure will provide 1,000 new parking stalls and will be located on the west side of the student towers. It has not yet been determined which structure will be constructed first, but it is known that the University is committed to constructing one of the two structures in the immediate future.

The phase IV expansion will impact reserved parking along North Campus Drive. Preliminary estimations deem that up to 30 parking stalls will be eliminated in order to provide a main entry drop-off and required fire lanes. In consideration of the current lack of parking, the design team should strive to minimize the impact on parking stalls during the development of the final design.

**Parking Diagram**

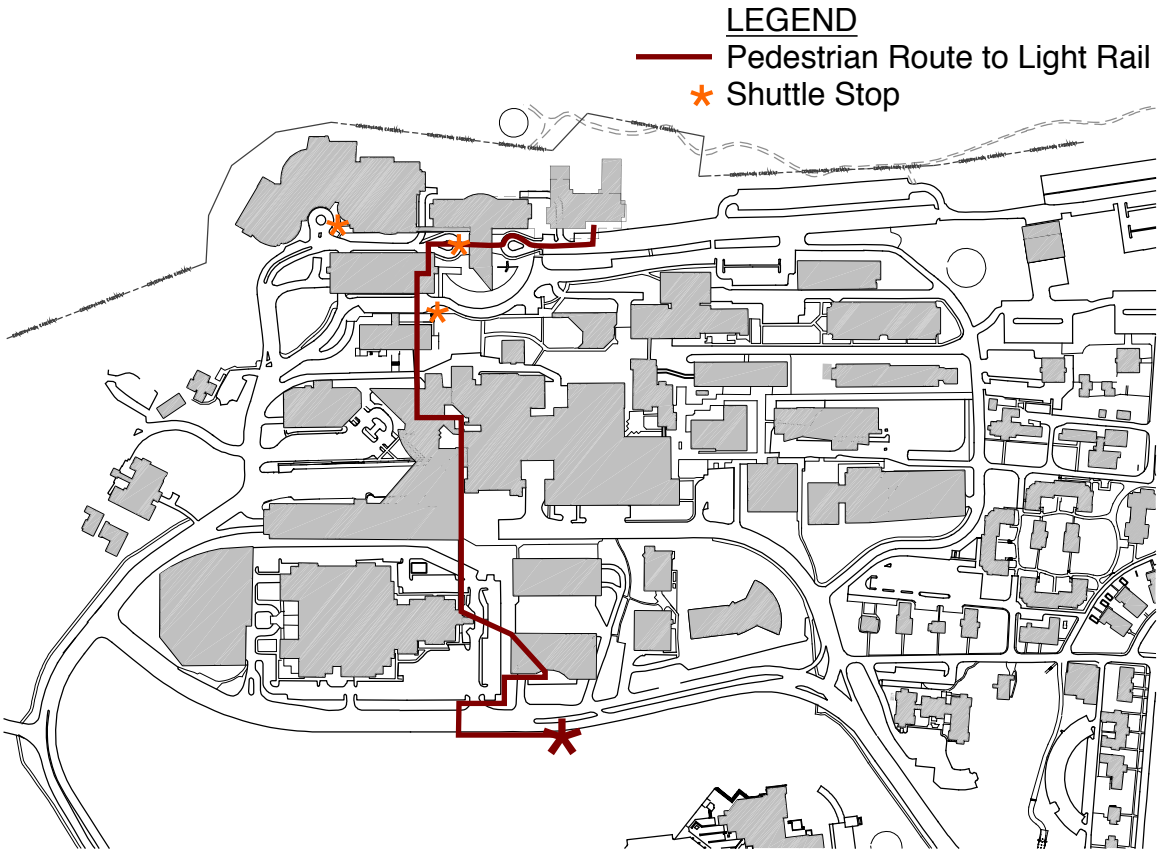


### 2.3.3 Transit

HCI is serviced by several forms of mass transportation. The Utah Transit Authority light rail system, aka TRAX, has a destination stop adjacent to the Moran Eye Center along Mario Cappecchi Drive. It is approximately a 13 minute walk, or half mile walk that climbs 153 in elevation. The diagram illustrates the most direct route from the Trax stop to HCI. The route utilizes elevators and sky bridges within several buildings to avoid stairs and provide universal access to HCI.

The University of Utah campus shuttle has eight shuttle routes. Of these eight routes the red, blue, black, VA, and HCI/HCH routes stop at the HCI facilities between the hours of 6am to 6pm. A live shuttle tracker website can be viewed at http://www.uofubus.com/ for real-time shuttle information.

**Transit Diagram**



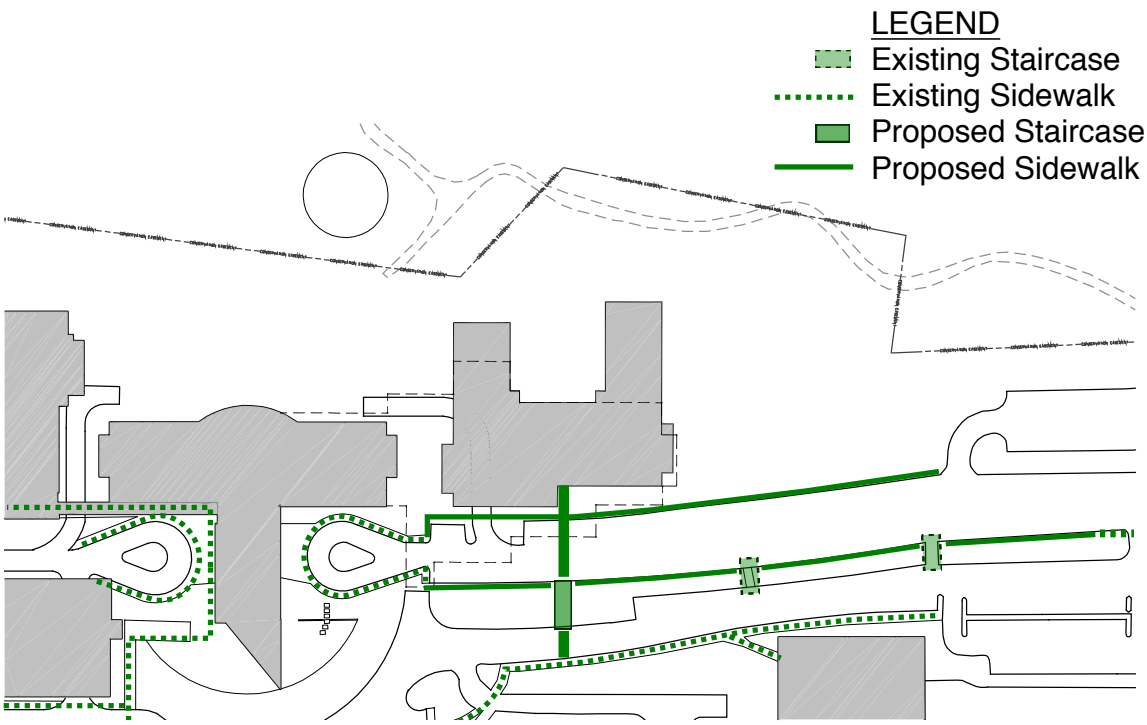
### 2.3.4 Pedestrian

The Health Sciences Center campus and larger University of Utah campus are pedestrian campuses. Walking to and from the numerous buildings, adjacent parking lots, parking structures, UTA bus stops, and campus shuttle stops is the prioritized mode of travel. The pedestrian infrastructure that is in place, such as sidewalks, paths, and pedestrian bridges, are utilized to navigate between destinations. However, there are many areas around HCI that lack sufficient pedestrian infrastructure, forcing people to walk through landscape areas, parking lots, and along drive aisles.

Sufficient pedestrian infrastructure is lacking along North Medical Drive and North Campus Drive. North Campus Drive functions as the main vehicular route and as a parking lot drive aisle that is also without sidewalks. Typically, perpendicular parking is not provided along a main entry route, but due to the physical constraints of the natural terrain, the two circulation routes have been combined. It is recommended that sidewalks be provided along North Campus Drive to help improve pedestrian access to the site.

The landscape area between North Medical Drive and North Campus Drive accommodates a 10 to 20 foot elevation change. Two staircases exist to move people from the lower road to the upper road. It is recommended that a third staircase, on axis with the phase IV expansion main entry, and sidewalks connecting the staircases to other existing sidewalks be provided within the phase IV expansion.

**Pedestrian Diagram**

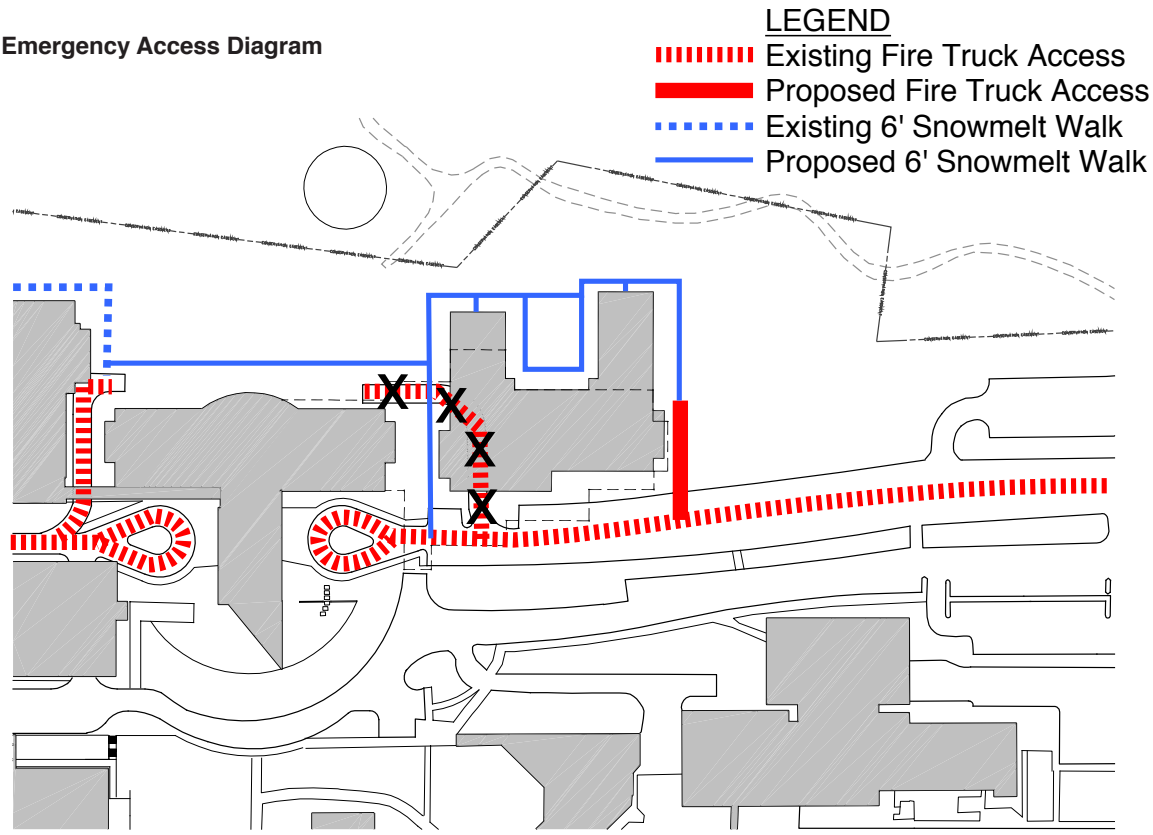


### 2.3.5 Emergency Access

The existing emergency access to the HCI facility is provided along North Campus Drive and Circle of Hope Drive. The visitor drop-offs also function as emergency vehicle access. There are two existing fire lanes that extend east to the back side of HCI, flanking both sides of the phase I portion of the facility. A six foot wide snow melted pathway extends from the end of the fire lane around the back side of the facility. These walks provide access to all sides of the building as well as fire hydrants located along the back side of the facility.

The proposed emergency access for the phase IV expansion eliminates the phase I southern fire lane and replaces it with a snow melted walk that connects to the existing northern fire lane. The proposed snow melted path also loops around the back of the proposed building, connecting to a new fire lane along the south edge of the proposed building.

**Emergency Access Diagram**



### 2.3.6 Snow Removal

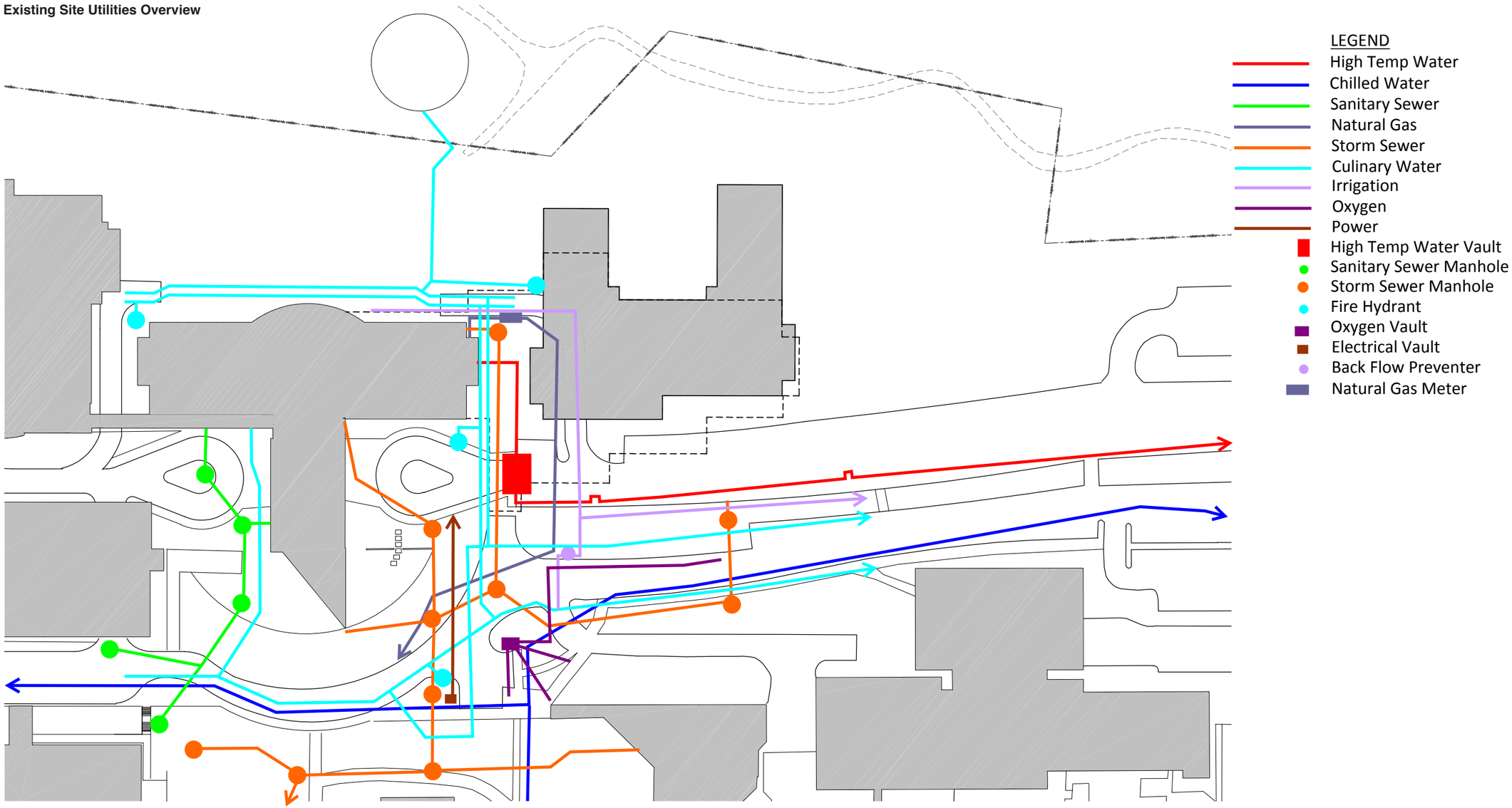
Snow Removal from roof top patios, staircases, and sidewalks on the project should include a snow melt system within the design. Plazas and sidewalks along the east side of the building represent the emergency exit from the building. Additionally, firefighting routes to the east of the building are accomplished through pedestrian pathways located on the north and south of the building. Therefore, all hardscape areas north, east and south of the building must be fitted with a suitable snow melt system (west side also gets snowmelt). In addition, the landscaping should identify and provide snow storage locations directly adjacent to parking areas.

## 2.4 UTILITY CONSIDERATIONS

### 2.4.1 Site Utilities Overview

This section addresses the site utilities. Maps and narrative are provided for each utility, including explanation of existing conditions, proposed connections, utilities to be abandoned, and utilities to be relocated.

**Existing Site Utilities Overview**



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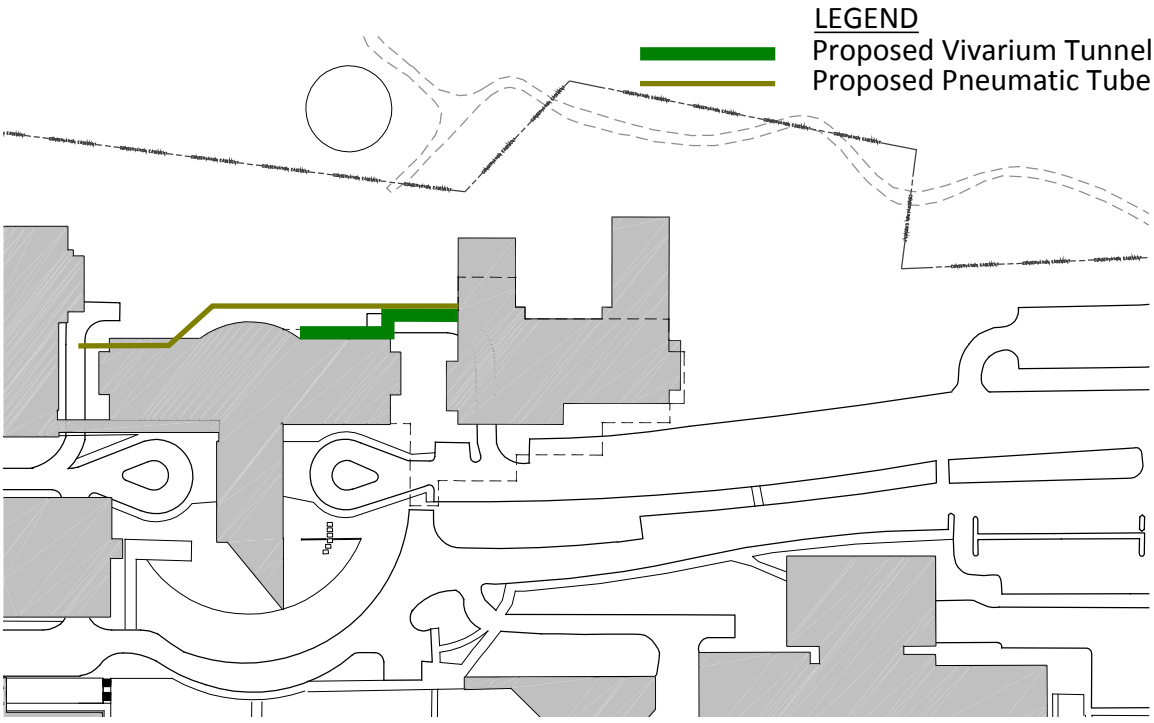
### 2.4.2 Vivarium Access Tunnel / Pneumatic Tube

The phase I building, Level A has a vivarium. The phase IV expansion will also include a vivarium. An access tunnel between the two Vivarium labs is included in the program that will be sub grade and is anticipated to run along the east edge of the relocated cooling tower structure (see Section 2.4.3.)

A pneumatic tube system will be installed to transport material between the existing cyclotron located under the service drive aisle between phase I and phase II and the proposed cyclotron on Level A in the phase IV building. The tube will be a 6-inch conduit immediately east of the proposed vivarium access tunnel. The current opinion is to allow the pneumatic tube to enter the basement of the phase I building once it clears the vivarium access tunnel and then route through that building. Further study will be required to determine the exact entry point on the phase I building and exact alignment to reach an appropriate receiving point near the existing cyclotron.

**Vivarium Tunnel and Pneumatic Tube**

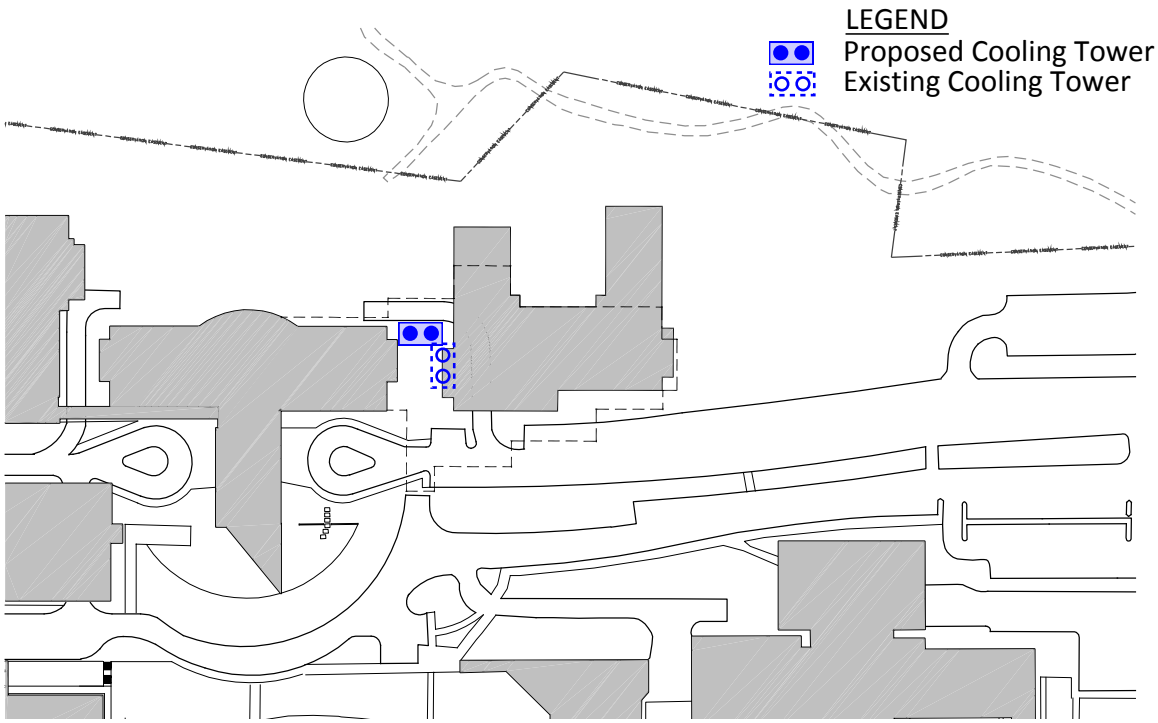


### 2.4.3 Cooling Towers

There are two cooling towers on the south end of the phase I building. They are part of the cooling system for the phase I building. The University of Utah was asked about consolidating chiller plants into a central location and removing the cooing towers in favor of connection to the central system. The decision was made to relocate the cooling tower location as shown in the diagram. The new cooling towers will have to be built prior to the demolition of the existing towers so as to not interrupt service to the phase I building. The new location of the cooling towers will necessitate the relocation of the existing gas meter east of the phase I building. The new cooling towers will also be utilized with economizers in the phase IV building.

Relocating the cooling towers causes a domino effect for multiple existing utilities in the vicinity. A gas meter station currently resides near the southeast corner of the phase I building. The meter station will need to be relocated to accommodate the new cooling towers. Similarly, sanitary sewer grease traps servicing the cafeteria of phase I will need to be extended to the drive aisle west of phases I and IV to make room for the towers and to be in a position to receive proper maintenance. Moreover, there are several storm sewer and culinary water lines that will be displaced as a result of the relocated cooling towers.

**Cooling Towers**

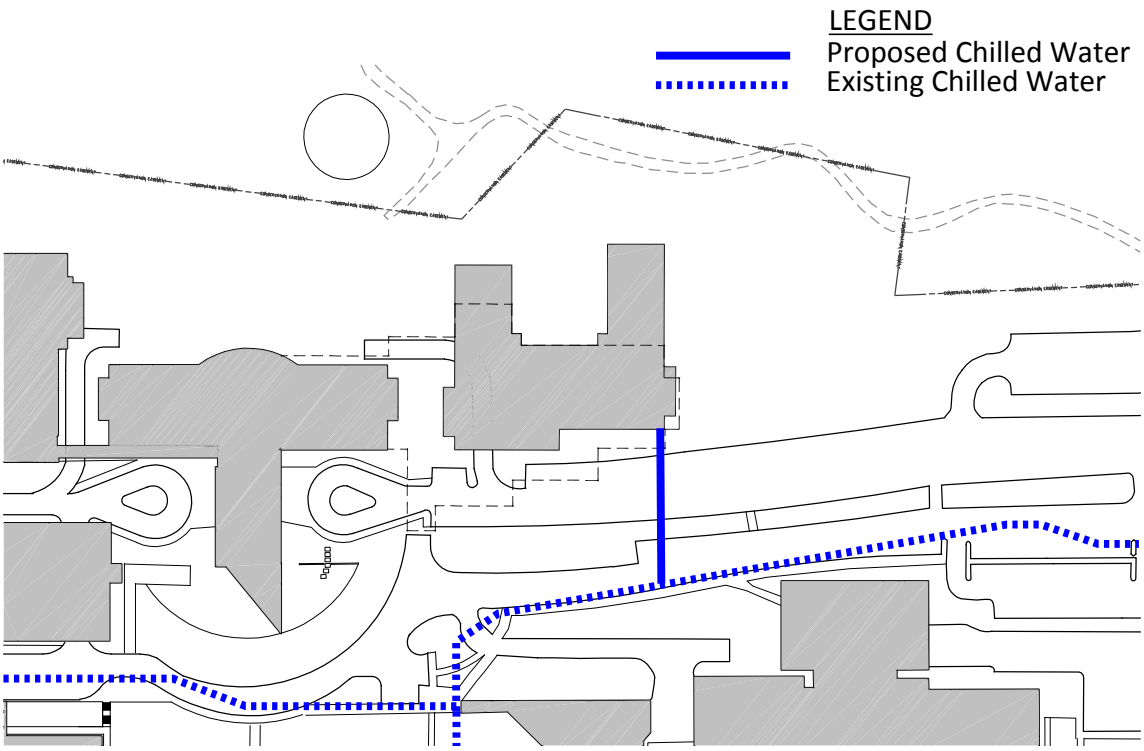


### 2.4.4 Chilled Water

A chilled water line exists in North Medical Drive. The line continues to the north past phase I. A connection to the phase IV project was anticipated and consequently, there is capacity in the existing line running in North Medical Drive.

The long range plan anticipated approximately 200,000 square feet for phase IV. However, an expansion to the central plant may be required as part of the project.

**Chilled Water**



### 2.4.5 Water Storage Tank

The top of the existing water storage tank is located approximately 190 horizontal feet and 95 vertical feet to the east of the Phase I building. In March of 2013, WEST Consultants, Inc. performed a study of this tank entitled, ***Storage Tank #2 Inundation Study***. In this study, WEST listed the following parameters:

Height of Water in Tank = 16 feet
Tank Diameter = 97 feet
Tank Area = 7,390 $ft^2$
Tank Volume = 884,500 gallons

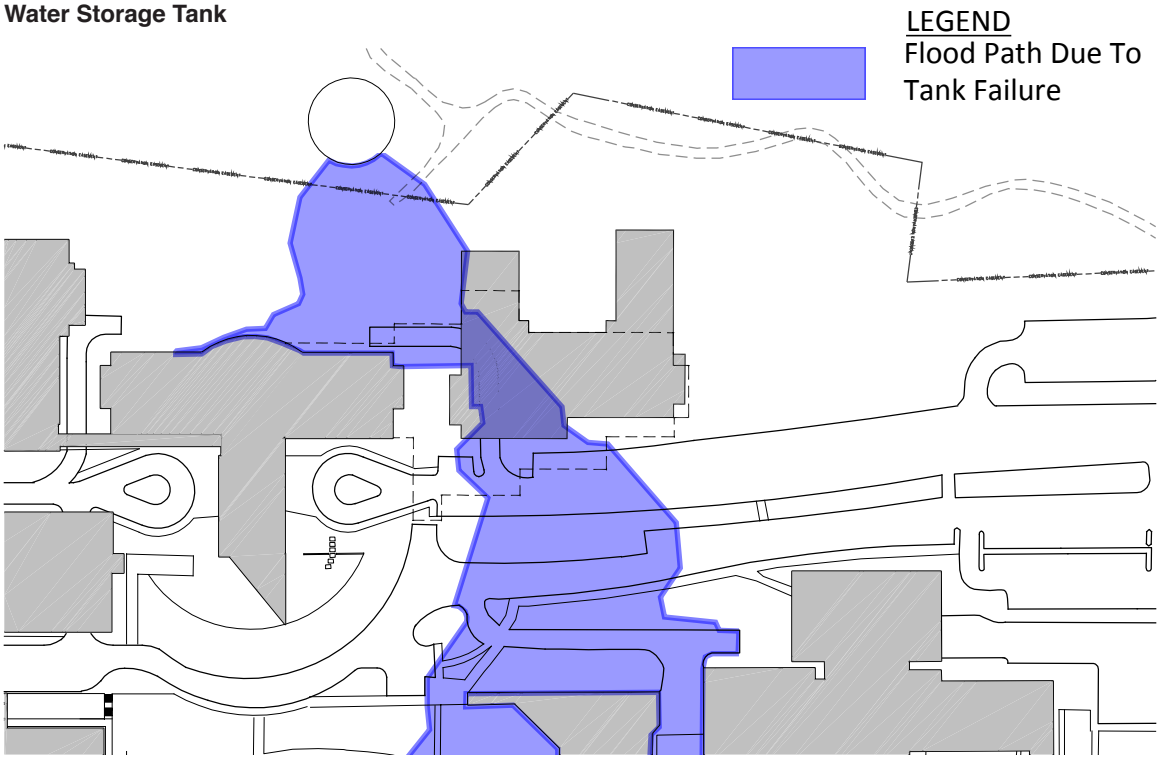
The report also studied the probable flow path created by a tank breach due to a sizable earthquake in the Salt Lake area. The magnitude of the flow path was studied according to the campus as presently constituted. Four breach widths in the tank were studied: 5 feet, 10 feet, 20 feet and 40 feet. Studying these widths generated a range of design parameters, specific to a location near the HCI air intake, to help understand the reality of the water created by the tank breach. They are listed below:

Range of Maximum Depth = 4 to 9 feet
Range of Maximum Velocity = 15.5 to 25.5 feet/sec.
Range of Time to Maximum Depth = Less than 30 seconds (all scenarios)

The flood path tends to funnel towards the dock area located between the phase I and phase IV buildings. Without some intervention, the dock area will likely become inundated.

Given the current layout of the surrounding improvements, containment of the tank volume due to a breach is not practical. The more practical approach is to design the proposed site and utilities to strategically route the released water through the site. Routing the water safely through the HCI campus should have at least two goals: 1) Maximize the health and safety of patrons and employees; and 2) Minimize the damage to existing and proposed structures. The design process should produce some solutions to meet these goals.

**Water Storage Tank**



### 2.4.6 Culinary Water / Fire Protection

There are both Salt Lake City-maintained lines and University of Utah-maintained lines in the immediate vicinity of the HCI phase IV site. Additionally, there are backup lines feeding from the 884,500 gallon water tank that terminate in a fire hydrant located across the maintenance road from the existing cooling towers.

Existing culinary service mains are laid in North Medical Drive. There is a 16-inch, Salt Lake City-maintained line located in the west side of the road. Additionally, there is a 12-inch, University of Utah-maintained line in the east side of the road.

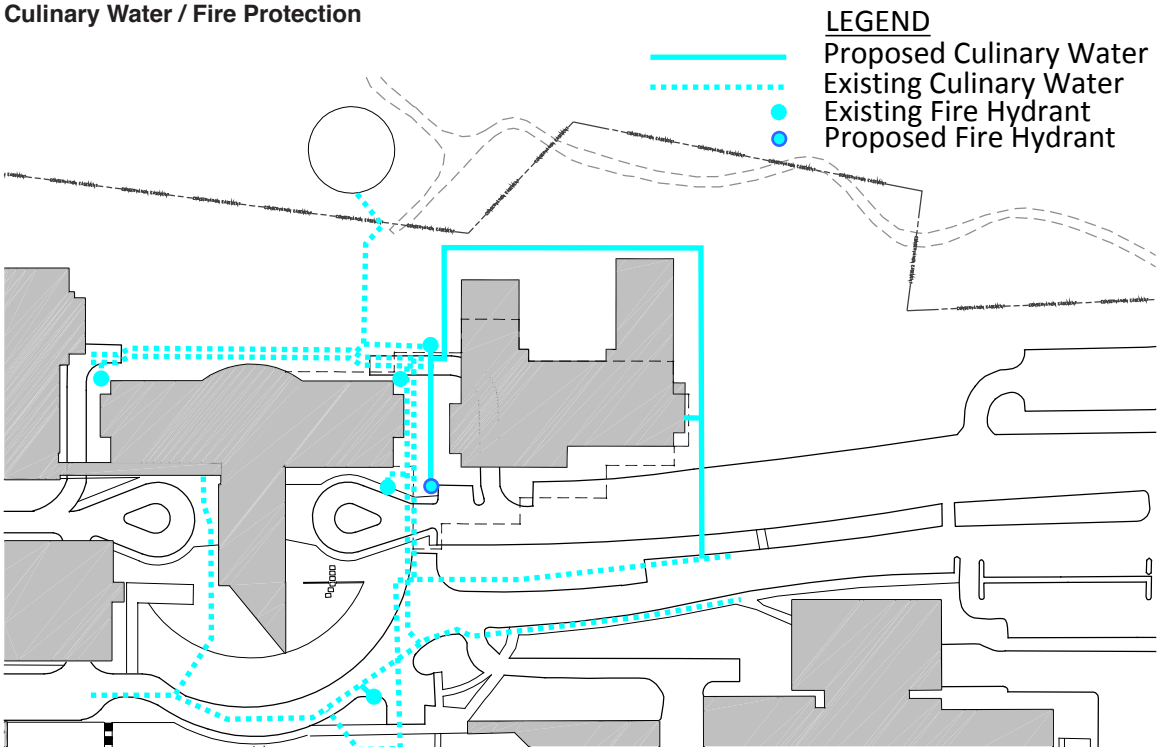
The project will extend the 12-inch university-maintained line around the south end of the phase IV expansion. The new building will connect to this line from its mechanical room near its southeast corner for both domestic and fire protection uses.

Fire protection lines will be extended around the east side of the phase IV building from the 12-inch university-owned main line to its respective segment buried in North Medical Drive. The existing valve for this extension is located in the service drive that wraps around the southeast corner of the phase I building. The phase IV building will employ an internal fire protection system capable of fighting a fire according to current fire protection standards.

Additionally, multiple fire hydrants (locations to be determined) will service the plaza areas east of the building with stepped pedestrian walkways for fire fighter access. These walkways will function in a fashion similar to those found on earlier phases of the Huntsman campus. The existing fire access road located south and east of the phase I building will likely be eliminated by the phase IV building.

Lastly, there is a secondary water tank connection, in the form of a charged fire hydrant, located southeast of the phase I building. This connection will likely be relocated to the drive aisle west of the phase I and IV buildings for easier access by firefighting equipment.

**Culinary Water / Fire Protection**

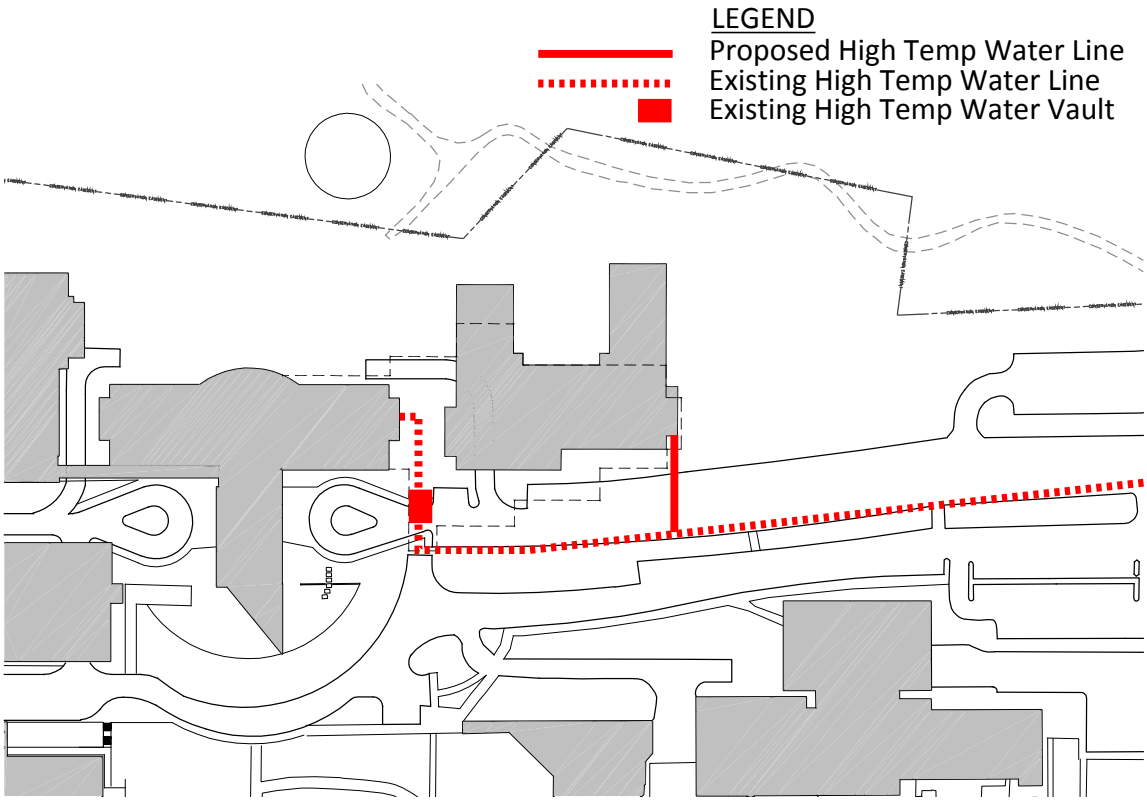


### 2.4.7 High Temp Water

There is an existing 8-inch high-temperature water line buried in East Medical Drive that is part of Zone 5A. The line terminates into the phase I building. The high temperature system comes into an underground vault where the line pressure reduces before entering into the building. Consideration of the proximity of phase IV building expansion to the vault must be understood.

The 8-inch main has capacity for the phase IV building as a connection was anticipated in the long-range plan. This plan anticipated approximately 220,000 square feet for the phase IV connection. The line has deteriorated to a point where the University has noted plans to replace the line in their Capital Utility Improvement Schedule. Simultaneously, they would like to upsize it to either a 10-inch or a 12-inch main, depending on an analysis of future demand. It is clear that the existing line will not be replaced as a part of the phase IV project. However, there is some discussion about installing a parking garage immediately west of the phase IV building. Such a project appears to be the more likely catalyst for upgrading and relocating the existing high-temperature water line.

**High Temp Water**



### 2.4.8 Sanitary Sewer

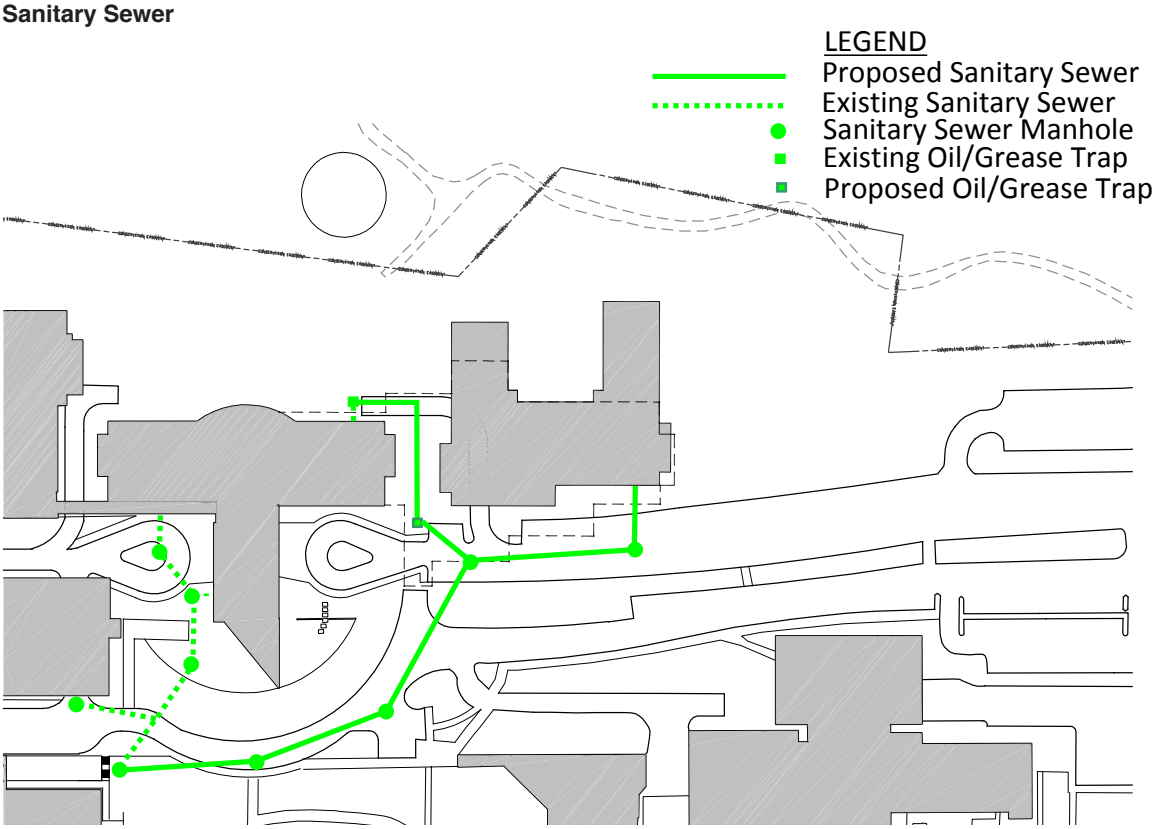
The preferred manhole to service the phase IV building is located near the southeast corner of the Clinical Neurosciences Center. It appears that all of the phase I sewer wastes discharge into this particular manhole and continue downstream through a 12-inch line that connects to the main sewer system on campus. Connection for proposed sanitary sewer systems will be made to this manhole.

An oil and grease trap exists near the southeast corner of the phase I building. Because the fire access road leading to the east of the phase I building will be eliminated, access to service the existing trap will also be eliminated. This trap is currently cleaned and serviced quarterly. Typically, heavy equipment servicing these traps needs access to within 150 feet of the trap.

Without relocation, the trap will be about 250 feet away. Additionally, the ability to adequately power wash the unit as well as the upstream and downstream sewer lines may be compromised. Furthermore, the trap may be in the way of the relocated cooling towers and the new vivarium tunnel. Therefore, the trap will likely be relocated closer to the drive aisle west of the phase I and IV buildings.

Section 3.3.5 (Sanitary Sewer and Waste) and Section 3.3.8 (Food Service) of this program describes the internal sanitary sewer service needs for the new building. It is understood that the need of an additional oil/grease trap has not yet been determined. If a trap is needed, design will be provided by the plumbing engineer. The civil plans will coordinate the location and connection to local sanitary sewer system.

**Sanitary Sewer**



### 2.4.9 Storm Sewer

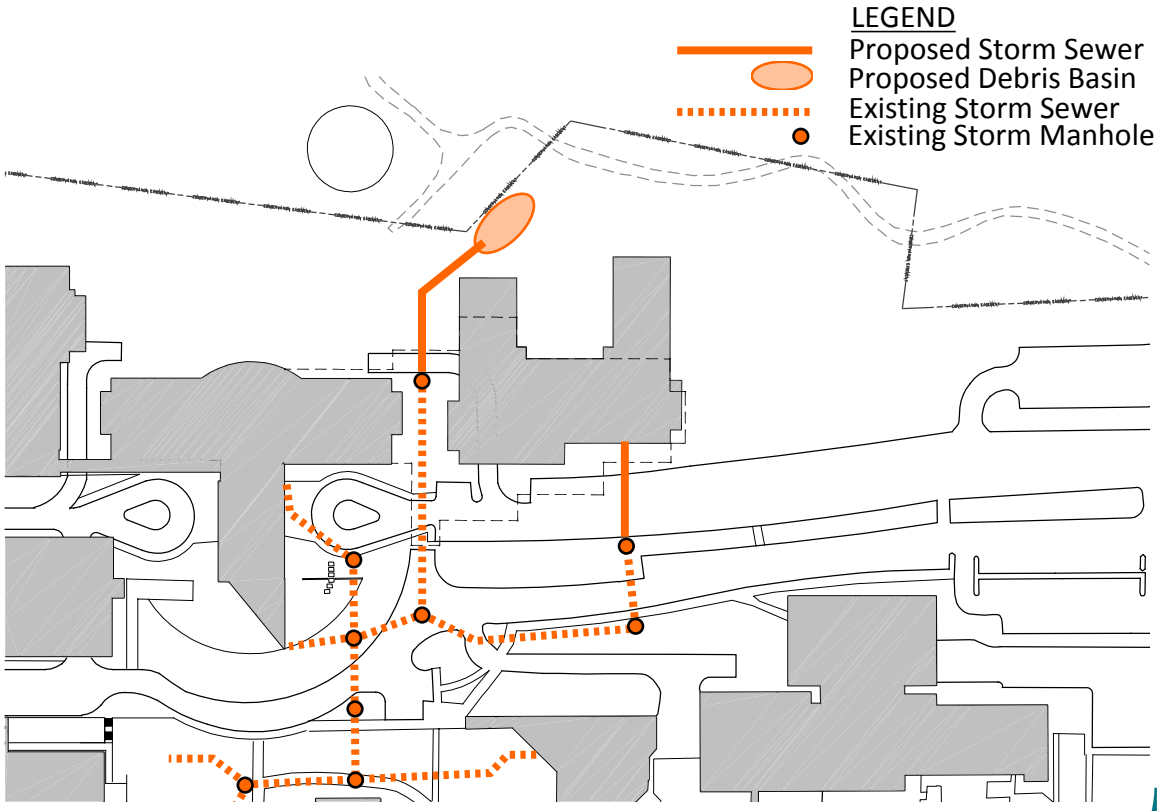
Detention is not required on the phase IV site. A campus regional detention facility is located on the Primary Children's Medical Center site. Storm water from the phase IV site will be captured in the existing pipe infrastructure and routed without constraint towards the campus regional detention facility.

As described in Section 2.2.4, a substantial gulch drains across the phase IV site. Immediately upstream of the site, the gulch contains a 36-inch concrete pipe through which all storm flows of the gulch pass. The capacity of this pipe is approximately 230 cubic feet per second. The proposed debris basin serves as a catchment area for water flowing through this pipe. A connection will be made from the new debris basin to the existing storm sewer manhole located in the dock area of the phase I building. The pipe downstream of this manhole is only 15 inches in diameter and is already dedicated to pass certain flows from the phase I site. The design is intended to maximize the capacity of the 15-inch pipe, utilize the capacity in the debris basin as a buffer, and route excessive storm flows around the building via overland flow. This drainage system will be designed to handle a 100-year storm event.

The diagram below shows two connections to the existing storm sewer lines located immediately north and west of the proposed building site. These will be the major connections to the existing system used to drain the proposed site. Roof drains will also be connected to this system.

There is some discussion about recycling storm water for use in either process water or irrigation. Additionally, there is a substantial subsurface stream flowing below the site. This flow has been observed about 16 feet below the surface and has been successfully pumped at about 800 gallons per minute. Multiple encounters with this subsurface flow have shown it to be continuous. As the design process unfolds, these options will be considered and implemented where feasible.

**Storm Sewer**



## 2.4.10 Saltwater System

Phase I utilizes a large brine tank (approximately 40' X 60') that is buried under the approach road from the South. The existing tank was installed roughly 20 years ago. Current practices utilize revised systems that can be incorporated into the building envelope and do not require the use of a large exterior brine tank. Therefore, no such tank is planned for phase IV.

HCI has been experiencing difficulties maintaining and using the existing saltwater system. Access to the system also conflicts with proposed location of the phase IV building expansion. Consideration of relocating the salt water system and potentially installing a Step-saver system should be vetted prior to design.

## 2.4.11 Irrigation

**Water Main Connection**
An existing point of connection to the culinary water main is located in the grass area south of HCI phase one. The point of connection includes a backflow preventer and services a 3" irrigation main line. The static water pressure at this location is 108 psi. The 3" main line is routed up the hill, across the HCI phase I visitor drop-off, adjacent to the chiller plant stacks, and then wraps around the back side of the building.

Re-routing of this main will be necessary to accommodate the proposed building expansion. The mainline must be kept in service during construction as it provides irrigation water to the HCI's existing landscape. The mainline is a looped system which provides some redundancy and capability to shut down individual portions of the mainline without shutting down the entire system.

University of Utah's Grounds Department has requested that a new, independent point of connection be installed to service the Phase IV expansion's irrigation system. The new point of connection will tap into the culinary water system; include a backflow prevention device and a hydrometer.

**Irrigation Controller**
The existing irrigation controllers at HCI do not have capacity to operate the phase IV expansion's irrigation system. An irrigation controller must be included as part of the new irrigation system. The Grounds Department has requested for the new controller to be pedestal mounted and equipped with TRC technology to provide strong remote control capabilities during the ongoing operation and maintenance of the system. Field Technicians have found it difficult to remote control wall mounted controllers.

**Central System Communication**
The University of Utah manages the majority of the campus' various irrigation systems with a central control system. Irrigation controllers in the field, across campus, communicate with the central system via radio communication. Due to the tall buildings in the Health Sciences Campus the "line of sight" necessary for radio communication is inconsistent often causing malfunctions between irrigation controllers in the field and the central system.

To resolve these communication issues, the Grounds Department recommends installing a central control unit (CCU) as part of the HCI phase IV expansion's irrigation system. The CCU functions as a hub that collects radio communication from the irrigation controllers in the field and then sends transmissions via hard-wire Ethernet connection back and forth to the central system. The CCU's large radio antenna location will provide good "line of sight" radio communication with the existing and proposed irrigation controllers throughout HCI's landscape—eliminating the poor radio communication issues currently being experienced.

A rough preliminary cost estimate of installing a CCU is $10,000 to $12,000. This estimate does not include the cost of the additional irrigation controller that is necessary for phase IV expansion's irrigation system.

# 2 Site Analysis

## Utility Considerations

**System Design Standards**
University of Utah irrigation system design standards will be followed in the design and specification of the proposed irrigation system.

In situations where planting beds or turf abut glass curtain walls of the building, avoid using long throw rotor heads. Instead, implement an eight foot swath of drip irrigation or use shorter broadcast spray head with adjustable nozzles. This greatly reduces overspray onto glass.

In instances where drip irrigation is installed in planting beds, use Netafim in line drip (campus standard). If the planting bed includes perennials or ornamental grasses that require division every couple of years, avoid in line drip. Potential options include spray heads with bubbler nozzles, or point to point drip systems. These alternatives reduce the risk of irrigation system damage during the dividing of perennials.

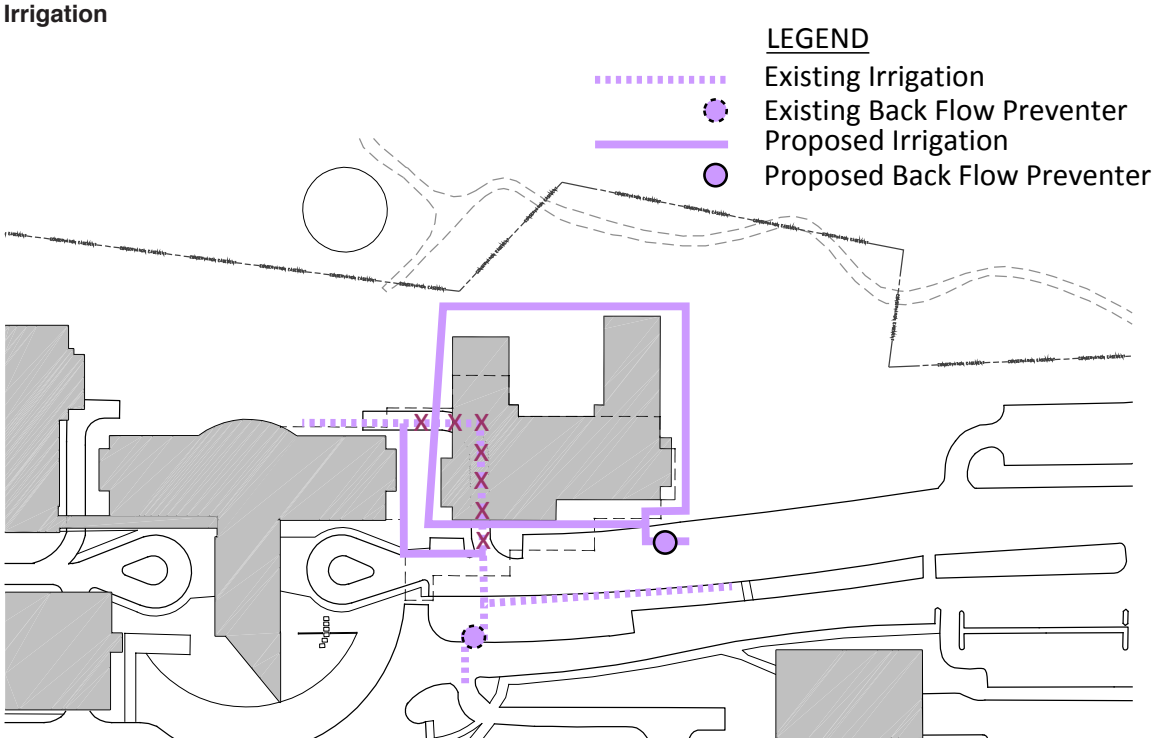
HCI interfaces with the natural lands of the Wasatch foothills. Install hillside irrigation zones to provide fire suppression where the built and natural landscapes interface.

Install mainline isolation valves in multiple locations along mainline to allow for partial system shutdown for repair.

Due to the difference in elevation present between the point of connection and west side of the landscape, install air relief valves at main line high points to relieve stress on the main line when the system is pressurized.

The University Grounds Department has standardized water connections. Install only hose bibs; rather than, hose bibs and quick couplers. Install hose bids at each valve bank of the system.

**Irrigation**



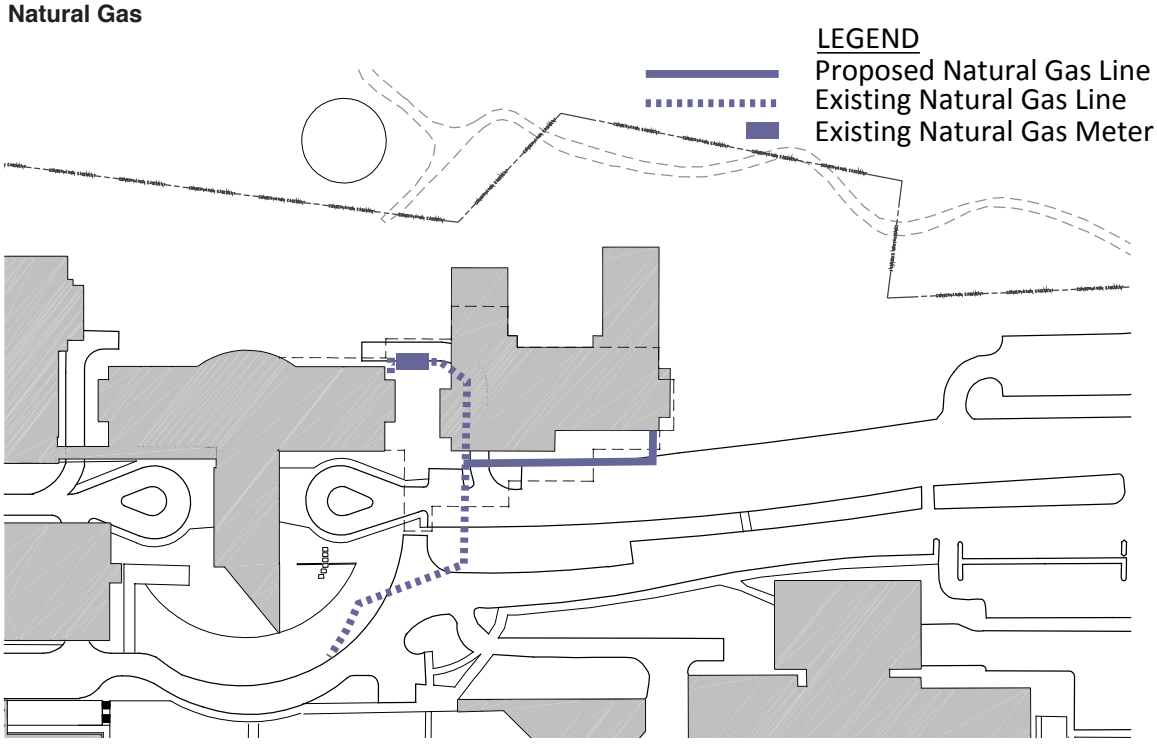
## 2.4.12 Natural Gas

There is an existing natural gas valve and meter station located adjacent to the cooling towers near the southeast corner of the HCI phase I building. The meter contains a 600 psi gas line feed. A 3-inch main line continues from the meter station around the cooling tower towards the west. The line crosses North Campus Drive and bends towards the north in North Medical Drive.

There is a conflict for space between the existing gas meter station and the proposed location for the relocated cooling towers. Additionally, installing the new vivarium tunnel between the phase I and phase IV buildings appears problematic if the gas meter station remains in its current location. Therefore, the gas meter station will likely need to be relocated to make room for both of these improvements. Further study is required to determine the proper relocation site for the meter station.

Connection to the 3-inch gas line south of phase I appears to be the proper location for gas service for the phase IV project. As design of the internal needs of the phase IV project progress, questions regarding the capacity of the existing 3-inch line to service the phase I and phase IV projects can be solved.

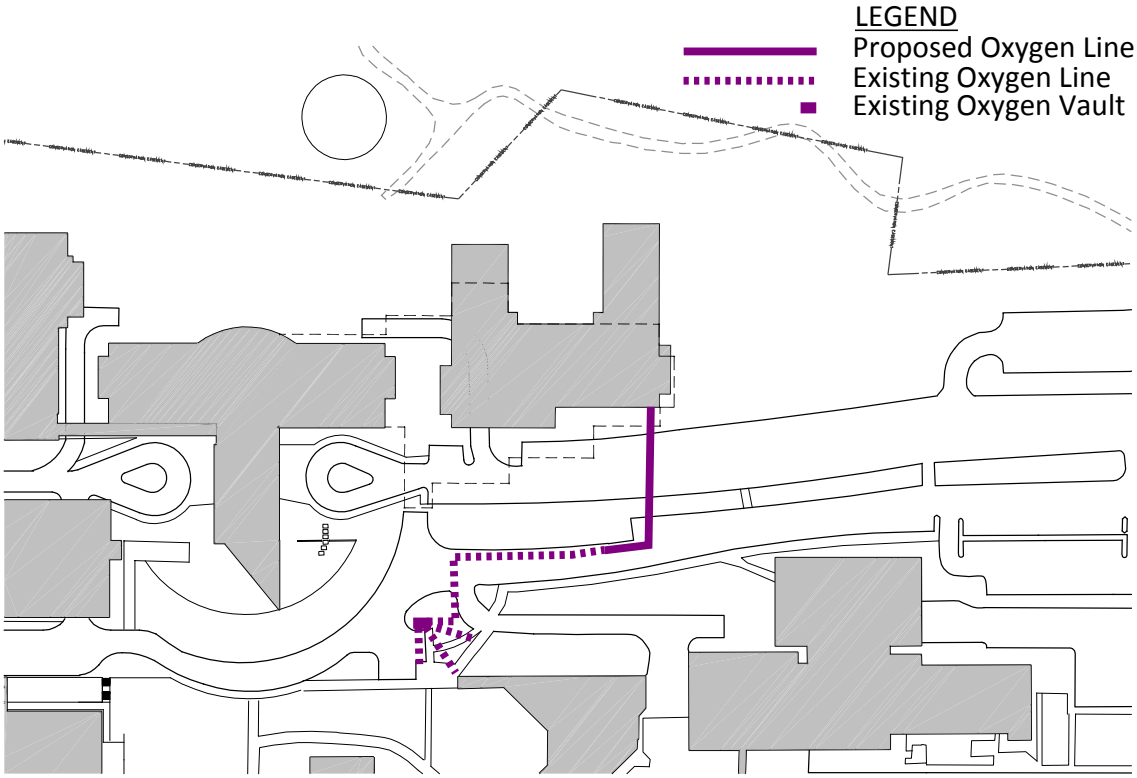
**Natural Gas**



### 2.4.13 Oxygen

An existing oxygen service line trench appears to have been installed as part of the phase I project. The trench seems to about 18 inches wide and 5 feet deep and contains three lines of various diameters: 3-inch, 1-1/4-inch and 1-inch. The trench appears to be connected to the phase I building through the dock area located at the south exterior. From there, the trench runs to the west through the vehicular tunnel until it connects to a raised vault in a park strip across North Medical Drive from the phase I tunnel entrance.

**Oxygen**



## 2.4.14 Electric Power

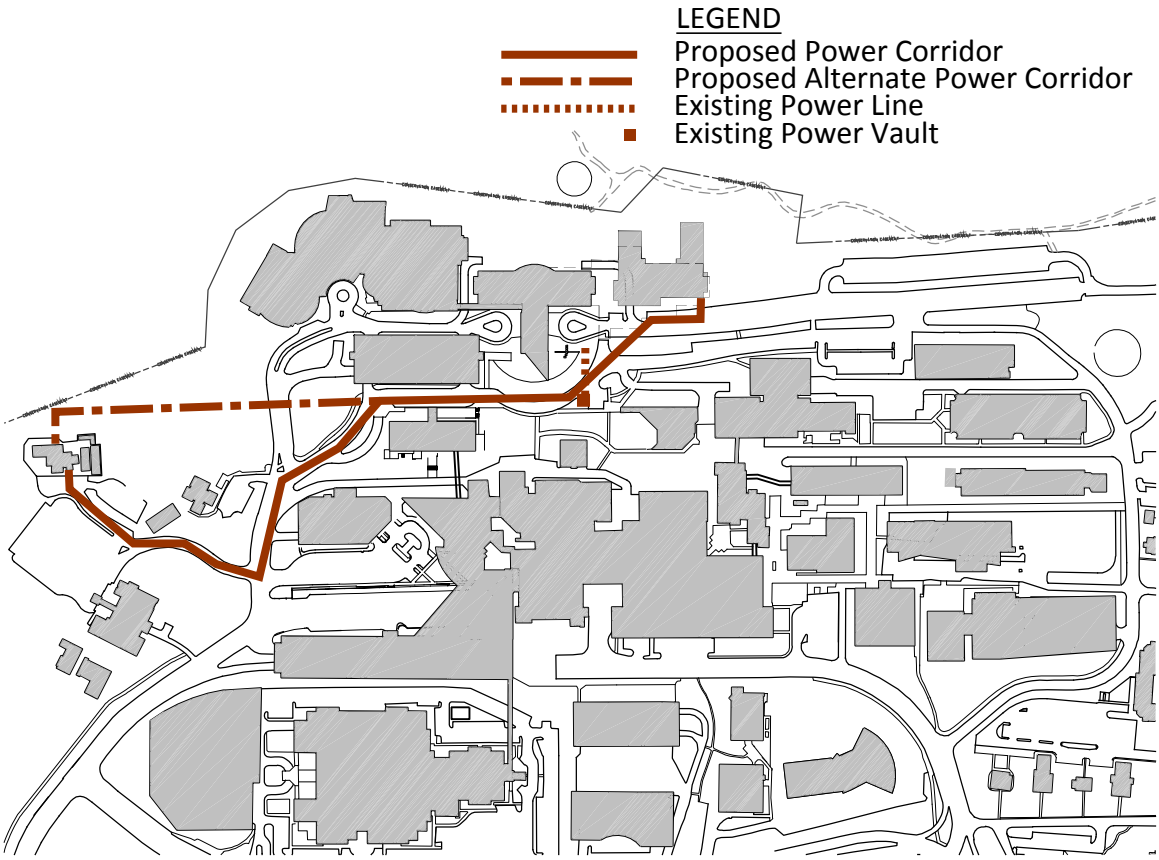
Section 3.3.6 (Electrical/Technology Systems) describes the electrical power needs of the proposed building. There are existing power lines running in duct banks in East Medical Drive from the Red Butte Power Station. The capacity of the existing duct banks appear to be completely full. The initial thinking was to upgrade the capacity of these duct banks to serve the phase IV building. However, a new solution has surfaced. That is to install power duct banks from the Medical Substation as shown on the graphic below.

There are two proposed alignments for the duct banks shown on the graphic. The first utilizes the existing roadway system to locate the corridor. This alignment provides easier access to manholes and other maintenance components.

The alternate corridor follows a more direct route to the Medical Substation. The more direct route translates into less materials and possibly lower cost. However, there may be some design issues (slope, maintenance, etc.) that make this alignment difficult. Both alignments will be studied in further detail as design progresses.

It is understood that the transformer for the building will be located internal to the building and not elsewhere on the site.

**Electric Power**



### 2.4.15 Communications

Section 3.3.6 (Electrical/Technology Systems) describes the communication needs of the proposed building. Existing communications lines, routed through the School of Medicine, are located west of the Phase IV site though there exact location is unclear.

A desire to install a separate dual service system in the proposed building has surfaced. However, such a system would require a new communications duct bank. The project does not appear to have the funds for a separate system.

### 2.4.16 Site Lighting

Exterior area lighting poles and fixtures will be designed to meet the university's campus lighting standards in terms of aesthetic, design, performance, and location. These standards were last updated November 1st, 2013.

## 2.5 SITE PROGRAM

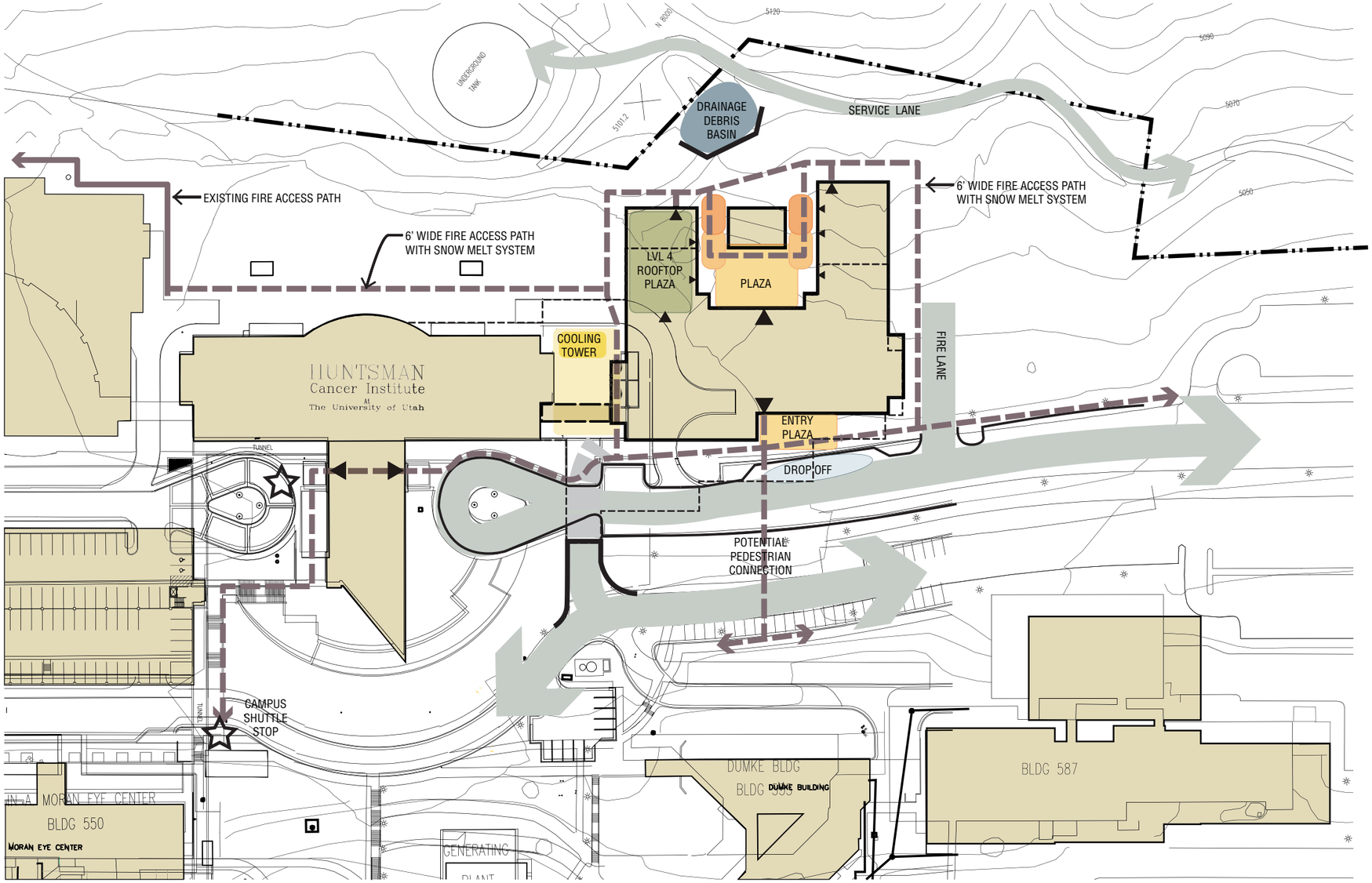
### 2.5.1 Exterior Space Program

The roof top gardens, outdoor patios and plazas should be designed as private space for HCI employees and visitors. Establishing a subtle barrier between the adjacent public shoreline trail and the outdoor spaces must be accomplished.

Sidewalks should be designed to allow access for utility cart maintenance as much as feasible. An eight foot wide sidewalk width should be provided.

Dumpsters and trash collection facilities are to be located within the loading dock area. Trash receptacles for pedestrian convenience should be located at every major building entrance, bicycle storage area, outdoor eating area, and transit stop.

**Exterior Space Program Diagram**



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## 2.5.2 Grading

The finished floor elevation for the building is set to match the finished floor elevation of the phase I building. Setting the finished floor elevation the same as phase I allows skywalk connections on levels 3, 4, 5 and 6 to be completed. To date, two connections are included and will be determined in design. Furthermore, a tunnel from the vivarium in phase I will be connected to the proposed tunnel in phase IV. This will allow the tunnel to connect into the same level in both buildings. Preliminary indications show that because the phase I building is oriented with the contours, the phase IV building should have very little difficulty in making these connections.

Though the finished floor of the new phase IV building seems to fit nicely with the existing phase I building, there are grading issues surrounding the building. The existing parking lot located immediately west of the phase IV building slopes down to the south. Slopes running from the southwest corner of the building to the west are likely to be very steep unless retaining walls are employed. Additionally, the site slopes dramatically to the east, necessitating that the excavation and bury of the building on its north, east and south edges. Furthermore, a multi-tiered plaza is planned immediately east of the building. Extensive retaining wall systems will be employed to allow the building to be constructed into the hillside.

## 2.5.3 Landscape Palette

Due to the precedent set by the initial phases of HCI, specify minimum 4" caliper trees and minimum 5 gallon shrubs. The included plant list (see Appendix 7.4) has been reviewed and approved by the University of Utah. This list should be used for plant selection. If plants are desired that are not on the list, seek approval from the Grounds Department. The University of Utah's primary sources for plant material are Progressive Plants and Twin Pines Nursery. The campus standard turf grass species mix is one hundred percent bluegrass. It should be used throughout this project.

**Rooftop Patio Planters and Green Roofs**
University of Utah campus standard green roof system is provided by Hydrotech. The minimum soil depth is two feet. The standard planting medium and soil specifications should be used in this project. Coordination with both architectural waterproofing of the building and structural load calculations must be addressed to meet these standards.

Planting design of the roof top gardens should take into account the difficulty of access for maintenance. Avoid using plants that require routine maintenance such as annuals and perennials. An acceptable level of maintenance requirements is clean up in the spring and pruning in the fall.

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## 3.1 ARCHITECTURAL PLANNING ISSUES

### 3.3.1 Project Mission

The goal of the New Children's and Families' Research Center at Huntsman Cancer Institute project is to capitalize on Huntsman Cancer Institute's success to further develop the facility and program including a Strategic Research Program expansion. This program expansion includes the following mission:

- Children's Cancer Research: Expand HCI programs in leukemia, sarcoma, and brain cancers to fight the leading disease killers of children.
- Cancer Genetics: Build on HCI's major discoveries in cancer genetics to tailor diagnosis and therapy.
- Cancer Risk & Prevention: Identify adults and children at high risk for cancer and intervene early for improved outcomes.
- Advanced Therapeutics: Accelerate progress in drug discovery to develop new treatments for childhood and adult cancers.
- Molecular Imaging: Advance cancer imaging to provide improved detection and treatment evaluation.
- Cancer Health Disparities: Ensure that all Utahans have access to cancer information and care.
- Wellness & Survivorship: Improve long-term quality of life for cancer survivors, including pediatric cancer survivors.
- Infrastructure: Establish HCI Biotechnology Center with world-class resources for cancer research.

**Key Project Details**

- The building will be wholly owned by the state of Utah
- The Huntsman Cancer Institute critically needs a research expansion estimated to provide 220,000 square feet of new research space
- Patient visits: 125,000/year (2013 projected visits) Current HCI space is fully occupied
- Development of programs, including the Center for Children's Cancer Research, requires new space
- Rapid pace of technology development is dramatically accelerating cancer research progress today
- Research program expansion will enhance competitiveness for grant funding and commercialization

**Impact on Utah Health and Economy**

- Improve human health: Cancer research saves lives
- Solidify and advance Utah's leadership position in cancer genetics and personalized medicine

**Huntsman Cancer Institute Accomplishments and Distinctions**

- The only National Cancer Institute-Designated Cancer Center in Intermountain West
- One of only 23 members of the National Comprehensive Cancer Network (NCCN)
- HCI scientists have discovered more inherited cancer susceptibility genes than anywhere else in the world

- Led development of the largest human genetic database in the world (Utah Population Database)
- More than 300 papers on HCI cancer research findings are accepted for publication in peer-reviewed scientific journals each year
- HCI brings major national media attention to Utah: e.g., The New York Times, CNN, and many others

**A Distinguished, Award-Winning Faculty**

Nobel Prize in Medicine, American Academy of Arts and Sciences Fellows, Howard Hughes Medical Institute Investigators, American Cancer Society Sword of Hope Awards, Jimmy V Foundation Award, Damon Runyon Foundation Clinical Investigators, Utah Governor's Medal for Science and Technology recipients, and many others

**HCI Brings Unique Resources For Cancer Research and Care To Intermountain West**

- Patients with complex cancers can stay in Utah for treatment.
- Many patients who live outside of Utah travel to HCI for treatment.
- HCI's programs include the only phase I clinical research program between Denver and San Francisco.
- HCI research makes over 200 clinical trials available to patients throughout state, from Logan to St. George.
- HCI hosts over 90,000 patient visits per year.
- HCI's alliance with Intermountain (Huntsman-Intermountain Cancer Care Program) has raised standard of cancer care for all Utahans.

### 3.1.2 Building Form and Massing

Architectural Nexus has evaluated the massing of the phase IV project to align with how it has been developed and designed for the first three phases of the Huntsman Cancer Institute and Hospital buildings.

**Exterior**

Presently, the existing buildings include concrete block and curtain wall systems as the primary exterior materials. 1/8" Bent Metal panels are used as accents and trim on the building. The color of the curtain wall is a custom champagne metallic color which is used on both the curtain wall aluminum and the metal panels.

The concrete block is a specialized block from Trenwyth Inc which comes from Illinois. The block looks like stone and does not have the dark flecks, which is associated with locally supplied block. The block has a limestone base which offers a uniform look of stone. One advantage to using this block is cost. The cost of this block product is equivalent to using a common brick veneer. The limestone base also provides this concrete block similar qualities to brick veneer as far as its ability to repel water. No sealant is needed for the concrete block.

The glazing on the building will match the previous phases. A low E energy efficient glazing has been used on all the phases. This glazing presently exceeds the energy codes in use today. Any roof below the level six roof line will be a green roof with a minimum of one roof plaza open to use by the staff. Level six roofing will be a membrane roof.

**Massing Issues**

The following is a discussion of building massing issues, which effect the ultimate decision on the building's form and massing.

Issue 1: Existing Huntsman Cancer Institute Buildings
The existing Huntsman Cancer Institute buildings create a strong eastern façade to the University. The phases of the HCI buildings are all high rises with a western grade to roof elevation of 96 plus feet. The proposed new phase IV building will have a similar height and mass.

Issue 2: Building Functions
Phase IV is primarily a research laboratory meeting 50% wet laboratory and 50% dry research (office spaces). The building will house approximately 300 full time staff members. Laboratory spaces are rigid and not as flexible as office space. These distinctions are shown in the laboratory narrative.

Issue 3: Views
HCI Phase IV, in our opinion, has the best opportunity on the Campus for 360 degree views. The eastern views are unimpeded views up the western mountain slopes. The southern views can see down the east Salt Lake Valley bench to the Point of the Mountain and beyond. The Western direction has panoramic views of the entire Salt Lake Valley. The Northern views are only limited by the Huntsman Cancer Institute buildings. Views from level two and above are not blocked by any of the University buildings west of the proposed phase IV site.

### 3.1.3 External Relationships

Phase IV will have several direct connections to phase I. The first two connections are on the underground on level A. The new vivarium will be directly connected to the existing phase I vivarium. The phase I dock will be combined with the new dock at phase IV enhancing both buildings while keeping the required staff at a minimum.

Presently, two bridge connections are planned to connect phase I with phase IV to enhance the communications between the research spaces and to allow a connection to food services and the large auditorium in phase I. HCI Phase IV does not currently have new parking as part of the project scope, independent studies by the University of Utah are presently underway. The new phase IV is constructed to allow connections to an underground section of a parking structure to the west of the new building. The new building configuration is compact and utilizes the site extending to the east with wings to permit the minimum impact on future University of Utah laboratories to the south of phase IV.

Fire protection for the building will be provided by fire truck access to the northwest, south and west faces of the building. A snow melted concrete walkway with a minimum of 6 foot wide access is provided along the east, south and north sides of the building similar to phases II and III. A snow melted trail will also be provided on the east side of phase I. This provides access for fire-fighting and exiting from the building. The east bench hillside grades, makes it impossible to provide a fire truck access. A complete system of fire hydrants will be provided along the eastern hillside similar to phases II and III primarily to fight hillside fires.

The design shall provide roof top plazas and a large central plaza on the East side of the building for staff use. Direct access to the exterior will be provided from levels 1 through 4 depending on the location in the East to West direction due to the site grades.

### 3.1.4 Internal Relationships

The Phase IV research building has been planned to maximize collaboration between the investigator teams in the west research laboratories and to bring into the building outlaying dry research groups. Laboratory modules are intended to accommodate 6 investigator teams in one laboratory module. The module is large enough to allow investigators teams to shrink or grow with needs and still allow collaboration without creating too much distance in the wet laboratory and office areas. The break rooms at each module are also setup to keep both the office personnel in contact with laboratory personnel. Direct visual connections will be made from office areas to the laboratories. This was a high priority with laboratory and office workers. Small meeting spaces throughout the building will allow for accidental meetings and allow groups to meet throughout the building without disturbing other staff members.

Office and dry laboratory areas are presently large areas which will have the ability to flex in sizes for the various department needs. There is a large conference room on each level with a number of smaller conference rooms. Some of the larger conference rooms will have the ability to be partitioned into smaller rooms as needed on a daily basis.

Central locker rooms and shower facilities are provided for the Institute's employee's use. A secure bike storage facility and a large exercise area are provided with access from the interior and exterior of the building for all of the Institute's use on level one.

Bridge connections are provided to link phase I and the new phase IV buildings which house the research branch of the Institute.

### 3.1.5 Circulation, External and Internal

**Exterior**
The phase IV building will have access and exiting circulation pathways on all sides of the facility. The HCI facilities are unique to the University in that the buildings sit on high slope sites on the east bench preventing fire trucks from accessing the east sides of the building. A series of concrete walkways and stairways have been developed with the approval of the Fire Marshalls and the Salt Lake City Fire Department to provide the walkway system on the east side of the building. The walkway is a minimum of six feet wide and is entirely snow melted so that no additional maintenance is required by the Institute or the University in winter conditions. This walkway system also allows for emergency exiting from all sides of phase IV. Stair towers exit directly to the exterior of the facility.

Phase IV will have bridge connections to phase I but the bridges are not used for exiting from either building.

**Interior**
Phase IV is presently planned to include four stair towers. Any stair tower that extends to level six will be pressurized because the building is classified as a high rise. The height from the fire truck access to level to the top floor is 80 plus feet. Presently, floors one through five have four accessible stair towers. Levels A (below grade) and level six have 3 accessible stair towers. The maximum occupancy load (B occupancy) is 380 on any single floor.

There are four passenger elevators serving all floors which will be closed off with smoke curtains while in the fire alarm mode along with two freight elevators.

### 3.1.6 History and Growth

**Phase I (Research and Clinical Building)**
Planning started in 1994 with occupancy in early 1999. The building included 36 investigator teams in the wet research laboratories and was supported by dry research groups and the institute's administrative offices. The building is supported by a large food services and dining facility. Phase I also houses the large 324 seat auditorium and an outpatient clinic center on level 2. Phase I consists of 238,000 GSF. A parking structure was built along with the phase I building.

**Phase II (Cancer Hospital and Clinic Building)**
The Huntsman Cancer Institute Phase II expansion planning started in 2000 with occupancy in 2003. The building expanded the institute's outpatient clinics and afforded the ability to provide full inpatient care. Phase II totaled 300,000 GSF. The building allowed for 50 inpatients, surgical services, Radiation Therapy, Imaging and food services. An additional conference center was added. This addition allowed for closer ties between research and clinical care of patients. Phases I and II are connected at the clinical floor and the sixth floor connecting the auditorium, food services and the conferencing center.

**Phase III (Cancer Hospital and Clinic Building Expansion)**
The Huntsman Cancer Institute and Hospital started a third building (expansion) in 2005 with occupancy in 2009. The expansion was 174,000 GSF. The expansion increased the inpatient component to 100 which included a bone marrow transplant unit and a critical care unit. Surgical capabilities were enhanced along with the expansion of imaging and clinical care areas.

**Proposed Phase IV (Research Building)**
The Huntsman Cancer Institute presently is looking to expand their research capabilities in Family and Pediatric cancer research. The proposed phase IV building will be 220,000 GSF and house 35 new investigator teams and increase the dry research capabilities. The building occupancy presently is planned for April of 2017.

### 3.1.7 Personnel Interaction / User Characteristics

The Huntsman Cancer Institute's goal is to provide opportunity for collaboration between investigators and promote interaction with clinical staff determining patient needs in the advancement of treatment technics. The phase IV building is proposed to allow the maximum ability for interaction with others in all areas of the building. A unique feature is the size of the open laboratories which allows the investigator teams to flex in size depending on their grant needs. Visual sight lines from adjacent areas are maximized to allow interaction.

### 3.1.8 Building Security

Phase IV security will be handled differently than phase I. The proposed design allows of the laboratory modules to be secured from all the public building spaces with card access. The stair towers and elevators will have card access. The card access within the building will fail safe open in fire alarm mode. All exterior doors will have card reader access controls. The level A Vivarium will include controlled access by a biometrics identification system. All the security controls will be run to the Institute's central control monitoring location. All security systems will comply with University of Utah Standards.

Video monitoring will be used for stairwells, exterior areas around the building, walkways and plaza areas in compliance with University of Utah Standards. Video monitoring will relay to the Institute's central monitoring location.

The vivarium spaces will have no exterior windows or unprotected outside openings.

### 3.1.9 Codes, Regulations and Safety

Codes relative to the HCI Phase IV building include:

- International Building Code 2012
- University of Utah Design Standards, November 1, 2013
- DFCM Design Criteria November 1, 2013
- International Mechanical Code 2012
- International Plumbing Code 2012
- International Fire Code 2012
- International Energy Conservation Code (IECC) 2012
- ADA (ADAAG) 2009
- ICC/ANSI A117.1 2009
- NFPA 2010
- ASHRE 90.1 (Energy Code) 2009
- NEC (National Electrical Code) 2011
- American Institute of Steel Construction (AISC) with commentary
- ACI 318 Building Code Requirements for Reinforced Concrete
- American Iron and Steel Institute (AISI) Specifications for the Design of Cold-Formed Steel Structural Members
- American Welding Society (ANSI/AWS) D1.1 Structural Welding Code
- Steel Joist Institute (SJI) for open wed Joists and Girders
- Steel Deck Institute (SDI) for metal floor and roof decks
- University of Utah East Campus Central / Chilled Water Plant, Design Manual B August 2013

See the following pages for a preliminary detailed code analysis of the Primary Children's & Families' Cancer Research Center at Huntsman Cancer Institute facility.

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# CODE ANALYSIS

## APPLICABLE CODES

| | Year | | Year |
|---|---|---|---|
| International Building Code | 2012 | National Electrical Code | 2011 |
| International Mechanical Code | 2012 | Uniform Code for Building Conservation | 2009 |
| International Fuel Gas Code | 2012 | ADA Accessibility Guildelines | 2010 |
| International Plumbing Code | 2012 | ICC / ANSI A117.1 | 2012 |
| International Fire Code | 2012 | | |
| International Energy Conservation Code | 2009 | | |

A. Occupancy and Group: B A-3 _____ _____ _____

Level 1 has a 100 seat Auditorium (A-3 Occupancy) with B Occupancy taking the remainder of the floor.

Change in Use: Yes _____ No XX Mixed Occupancy: Yes XX No _____

Special Use and Occupancy (e.g. High Rise, Covered Mall): HIGH RISE

B. Seismic Design Category: II Design Wind Speed: 115 mph

C. Type of Construction (circle one):

I/A (circled) I/B II/A II/B III/A III/B IV/HT V/A V/B

D. Fire Resistance Rating Requirements for the Exterior Walls based on the fire separation distance (in hours):

North: 0 South: 0 East: 0 West: 0

E. Mixed Occupancies: YES Nonseparated Uses: YES

F: Sprinklers:

Required: YES Provided: YES

Type of Sprinkler System (IBC 903.3.1) NFPA 13

G: Number of Stories: 6 Building Height: 96'-0"

# CODE ANALYSIS

H: Actual Area per Floor (square feet): TBD

I: Tabular Area: (table 503): UNLIMITED

J: Area Modifications: TBD

a) $A_a = \left\{ A_t + \left[ A_t \times I_f \right] + \left[ A_t \times I_s \right] \right\}$ $\quad I_f = \left[ F/P - 0.25 \right] W/30$

b) Sum of the Ratio Calculations for Mixed Occupancies: TBD

$$\frac{\text{Actual Area}}{\text{Allowable Area}} \leq 1$$

c) Total Allowable Area for: TBD

1) One Story: _____
2) Two Story: $A_a(2)$_____
3) Three Story: $A_a(3)$_____

d) Unlimited Area Building: Yes XX No _____ Code Section: T503

K. Fire Resistance Rating Requirements for Building Elements (hours).

| Element | Hours | Assembly Listing | Element | Hours | Assembly Listing |
|---|---|---|---|---|---|
| Exterior Bearing Walls | NA | | Floors - Ceiling Floors | 2 | D933, D743 |
| Interior Bearing Walls | TBD | | Roofs - Ceiling Roofs | 1-1/2 | D933 |
| Exterior Non-Bearing Walls | NA | | Exterior Doors and Windows | 0 | |
| Structural Frame | 3 | X649, N731 D902, X790 | Shaft Enclosures | 2 | U497 |
| Partitions - Permanent | 0 | | Fire Walls | TBD | TBD |
| Fire Barriers | 0 | | Fire Partitions | TBD | TBD |
| | | | Smoke Partitions | 0 | |

# CODE ANALYSIS

L. Design Occupant Load: See Table

Exit Width Required: See Table Exit Width Provided: TBD

| Floor Level | Floor Description | Occupant Load Factor (T1004.1.2) | # of Occupants (1004) | # of Exits (1021/1015) | Required Egress Width (1005) (x0.2) | Required Stair Width (1005) (x0.3) | Required Aisle Width (1018) | Common Path of Travel Distance (1014.3) | Total Travel Distance (1016) |
|---|---|---|---|---|---|---|---|---|---|
| A | Service | 1/100 | 369 | 3 | 73.8" | 110.7" | 60" min | 100'-0" | 300'-0" |
| 1 | Office | 1/100 | 278 | 4 | 55.6" | 83.4" | 60" min | 100'-0" | 300'-0" |
| 2 | Lab | 1/100 | 358 | 4 | 71.6" | 107.4" | 60" min | 100'-0" | 300'-0" |
| 3 | Lab | 1/100 | 369 | 4 | 73.8" | 110.7" | 60" min | 100'-0" | 300'-0" |
| 4 | Lab | 1/100 | 369 | 4 | 73.8" | 110.7" | 60" min | 100'-0" | 300'-0" |
| 5 | Office | 1/100 | 315 | 4 | 63" | 94.5" | 60" min | 100'-0" | 300'-0" |
| 6 | Office | 1/100 | 323 | 3 | 64.6" | 96.9" | 60" min | 100'-0" | 300'-0" |
| | BUILDING TOTAL | | 2,381 | | | | | | |

M. Minimum Number of Required Plumbing Facilities:

a) Water Closets - Required (m) 17 (f) 34 Provided (m) TBD (f) TBD

b) Urinals - Required (m) 14 (f) - Provided (m) TBD (f) -

c) Lavatories - Required (m) 26 (f) 26 Provided (m) TBD (f) TBD

d) Bath Tubs or Showers: TBD

e) Drinking Fountains: 27 Service Sinks: 7

| FLOOR - (OCC) | WOMEN | MEN | WATER CLOSETS WOMEN | WATER CLOSETS MEN | URINALS | SINKS WOMEN | SINKS MEN | DRINKING FOUNTAINS | SERVICE SINKS | OTHER |
|---|---|---|---|---|---|---|---|---|---|---|
| A - (369) | 185 | 185 | 5 | 3 | 2 | 4 | 4 | 4 | 1 | - |
| 1 - (278) | 139 | 139 | 4 | 2 | 2 | 3 | 3 | 3 | 1 | - |
| 2 - (358) | 179 | 179 | 5 | 3 | 2 | 4 | 4 | 4 | 1 | - |
| 3 - (369) | 185 | 185 | 5 | 3 | 2 | 4 | 4 | 4 | 1 | - |
| 4 - (369) | 185 | 185 | 5 | 3 | 2 | 4 | 4 | 4 | 1 | - |
| 5 - (315) | 158 | 158 | 5 | 3 | 2 | 3 | 3 | 4 | 1 | - |
| 6 - (323) | 162 | 162 | 5 | 3 | 2 | 4 | 4 | 4 | 1 | - |
| BUILDING TOTAL | | | 34 | 17 | 14 | 26 | 26 | 27 | 7 | |

# CODE ANALYSIS

FOOTNOTES:

1) In case of conflict with the U.S. Department of Justice Federal Registers Parts I through V - ADA Guidelines and specific reference to the International Building Code Accessibility Chapters, the more restrictive requirement shall govern.

2) Additional Code Information shall be provided at the discretion of the Building Official for Complex Buildings. Including, but not limited to:
   a) High Rise Requirements. To match Section 403
   b) Atriums.
   c) Performance Based Criteria.
   d) Means or Egress Analysis.
   e) Fire Assembly Locator Sheet.
   f) Exterior and Interior Accessibility Route.
   g) Fire Stopping, Including Tested Design Number.

## NONSTRUCTURAL COMPONENT CHECKLIST

The attached checklist must be provided near the front of the construction plans of all DFCM projects involving new construction, building additions, or the addition of new or replaced components. One box must be checked within each row. Comments should be provided noting the particular component(s) that require seismic restraint.

Please review the DFCM Guidelines document for more clarification on requirements for non-structural components.

### NONSTRUCTURAL COMPONENT CHECKLIST

| *ITEM DESCRIPTION* | *NOT REQUIRED* | *ON CONST. DOCUMENTS* | *DEFERRED SUBMITTAL* | *COMMENTS* |
|---|---|---|---|---|
| **Architectural Components:** | | | | |
| Interior Nonstructural Walls & Partitions | | X | | |
| Cantilever Elements *(i.e. parapets, etc.)* | | X | | |
| Exterior Nonstructural Wall Elements | | X | | |
| Veneer | | X | | |
| Penthouses | X | | | |
| Ceilings *(i.e. suspended grid or hard-lid)* | | X | | |
| Cabinets *(i.e. storage cabinets, equip, etc.)* | | X | | |
| Access Floors | | X | | |
| Storage Racks | | | X | Owner Provided / Owner Installed Equipment |
| Appendages & Ornamentations | X | | | |
| Signs & Billboards | | | X | Owner Provided / Owner Installed Vendor |
| Other: Lab & Misc. Equipment | | | X | |
| Other: Vivarium Cage Racks | | | X | |
| **MEP Components:** | | | | |
| Fire Sprinklers | | | X | |
| Mechanical Equipment *(i.e. HVAC, fans, air handlers, boilers, furnaces, tanks, chillers, water heaters, heat exchangers, evaporators, engines, turbines, pumps, compressors, MFR equipment, etc.)* | | X | | |
| Electrical Equipment *(i.e. generators, batteries, inverters, transformers, MCC, panel boards, switch gear, cabinets, etc.)* | | X | | |
| Elevator & Escalator Components | | | X | |
| Communication Equipment, Computers, Instrumentation, and Controls | | X | | |

Revised: 08/06/2013

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# 3 Building Requirements

## Architectural Planning Issues

| *ITEM DESCRIPTION* | *NOT REQUIRED* | *ON CONST. DOCUMENTS* | *DEFERRED SUBMITTAL* | *COMMENTS* |
|---|---|---|---|---|
| Roof-mounted Chimneys, Stacks, Cooling & Electrical Towers | | X | | |
| Lighting Fixtures | | X | | |
| Vibration Isolated Components | | X | | |
| Piping & Conduit Systems | | X | | |
| Ductwork *(including in-line components)* | | X | | |
| Conveyors | X | | | |
| Cable Trays | | X | | |
| Other: | | | | |
| Other: | | | | |

**NOTES:**

1. Deferred submittals for seismic restraint of nonstructural components must be submitted to the DFCM Building Official a minimum of two weeks prior to the planned installation in order to allow for plan review and forwarding to inspectors. In the event that the submittal is deficient additional time may become necessary.
2. If seismic restraints of non-structural components are installed prior to receiving DFCM approval they shall not be covered or concealed until receiving both plan review and inspection approval. Further, installers are proceeding at their own risk until plan review and inspection approval occurs.
3. The requirements for seismic restraint of nonstructural components cannot be satisfied by a general reference to Design Manuals. The design professional may utilize these manuals as a basis of their design, but must provide all supporting documentation to ensure that the design conforms to the requirements of ASCE 7-10, Chapter 13.
4. Submittals must include details of the proposed seismic restraint of nonstructural components. These details must show specific information relating to the materials, type, size, and locations of anchorages; materials used for bracing; attachment requirements of bracing to structure and component; and locations of transverse and longitudinal sway bracing and rod stiffeners. Submittals may also require structural calculations, engineering reports, test data, and/or specifications to ensure code compliance.

| **DEFERRED SUBMITTALS LIST** | | |
|---|---|---|
| Cantilever Elements | Curtain Wall Systems | Storage Racks |
| Signage (Building & Room) | Lab Furniture & Equipment | Fire Sprinklers |
| Elevator | Fire Alarms | Bracing for Mechanical Equipment |
| Bracing for Electrical Equipment | Seismic Connections for Mech. Ducts | Seismic Connections for Elect. Conduit |
| Seismic Connections for Cable Trays | | |
| | | |

Revised: 08/06/2013

## SPECIAL INSPECTION, MATERIAL TESTING & STRUCTURAL OBSERVATION ITEMS REQUIRED BY CHAPTER 17 OF THE 2012 IBC

Indicate items requiring special inspection, structural testing, or structural observations by checking the appropriate box. All items not requiring inspection/testing should be removed from the form. For items requiring continuous inspection, a special inspector must be present onsite during the performance of that task. In most cases "periodic" inspections/tests shall be performed prior to commencing the task, intermittently during the task, and at the completion of the task. The "Detailed Instructions & Frequency" provides a description of the presumed requirements for tasks requiring "periodic" inspections. The design professional in responsible should revise the requirements as needed on a project-specific basis.

### FABRICATORS (IBC 1704.2.5) To Be Matched up with DFCM Approved List

| | | | | | |
|---|---|---|---|---|---|
| ☐ Approved Fabricator | Yes | No | ☐ Unapproved Fabricator | Yes | No |

| | | | |
|---|---|---|---|
| Fabricators Name: | | | |
| Fabricators plant location | | | |
| Required In-plant Inspections | ☐ Steel Construction<br>☐ Cold-formed Construction | ☐ Concrete Construction<br>☐ Other: _____ | ☐ Wood Construction<br>☐ Other: _____ |

### STRUCTURAL STEEL (IBC 1705.2.1, 1705.11.1 & 1705.12.2)

| Item | | | Detailed Instructions and Frequencies |
|---|---|---|---|
| **PRIOR TO WELDING (TABLE N5.4-1, AISC 360-10):** | | | |
| Verify welding procedures (WPS) and consumable certificates | ☒ Continuous | ☐ Periodic | |
| Material identification | ☐ Continuous | ☒ Periodic | Verify type and grade of material. |
| Welder identification | ☐ Continuous | ☒ Periodic | A system shall be maintained by which a welder who has welded a joint or member can be identified. |
| Fit-up groove welds | ☐ Continuous | ☒ Periodic | Verify joint preparation, dimensions, cleanliness, tacking, and backing. |
| Access holes | ☐ Continuous | ☒ Periodic | Verify configuration and finish. |
| Fit-up of fillet welds | ☐ Continuous | ☒ Periodic | Verify alignment, gaps at root, cleanliness of steel surfaces, and tack weld quality and location. |
| **DURING WELDING (TABLE N5.4-2, AISC 360-10):** | | | |
| Use of qualified welders | ☐ Continuous | ☒ Periodic | Verify that welders are appropriately qualified. |
| Control and handling of welding consumables | ☐ Continuous | ☒ Periodic | Verify packaging and exposure control. |
| Cracked tack welds | ☐ Continuous | ☒ Periodic | Verify that welding does not occur over cracked tack welds. |
| Environmental conditions | ☐ Continuous | ☒ Periodic | Verify wind speed is within limits as well as precipitation and temperature. |
| WPS followed | ☐ Continuous | ☒ Periodic | Verify items such as settings on welding equipment, travel speed, welding materials, shielding gas type/flow rate, preheat applied, interpass temperature maintained, and proper position. |
| Welding techniques | ☐ Continuous | ☒ Periodic | Verify interpass and final cleaning, each pass is within profile limitations, and quality of each pass. |

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| | | | |
|---|---|---|---|
| **AFTER WELDING (TABLE N5.4-3, AISC 360-10):** | | | |
| Welds cleaned | ☐ Continuous | ☒ Periodic | Verify that welds have been propyl cleaned. |
| Size, length, and location of welds | ☒ Continuous | ☐ Periodic | |
| Welds meet visual acceptance criteria | ☒ Continuous | ☐ Periodic | |
| Arc strikes | ☒ Continuous | ☐ Periodic | |
| k-area | ☒ Continuous | ☐ Periodic | |
| Backing & weld tabs removed | ☒ Continuous | ☐ Periodic | |
| Repair activities | ☒ Continuous | ☐ Periodic | |
| Document acceptance or rejection of welded joint/member | ☒ Continuous | ☐ Periodic | |
| **NONDESTRUCTIVE TESTING (SECTION N5.5, AISC 360-10):** | | | |
| CJP welds (Risk Cat. II) | ☐ Continuous | ☒ Periodic | Ultrasonic testing shall be performed on 10% of CJP groove welds in butt, T- and corner joints subject to transversely applied tension loading in materials 5/16-inch thick or greater. Testing rate must be increased if > 5% of welds tested have unacceptable defects. |
| CJP welds (Risk Cat. III or IV) | ☒ Continuous | ☐ Periodic | ***A reduction in the rate of ultrasonic testing is allowed per Section N5.5e.*** |
| Welded joints subject to fatigue | ☒ Continuous | ☐ Periodic | |
| **PRIOR TO BOLTING (TABLE N5.6-1, AISC 360-10):**<br>➢ *Not required if only snug-tight joints are specified [per Section N5.6(1) of AISC 360-10].* | | | |
| Certifications of fasteners | ☒ Continuous | ☐ Periodic | |
| Fasteners marked | ☐ Continuous | ☒ Periodic | Verify that fasteners have been marked in accordance with ASTM requirements. |
| Proper fasteners for joint | ☐ Continuous | ☒ Periodic | Verify grade, type, and bolt length if threads are excluded from the shear plane. |
| Proper bolting procedure | ☐ Continuous | ☒ Periodic | Verify proper procedure is used for the joint detail. |
| Connecting elements | ☐ Continuous | ☒ Periodic | Verify appropriate faying surface condition and hole preparation, if specified, meet requirements. |
| Pre-installation verification testing | ☐ Continuous | ☒ Periodic | Observe and document verification testing by installation personnel for fastener assemblies and methods used. |
| Proper storage | ☐ Continuous | ☒ Periodic | Verify proper storage of bolts, nuts, washers, and other fastener components. |
| **DURING BOLTING (TABLE N5.6-2, AISC 360-10):**<br>➢ *Not required if only snug-tight joints are specified [per Section N5.6(1) of AISC 360-10].*<br>➢ *Not required for pretensioned joints using turn-of-the-nut method with match-marking, direct-tension-indicators, or twist-off type tension control method [per Section N5.6(2) of AISC 360-10].* | | | |
| Fastener assemblies | ☐ Continuous | ☒ Periodic | Verify that fastener assemblies are of suitable condition, paced in all holes, and washers are positioned as required. |
| Snug-tight prior to pretensioning | ☐ Continuous | ☒ Periodic | Verify that joints are brought to snug-tight condition prior to pretensioning operation. |
| Fastener component | ☐ Continuous | ☒ Periodic | Verify that fastener component is not turned by wrench prevented from rotating. |
| Pretensioned fasteners | ☐ Continuous | ☒ Periodic | Verify that fasteners are Pretensioned in accordance with RCSC Specification, progressing systematically from the most rigid point toward the free edges. |

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| | | | |
|---|---|---|---|
| **AFTER BOLTING (TABLE N5.6-3, AISC 360-10):** | | | |
| Document acceptance or rejection of bolted connections | ☒ Continuous | ☐ Periodic | |
| **OTHER STEEL INSPECTIONS (SECTION N5.7, AISC 360-10; Tables J8-1 & J10-1, AISC 341-10):** | | | |
| Structural steel details | ☐ Continuous | ☒ Periodic | All fabricated steel or steel frames shall be inspected to verify compliance with the details shown in the construction documents, such as braces, stiffeners, member locations, and proper application of joint details at each connection. |
| Anchor rods and other embedments supporting structural steel | ☐ Continuous | ☒ Periodic | Shall be on the premises during the placement of anchor rods and other embedments supporting structural steel for compliance with construction documents. Verify the diameter, grade, type, and length of the anchor rod or embedded item, and the extent or depth of embedment prior to placement of concrete. |
| Reduced beam sections (RBS) | ☐ Continuous | ☒ Periodic | Verify contour and finish as well as dimensional tolerances *(see Table J8-1 of AISC 341-10)*. |
| Protected zones | ☐ Continuous | ☒ Periodic | Verify that no holes or unapproved attachments are made within the protected zone *(see Table J8-1 of AISC 341-10)*. |
| **STEEL ELEMENTS OF COMPOSITE CONSTRUCTION (TABLE N6.1, AISC 360-10; TABLES J9-1 thru J9-3, AISC 341-11):** | | | |
| Placement and installation of steel deck | ☒ Continuous | ☐ Periodic | |
| Placement and installation of steel headed stud anchors | ☒ Continuous | ☐ Periodic | |
| Document acceptance or rejection of steel elements | ☒ Continuous | ☐ Periodic | |
| Reinforcing steel | ☐ Continuous | ☒ Periodic | Verify appropriate reinforcement size, spacing, and orientation; that it has not been re-bent in field; that it is correctly tied and supported; and that required steel clearances have been provided. |
| Composite member size | ☐ Continuous | ☒ Periodic | Verify that composite member is the required size. |

## STEEL CONSTRUCTION OTHER THAN STRUCTURAL STEEL (IBC 1705.2.2)

| Item | Detailed Instructions and Frequencies | | |
|---|---|---|---|
| **STEEL ROOF AND FLOOR DECKS (IBC TABLE 1705.2.2):** | | | |
| Material verification of cold-formed steel deck | ☐ Continuous | ☒ Periodic | Confirm that identification markings are provided to conform to ASTM standards specified on construction documents. |
| Floor and roof deck welds | ☐ Continuous | ☒ Periodic | Visual inspection is required to confirm that weld meets acceptance criteria of AWS D1.3. Welder qualifications should also be verified. |
| **WELDING OF REINFORCING STEEL (IBC TABLE 1705.2.2):** | | | |
| Verification of weldability | ☐ Continuous | ☒ Periodic | Verify weldability of reinforcing steel based upon carbon equivalent and in accordance with AWS D1.4. |

| | | | |
|---|---|---|---|
| Reinforcing steel in intermediate or special moment fames, and boundary elements of special structural walls | ☒ Continuous | ☐ Periodic | |
| Shear reinforcement | ☒ Continuous | ☐ Periodic | |
| Other reinforcing steel | ☐ Continuous | ☒ Periodic | Visually inspect all welds in accordance with AWS D1.4. |
| **COLD-FORMED STEEL CONSTRUCTION (IBC 1705.2.2.1.1, 1705.10.3, and 1705.11.3):** | | | |
| Trusses spanning > 60-feet | ☐ Continuous | ☒ Periodic | Verify that temporary and permanent truss bracing is installed in accordance with approved truss package. Performed by code inspection firm. |
| Wind-force-resisting systems or seismic-force-resisting systems | ☐ Continuous | ☒ Periodic | Periodic inspections of welding operations. If fastener spacing is < 4”o.c.: Verify that proper screw attachment, bolting, anchoring and other fastening of shear walls, diaphragms, drag struts, braces, shear panels and holdowns has occurred. Performed by code inspection firm. |

**CONCRETE CONSTRUCTION (IBC 1705.3 & 1705.12.1)**

| Item | | | Detailed Instructions and Frequencies |
|---|---|---|---|
| Reinforcing steel, including prestressing tendons | ☐ Continuous | ☒ Periodic | Verify prior to placing concrete that reinforcing is of specified type, grade and size; that it is free of oil, dirt and rust; that it is located and spaced properly; that hooks, bends, ties, stirrups and supplemental reinforcement are placed correctly; that lap lengths, stagger and offsets are provided; and that all mechanical connections are installed per the manufacturer’s instructions and/or evaluation report. |
| Cast-in bolts & embeds | ☐ Continuous | ☒ Periodic | Inspection of anchors or embeds cast in concrete is required when allowable loads have been increased or where strength design is used. |
| Post-installed anchors or dowels | ☐ Continuous | ☒ Periodic | All post-installed anchors/dowels shall be specially inspected as required by the approved ICC-ES report. |
| Use of required mix design | ☐ Continuous | ☒ Periodic | Verify that all mixes used comply with the approved construction documents; ACI 318: Ch. 4, 5.2-5.4; and IBC 1904.3, 1913.2, 1913.3. |
| Concrete sampling for strength tests, slump, air content, and temperature | ☒ Continuous | ☐ Periodic | |
| Concrete & shotcrete placement | ☒ Continuous | ☐ Periodic | |

| | | | |
|---|---|---|---|
| Curing temperature and techniques | ☐ Continuous | ☒ Periodic | Verify that the ambient temperature for concrete is kept at > 50°F for at least 7 days after placement. High-early-strength concrete shall be kept at > 50°F for at least 3 days. Accelerated curing methods may be used (see ACI 318: 5.11.3). The ambient temperature for shotcrete shall be > 40°F for the same period of time as noted for concrete. Shotcrete shall be kept continuously moist for at least 24 hours after shotcreting. All concrete materials, reinforcement, forms, fillers, and ground shall be free from frost. In hot weather conditions ensure that appropriate measures are taken to avoid plastic shrinkage cracking and that the specified water/cement ratio is not exceeded. |
| Pre-stressed concrete | ☒ Continuous | ☐ Periodic | |
| Erection of precast concrete | ☐ Continuous | ☒ Periodic | Verify that all precast elements are lifted, assembled and braced in accordance with the approved construction documents. |
| Strength verification | ☐ Continuous | ☒ Periodic | Verify that adequate strength has been achieved prior to the removal of shores and forms or the stressing of post-tensioned tendons. |
| Formwork | ☐ Continuous | ☒ Periodic | Verify that the forms are placed plumb and conform to the shapes, lines, and dimensions of the members as required by the approved construction documents. |
| Reinforcement complying with ASTM A 615 in special moment frames, special structural walls and coupling beams | ☐ Continuous | ☒ Periodic | Verify that ASTM A 615 reinforcing steel used in these areas complies with ACI 318: 21.1.5.2 by means of certified mill test reports. If this reinforcing steel is to be welded chemical tests shall be performed in accordance with ACI 318: 3.5.2. |

## MASONRY CONSTRUCTION (IBC 1705.4)

| Item | | | Detailed Instructions and Frequencies |
|---|---|---|---|
| **PRIOR TO CONSTRUCTION (ARTICLE 1.15, TMS-602/ACI 530.1-11):** | | | |
| Review material certificates, mix designs, test results and construction procedures | ☐ Continuous | ☒ Periodic | Verify that materials conform to the requirements of the approved construction documents. Mix design, test results, material certificates, and construction procedures should be submitted for review. Mortar mix designs shall conform to ASTM C 270 while grout shall conform to ASTM C 476. Material certificates shall be provided for the following: reinforcement; anchors, ties, fasteners, and metal accessories; masonry units; mortar and grout materials. Construction procedures for cold-weather or hot-weather construction shall be reviewed. |
| **AS CONSTRUCTION BEGINS (TABLE 1.19.2, TMS-402/ACI 530-11):** | | | |
| Proportions of site-prepared mortar | ☐ Continuous | ☒ Periodic | Verify that mortar is of the type and color specified on the construction documents, that it conforms to ASTM C 270, and that it is mixed in accordance with Article 2.6 A of TMS-602/ACI 530.1-11. |
| Construction of mortar joints | ☐ Continuous | ☒ Periodic | Verify that mortar joints comply with Article 3.3 B of TMS-602/ACI 530.1-11. |

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| Grade and size of prestressing tendons and anchorages | ☐ Continuous | ☒ Periodic | Verify that prestressing tendons comply with Article 2.4 B of TMS-602/ACI 530.1-11 and that anchorages, couplers, and end blocks comply with Article 2.4 H. |
| Location of reinforcement, connectors, and prestressing tendons and anchorages | ☐ Continuous | ☒ Periodic | Verify that reinforcement is placed in accordance with Article 3.4 of TMS-602/ACI 530.1-11. Prestressing tendons shall be placed per Article 3.6 A. |
| Prestressing technique | ☐ Continuous | ☒ Periodic | Verify that prestressing technique complies with Article 3.6 B of TMS-602/ACI 530.1-11. |
| Properties of thin-bed mortar for AAC masonry | ☐ Continuous | ☒ Periodic | Verify that mortar complies with Article 2.1 C of TMS-602/ACI 530.1-11. |
| **PRIOR TO GROUTING (TABLE 1.19.2, TMS-402/ACI 530-11):** | | | |
| Grout space | ☐ Continuous | ☒ Periodic | Verify that grout space is free of mortar droppings, debris, loose aggregate, and other deleterious materials and that cleanouts are provided per Article 3.2 D and 3.2 F of TMS-602/ACI 530.1-11. *Continuous inspection is required for Risk Category IV buildings.* |
| Grade, type, and size of reinforcement and anchor bolts, and prestressing tendons and anchorages | ☐ Continuous | ☒ Periodic | Verify that reinforcement, joint reinforcement, wall ties, anchor bolts and veneer anchors comply with the approved construction documents and Section 1.6 of TMS 402/ACI 530-11. |
| Placement of reinforcement, connectors, and prestressing tendons and anchorages | ☐ Continuous | ☒ Periodic | Verify that reinforcement, joint reinforcement, wall ties, anchor bolts and veneer anchors are installed in accordance with the approved construction documents and Articles 3.2 E, 3.4, and 3.6 A of TMS 602/ACI 530.1-11. *Continuous inspection is required for Risk Category IV buildings.* |
| Proportions of site-prepared grout and prestressing grout for bonded tendons | ☐ Continuous | ☒ Periodic | Verify that grout is proportioned per ASTM C 476 and has a slump between 8-11 inches. Self-consolidated grout shall not be proportioned onsite. (see Articles 2.6 B and 2.4 G.1.b of TMS 602/ACI 530.1-11. *Continuous inspection is required for Risk Category IV buildings.* |
| Construction of mortar joints | ☐ Continuous | ☒ Periodic | Verify that mortar joints are placed in accordance with Article 3.3 B of TMS 602/ACI 530.1-11. |
| **DURING MASONRY CONSTRUCTION:** | | | |
| Size and location of structural elements | ☐ Continuous | ☒ Periodic | Verify the locations of structural elements with respect to the approved plans and confirm that tolerances meet the requirements of Article 3.3 F of TMS 602/ACI 530.1-11. |
| Type, size, and location of anchors, including other details of anchorage of masonry to structural members, frames, or other construction. | ☐ Continuous | ☒ Periodic | Verify that correct anchorages and connections are provided per the approved plans and Sections 1.16.4.3 and 1.17.1 of TMS 402/ACI 530-11. *Continuous inspection is required for Risk Category IV buildings.* |
| Welding of reinforcement | ☒ Continuous | ☐ Periodic | |
| Preparation, construction, and protection of masonry during cold weather (<40°F) or hot weather (>90°F). | ☐ Continuous | ☒ Periodic | Verify that cold-weather construction is performed in accordance with Article 1.8 C of TMS 602/ACI 530.1-11 and hot weather construction per Article 1.8 D of TMS 602/ACI 530.1-11. |
| Application and measurement of prestressing force | ☒ Continuous | ☐ Periodic | |

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| | | | |
|---|---|---|---|
| Placement of grout and prestressing grout for bonded tendons is in compliance | ☒ Continuous | ☐ Periodic | |
| Placement of AAC masonry units and construction of thin-bed mortar joints | ☐ Continuous | ☒ Periodic | Verify that mortar is placed in accordance with Article 3.3 B.8 of TMS-602/ACI 530.1-11. |
| Observation of grout specimens, mortar specimens, and/or prisms | ☐ Continuous | ☒ Periodic | Confirm that specimens/prisms are performed as required by Article 1.4 of TMS-602/ACI 530.1-11. *Continuous inspection is required for Risk Category IV buildings.* |
| **MINIMUM TESTING:** | | | |
| Verification of Slump Flow and Visual Stability Index (VSI) for self-consolidating grout | ☐ Continuous | ☒ Periodic | Compressive strength tests should be performed in accordance with ASTM C 1019 for slump flow and ASTM C 1611 for VSI. |
| Verification of $f'_m$ and $f'_{AAC}$ | ☐ Continuous | ☒ Periodic | Determine the compressive strength for each wythe by the "unit strength method" or by the "prism test method" as specified in Article 1.4 B of TMS 602/ACI 530.1-11 prior to construction. *For Risk Category IV buildings this should be verified at every 5,000ft² of construction.* |
| Verification of proportions of materials in premixed or pre-blended mortar and grout | ☐ Continuous | ☒ Periodic | Verify that proportions for mortar meet ASTM C 270 and proportions for grout meet ASTM C 476. This applies to *Risk Category IV buildings only.* |

## SOILS CONSTRUCTION (IBC 1705.6)

| Item | | | Detailed Instructions and Frequencies |
|---|---|---|---|
| Verify subgrade is adequate to achieve design bearing capacity | ☐ Continuous | ☒ Periodic | Prior to placement of concrete. |
| Verify excavations extend to proper depth and material | ☐ Continuous | ☒ Periodic | Prior to placement of compacted fill or concrete. |
| Verify that subgrade has been appropriately prepared prior to placing compacted fill | ☐ Continuous | ☒ Periodic | Prior to placement of compacted fill. |
| Perform classification and testing of compacted fill materials | ☐ Continuous | ☒ Periodic | All materials shall be checked at each lift for proper classifications and gradations not less than once for each 10,000ft² of surface area. |
| Verify proper materials, densities and lift thicknesses during placement and compaction. | ☒ Continuous | ☐ Periodic | |

## CAST-IN-PLACE DEEP FOUNDATIONS (IBC 1705.8)

| Item | | | Detailed Instructions and Frequencies |
|---|---|---|---|
| Observe drilling operation and reporting | ☒ Continuous | ☐ Periodic | |
| Verify placement locations & plumbness, confirm element diameters, lengths, embedment and adequate end-bearing capacity. Record concrete or grout volumes. | ☒ Continuous | ☐ Periodic | |
| Perform additional inspections for concrete elements. | ☐ Continuous | ☐ Periodic | Concrete per IBC 1705.3 |

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### SPRAYED FIRE-RESISTANT MATERIALS (IBC 1705.13)

| Item | | | Detailed Instructions and Frequencies |
|---|---|---|---|
| Surface preparation | ☐ Continuous | ☒ Periodic | Prior to application confirm that surface has been prepared per the approved fire-resistance design and manufacturer's instructions. |
| Material thickness | ☐ Continuous | ☒ Periodic | Samples shall be taken from selected floor, roof and wall assemblies and structural members. No more than 10% of the samples shall be less than the thickness required by the fire-resistance design. |
| Material density | ☐ Continuous | ☒ Periodic | Density tests shall be performed in accordance with ASTM E 605 for every 2,500ft² of floor, roof or wall area. One sample must also be provided for each beam, girder, truss or column at each story. |
| Bonding strength | ☐ Continuous | ☒ Periodic | Bond strength tests shall be performed in accordance with ASTM E 736 for every 2,500ft² of floor, roof or wall area. One sample must also be provided for each beam, girder, truss or column at each story. The bond strength shall not be less than 150psf. |

### MASTIC AND INTUMESCENT FIRE-RESISTANT COATINGS (IBC 1705.14)

| Item | | | Detailed Instructions and Frequencies |
|---|---|---|---|
| Surface preparation | ☐ Continuous | ☒ Periodic | Prior to application confirm that surface temperature and substrate are acceptable and that a compatible primer is used in accordance with AWCI 12-B. |
| Thickness | ☐ Continuous | ☒ Periodic | Record thickness of primer or other existing coating on substrate prior to application of coating. Final thickness of coating must be verified in multiple locations prior to applying top coat per AWCI 12-B. |

### EXTERIOR INSULATION AND FINISH SYSTEMS (EIFS) (IBC 1705.15)

| Item | | | Detailed Instructions and Frequencies |
|---|---|---|---|
| Material and installation | ☐ Continuous | ☒ Periodic | Verify that water-resistive barrier, complying with ASTM E 2570, is installed appropriately over a sheathing substrate. *(Not required if applied over concrete, masonry, or if a means of draining moisture to exterior is provided.)* ***Performed by code inspection firm.*** |

### FIRE-RESISTANT PENETRATIONS AND JOINTS (IBC 1705.16)

- *Only required for high-rise buildings or those assigned to Risk Category III or IV per IBC Table 1604.5.*

| Item | | | Detailed Instructions and Frequencies |
|---|---|---|---|
| Penetration firestops | ☐ Continuous | ☒ Periodic | Listed systems shall be inspected in accordance with ASTM E 2393. |
| Fire-resistant joint systems | ☐ Continuous | ☒ Periodic | Listed systems shall be inspected in accordance with ASTM E 2393. |

### SMOKE CONTROL (IBC 1705.17)

| Item | | | Detailed Instructions and Frequencies |
|---|---|---|---|
| Verify device locations and perform leakage testing | ☐ Continuous | ☒ Periodic | During erection of ductwork and prior to concealment. As defined by rational analysis. |
| Pressure difference testing, flow measurements and detection and control verification | ☐ Continuous | ☒ Periodic | Prior to occupancy and after sufficient completion. As defined by rational analysis. |

### ARCHITECTURAL COMPONENTS (IBC 1705.11.5 & 1705.11.7)

- *Only required for buildings located within Seismic Design Category D, E, or F.*

| Item | | | Detailed Instructions and Frequencies |
|---|---|---|---|
| Erection and fastening of exterior cladding or interior and exterior veneers | ☐ Continuous | ☒ Periodic | Verify appropriate materials, fasteners and attachment at commencement of work and at completion. Performed by code inspection firm. (Not required if < 30 feet or less than 5psf). |
| Erection and fastening of interior and exterior nonbearing walls | ☐ Continuous | ☒ Periodic | Verify appropriate materials, fasteners and attachment at commencement of work and at completion. Performed by code inspection firm. (Not required if < 30 feet or for interior walls < 15psf). |
| Access floors | ☐ Continuous | ☒ Periodic | Verify that anchorage complies with approved construction documents. Inspection of post-installed anchors shall comply with approved ICC-ES report. ***Performed by code inspection firm.*** |
| Storage racks | ☐ Continuous | ☒ Periodic | Verify that anchorage complies with approved construction documents. Inspection of post-installed anchors shall comply with approved ICC-ES report. ***Performed by code inspection firm.*** |

### MECHANICAL & ELECTRICAL COMPONENTS (IBC 1705.11.4 & 1705.11.6)

- *Only required for buildings located within Seismic Design Category C, D, E, or F.*

| Item | | | Detailed Instructions and Frequencies |
|---|---|---|---|
| Anchorage of emergency or standby power systems | ☐ Continuous | ☒ Periodic | Verify that anchorage complies with approved construction documents. ***Performed by code inspection firm.*** |
| Installation of piping systems carrying flammable, combustible or highly toxic materials | ☐ Continuous | ☒ Periodic | Verify that installation and restraint comply with approved construction documents. ***Performed by code inspection firm.*** |
| Installation of HVAC ductwork containing hazardous materials | ☐ Continuous | ☒ Periodic | Verify that installation and restraint comply with approved construction documents. ***Performed by code inspection firm.*** |
| Installation of vibration isolation systems having a clearance of ≤¼" | ☐ Continuous | ☒ Periodic | Verify that installation complies with approved construction documents and manufacturer's recommendations. ***Performed by code inspection firm.*** |
| Designated seismic systems | ☐ Continuous | ☒ Periodic | Confirm that manufacturer's certificate of compliance conforms to the requirements of Section 13.2 of ASCE 7-10. Verify that the label, anchorage or mounting conforms to the manufacturer's certificate of compliance. ***Performed by code inspection firm.*** |

**SEISMICALLY ISOLATED STRUCTURES (IBC 1705.11.8 & 1705.12.4)**

| Item | | | Detailed Instructions and Frequencies |
|---|---|---|---|
| Prototype tests | ☐ Continuous | ☒ Periodic | Prototype tests shall be performed on selected samples prior to construction in accordance with Section 17.8 of ASCE 7-10. |
| Fabrication and installation | ☐ Continuous | ☒ Periodic | Verify that fabrication and installation of isolator units and energy dissipation devices conform to manufacturer's recommendations and approved construction documents. |

**SPECIAL CASES (IBC 1705.1.1)** – material alternatives or unusual design applications

| Item | | | Detailed Instructions and Frequencies |
|---|---|---|---|
| Material and installation | ☐ Continuous | ☐ Periodic | Per design professional in responsible charge or report from an accepted accreditation agency (i.e. ICC-ES). |

**MISCELLANEOUS AREAS**

➢ *These inspections may be recommended by the Architect/Engineer and are to be approved by DFCM.*

| Item | | | Detailed Instructions and Frequencies |
|---|---|---|---|
| Suspended Acoustical Ceilings | ☐ Continuous | ☒ Periodic | ***Performed by code inspection firm.*** |
| Soil backfill (specify locations and frequency) | ☐ Continuous | ☒ Periodic | **TBD** |
| Soils for curb and gutter (specify locations and frequency) | ☐ Continuous | ☐ Periodic | **TBD** |
| Soils for parking lots (specify locations and frequency) | ☐ Continuous | ☐ Periodic | **TBD** |
| Soils for utility trench backfill | ☐ Continuous | ☐ Periodic | **TBD** |
| Reinforcement for slab on grade sidewalks and drive approaches (specify locations and frequency) | ☒ Continuous | ☐ Periodic | |
| Reinforcement for interior slab on grade (specify locations and frequency) | ☒ Continuous | ☐ Periodic | |
| Concrete testing for slab on grade sidewalks and drive approaches (specify locations and frequency) | ☐ Continuous | ☒ Periodic | **TBD** |
| Concrete testing for interior slab on grade (specify locations and frequency) | ☐ Continuous | ☒ Periodic | **TBD** |
| Asphalt inspection (specify locations and frequency) | ☐ Continuous | ☒ Periodic | **TBD** |
| Asphalt testing (specify locations and frequency) | ☐ Continuous | ☒ Periodic | **TBD** |
| Steam and water line welding (specify locations and frequency) | ☒ Continuous | ☐ Periodic | |
| Seismic supports for duct work and sealing of joints for duct work | ☐ Continuous | ☒ Periodic | **TBD** |
| Seismic supports for electrical raceways, cable trays and lights | ☐ Continuous | ☒ Periodic | **TBD** |
| Seismic supports for plumbing lines including gas, water and steam and condensation | ☐ Continuous | ☒ Periodic | **TBD** |
| Seismic bracing for mechanical units both on slab and suspended | ☐ Continuous | ☒ Periodic | **TBD** |
| | ☐ Continuous | ☐ Periodic | |
| | ☐ Continuous | ☐ Periodic | |
| | ☐ Continuous | ☐ Periodic | |
| | ☐ Continuous | ☐ Periodic | |

Special Inspectors Shall:

- Be approved by the Building Official prior to performing any duties;
- Provide proof of licensure as a special inspector by the State of Utah for each type of inspection;
- Inspection reports are to meet the requirements of IBC 1704.2.4 and DFCM standards;
- Inspection reports are to be submitted to the code consultant, architect, DFCM project manager, and the State of Utah Building Official within 48 hours of performing inspections;
- A final inspection report shall be submitted following completion of the project documenting the types of special inspections performed and a statement indicating that the structure is in compliance with the approved construction documents and applicable codes (see IBC 1704.2.4).

**STRUCTURAL OBSERVATIONS (IBC 1704.5)**

| Item | | Proposed Frequency | Name of Structural Observer |
|---|---|---|---|
| Footings & Piers | ☒ Required | **TBD** | |
| Mat Foundations | ☒ Required | **TBD** | |
| Concrete Walls | ☒ Required | **TBD** | |
| Steel Moment Frames | ☒ Required | **TBD** | |
| Steel Braced Frames | ☒ Required | **TBD** | |
| Concrete Moment Frames | ☒ Required | **TBD** | |
| Concrete Diaphragms | ☒ Required | **TBD** | |
| Steel Deck Diaphragms | ☒ Required | **TBD** | |
| Other: | ☐ Required | | |
| Other: | ☐ Required | | |
| Other: | ☐ Required | | |
| Other: | ☐ Required | | |

Structural Observer's Shall:

- Provide proof of licensure as a licensed professional/structural engineer by the State of Utah;
- If structural observations are performed by individuals other than the design professional in responsible charge, they should first be approved by the Building Official.
- At the conclusion of work a final structural observation report must be submitted to the Building Official noting any deficiencies which, to the best of the structural observer's knowledge, have not been resolved (see IBC 1704.5).

Updated July 22, 2013

## 2012 Code Analysis Form

**PART 4 - GRADE PLANE ELEVATION & HEIGHT & STORIES (504)**

| BUILDING WALL | AVERAGE ELEVATION | GRADE PLANE ELEVATION |
|---|---|---|
| NORTH | 96'-0" to 16'-0" | TBD - VARIES |
| SOUTH | 96'-0" to 48'-0" | TBD - VARIES |
| EAST | 96'-0" to 16'-0" | TBD - VARIES |
| WEST | 96'-0" | TBD - VARIES |
| | TOTAL BUILDING G.P.E. | TBD - VARIES |

| STORY | FINISHED FLOOR ELEVATION | STORY ABOVE G.P.E. | HEIGHT |
|---|---|---|---|
| BASEMENT (A) | 5019.0' (84'-0") | TBD - VARIES | TBD |
| 1ST FLOOR | 5035.0' (100'-0") | TBD - VARIES | TBD |
| 2ND FLOOR | 5051.0' (116'-0") | TBD - VARIES | TBD |
| 3RD FLOOR | 5067.0' (132'-0") | TBD - VARIES | TBD |
| 4TH FLOOR | 5083.0' (148'-0") | TBD - VARIES | TBD |
| 5TH FLOOR | 5099.0' (164'-0") | TBD - VARIES | TBD |
| 6TH FLOOR | 5115.0' (180'-0") | TBD - VARIES | TBD |
| TOTAL BUILDING | | TBD - VARIES | TBD |

**PART 5 - AUTOMATIC FIRE SPRINKLER (903. T503)**

| ITEM | REFERENCE | COMMENTS |
|---|---|---|
| Required | YES – 903.7.11.3 | |
| Area Increase | NO | |
| Height Increase | NO | |
| Fire-Resistance Substitution | NO | |

**PART 6 - OCCUPANCY SEPARATIONS (T508.3.3)** N/A

| OCCUPANCY/OCCUPANCY | RATING | IBC/UL DESIGN # |
|---|---|---|
| - | - | - |
| - | - | - |

**PART 7 - OTHER BUILDING ELEMENTS (T601 and T602)**

| ELEMENT | MATERIAL (602.3) | RATING | IBC/UL DESIGN # |
|---|---|---|---|
| Interior Bearing Wall | TBD | - | - |
| Interior Non-Bearing Wall | Gypsum / Metal Studs | 0 | N/A |
| Structural Frame | TBD | - | - |
| Exterior Structural Frame | TBD | - | - |
| Shaft Enclosure | Shaft Walls | 2 Hour | U415, System 'F' |
| Floor / Ceiling Assembly | Concrete on Metal Deck | 2 Hour | D933 / D743 |
| Roof / Ceiling Assembly | Concrete on Metal Deck | 1-1/2 Hour | D933 |
| Vertical Exit Enclosure | TBD | 2 Hour | - |

**PART 8 - EXTERIOR WALL FIRE RATINGS & OPENING PROTECTION (705.8)**
(Modify as needed for additional stories.)

| WALL LOCATION | PROTECTED | UNPROTECTED | PARAPET REQ'D (705.11) |
|---|---|---|---|
| NORTH | - | X | - |
| SOUTH | - | X | - |
| EAST | - | X | - |
| WEST | - | X | - |

## 2012 Code Analysis Form

**PART 9 - EXIT REQUIREMENTS**

| FLOOR LEVEL | ROOM NAME | OCCUPANT LOAD FACTOR (T1004.1.1) | # OF OCCUPANTS (1004) | # OF EXITS (1021/1015) | REQ'D EGRESS WIDTH (1005) | REQ'D STAIR WIDTH (1005) | REQ'D AISLE WIDTH (1018) | COMMON PATH OF TRAVEL DISTANCE (1014.3) | TOTAL TRAVEL DISTANCE (1016) |
|---|---|---|---|---|---|---|---|---|---|
| A | Service | 1/100 | 369 | 3 | 73.8" | 110.7" | 60" min | 100' | 300' |
| 1 | Office | 1/100 | 278 | 4 | 55.6" | 83.4" | 60" min | 100' | 300' |
| 2 | Lab | 1/100 | 358 | 4 | 71.6" | 107.4" | 60" min | 100' | 300' |
| 3 | Lab | 1/100 | 369 | 4 | 73.8" | 110.7" | 60" min | 100' | 300' |
| 4 | Lab | 1/100 | 369 | 4 | 73.8" | 110.7" | 60" min | 100' | 300' |
| 5 | Office | 1/100 | 315 | 4 | 63" | 94.5" | 60" min | 100' | 300' |
| 6 | Office | 1/100 | 323 | 3 | 64.6" | 96.9" | 60" min | 100' | 300' |
| | BUILDING TOTAL | - | 2,381 | - | - | - | - | - | - |

**PART 10 - ADDITIONAL REQUIREMENTS**

| | |
|---|---|
| ACCESSIBLE MEANS OF EGRESS (1007) | Yes |
| ACCESSIBLE ROUTE (3411.7) | Yes |
| SPECIAL OCCUPANCY REQUIREMENTS (CHAPTER 4) | N/A |
| | |

**PLUMBING FIXTURES (T 2902.1)**

| OCCUPANCY | WOMEN | MEN | W.C. WOMEN | W.C. MEN | URINALS | SINKS WOMEN | SINKS MEN | D.F. | SERVICE SINKS | OTHER |
|---|---|---|---|---|---|---|---|---|---|---|
| Level A – Service (369 occupants) | 185 | 185 | 5 | 3 | 2 | 4 | 4 | 4 | 1 | - |
| Level 1 – Office (278 occupants) | 139 | 139 | 4 | 2 | 2 | 3 | 3 | 3 | 1 | - |
| Level 2 – Lab (358 occupants) | 179 | 179 | 5 | 3 | 2 | 4 | 4 | 4 | 1 | - |
| Level 3 – Lab (369 occupants) | 185 | 185 | 5 | 3 | 2 | 4 | 4 | 4 | 1 | - |
| Level 4 – Lab (369 occupants) | 185 | 185 | 5 | 3 | 2 | 4 | 4 | 4 | 1 | - |
| Level 5 – Office (315 occupants) | 158 | 158 | 5 | 3 | 2 | 3 | 3 | 4 | 1 | - |
| Level 6 – Office (323 occupants) | 162 | 162 | 5 | 3 | 2 | 4 | 4 | 4 | 1 | - |
| TOTAL BUILDING | - | - | 34 | 17 | 14 | 26 | 26 | 27 | 7 | - |

**PART 11 – BUILDING PERFORMANCE PARAMETERS:**
Include a summary of building performance parameters (design temperatures for spaces, humidity control set-points, special ventilation requirements, lighting levels for spaces, etc.) with the Code Summary. Also include structural calculations and energy calculations. (Presently see narratives)

## 2012 Code Analysis Form

**PART 12 – DEFERRED SUBMITTALS, NONSTRUCTURAL COMPONENTS CHECKLIST, & SPECIAL INSPECTIONS LIST:**
Provide the following information in the Code Analysis, deleting non-applicable sections.

**LIST OF DEFFERED SUBMITTALS**

| ITEM | DRAWING REFERENCE | SPECIFICATION REFERENCE |
|---|---|---|
| Fire Sprinkler Drawings | | |
| Curtain Walls | | |
| Electrical Seismic Calculations | | |
| Mechanical Seismic Calculations | | |
| Plumbing Seismic Calculations | | |
| | | |

**GUIDELINES FOR SEISMIC RESTRAINT OF NONSTRUCTURAL COMPONENTS**

1. General Comments:
   a) These guidelines shall apply to all nonstructural components as required by the IBC 1613.1. Nonstructural components consist of architectural, mechanical and electrical components that are permanently attached to the primary structure.
   b) When a change in occupancy occurs that causes an existing building to be reclassified to a higher Occupancy Category per IBC Table 1604.5, all existing nonstructural components shall be confirmed to meet the seismic restraint requirements of Chapter 13 in ASCE 7.
   c) The guidelines noted herein shall not cancel or set aside more conservative requirements specified by the design professional in responsible charge.
   d) All references made to the IBC or ASCE 7 latest editions adopted by the State of Utah.
2. Checklist Requirements:
   a) Each item within the checklists shall have the appropriate box checked and comments shall be provided noting the particular component(s) that require seismic restraint.
   b) The “Not Required” box should only be checked if the component is exempt from requiring seismic restraint by Section 13.1.4 of ASCE 7, or if the component in question will not be provided as part of the project.
   c) If the “Deferred Submittal” box is checked, the additional requirements of Section 6 included in this handout must be met.
3. Submittal Requirements:
   a) Seismic restraint submittals shall include construction documents meeting the requirements of Section 4 of this handout as well as supporting design information discussed in Section 5 of this handout.
4. Construction Documents:
   a) The construction documents must include seismic restraint details providing specific information relating to the materials, type, size, and locations of anchorages; materials used for bracing; attachment requirements of bracing to structure and component; and locations of transverse and longitudinal sway bracing and rod stiffeners.
   b) The construction documents must note the special inspection and testing requirements for the seismic restraint of nonstructural components per Section 13.2.7 of ASCE 7.
   c) Products that have been tested and listed under the ICC Evaluation Service Program, can be installed in accordance with the provisions and limitations of the ICC Listing Report.
   d) The requirements for anchorage/bracing of nonstructural components cannot be satisfied by a general reference to Design Manuals. Design professional may utilize these manuals as a basis of their design, but must provide all supporting documentation to ensure that the design conforms to the requirements of the IBC.
   e) Rod hangers shall not be used as seismic supports unless the length of the hanger from the supporting structure is 12 in. or less. Rod hangers shall not be constructed in a manner that subjects the rod to bending moments.
5. Seismic Restraint Design Requirements:
   a) Per IBC 1613.1, the seismic restraint of nonstructural components shall meet the requirements of ASCE 7. If the component in question is exempted by Section 13.1.4 of ASCE 7, a submittal noting the seismic restraint of that particular component is not required.

**2012 Code Analysis Form**

b) The seismic restraint design must meet the requirements listed in Table 13.2-1 of ASCE 7. These requirements may be met by providing either a project-specific design prepared by a registered design professional, or a manufacturer's certification that the component is seismically qualified.
c) A certificate of seismic qualification by the manufacturer must be accompanied by one of the following items:
   i) An engineered analysis conforming to the requirements of Chapter 13 of ASCE 7.
   ii) Testing by a nationally recognized testing standard procedure such as ICC-ES AC 156. The substantiated seismic design capacities shall exceed the seismic demands determined by Section 13.3 of ASCE 7.
   iii) Experience data conforming to a nationally recognized procedure. The substantiated seismic design capacities shall exceed the seismic demands determined by Section 13.3 of ASCE 7.
d) The following seismic restraint publications shall be considered "Accepted Engineering Practice", but require pre-approval of the Building Official:
   i) Seismic Restraint Manual, Guidelines for Mechanical Systems (3rd Edition, published by SMACNA)
   ii) Guidelines and details that have been evaluated and reported under the International Code Council Evaluation Service Program (ICC-ES).
   iii) Seismic restraint manuals, guidelines and details that have been approved by the California Office of Statewide Health Planning and Development (OSHPD) under their pre-approval program for seismic restraint systems.

6. Deferred Submittals:
   a) Deferred submittals of seismic restraint of nonstructural components must be submitted to the Building Official a minimum of two weeks prior to the planned installation in order to allow for plan review and forwarding to inspectors. In the event that the submittal is deficient additional time may become necessary.
   b) Deferred submittals shall be clearly noted on the construction plans as required by IBC in Chapter 1. Prior to submitting to the Building Official, the deferred submittal must follow the protocol outlined in the section entitled "Deferred Submittals" in the IBC Chapter 1. Please note on the plans that no deferred submittal elements shall be installed until Building Official approval has been received.
   c) If seismic restraints of nonstructural components are installed prior to receiving Building Official approval they shall not be covered or concealed until plan review and inspection approval. Further, installers are proceeding at their own risk until plan review and inspection approval occurs.

## 2012 Code Analysis Form

**NONSTRUCTURAL COMPONENT CHECKLIST**

The attached checklist must be provided as part of the Code Analysis in the construction documents of all projects involving new construction, building additions, alterations, or the addition of new or replaced components. One box must be checked within each row. Comments should be provided noting the particular component(s) that require seismic restraint.

| ITEM DESCRIPTION | NOT REQUIRED | ON CONST DOCUMENTS | DEFERRED SUBMITTAL | COMMENTS |
|---|---|---|---|---|
| **Architectural Components** | | | | |
| Interior nonstructural walls and partitions | ☐ | ☒ | ☐ | |
| Cantilever elements (i.e. parapets, etc) | ☐ | ☒ | ☐ | |
| Exterior nonstructural wall elements | ☐ | ☒ | ☐ | |
| Veneer | ☐ | ☒ | ☐ | |
| Penthouses | ☒ | ☐ | ☐ | |
| Ceilings (i.e. suspended grid or hard-lid) | ☐ | ☒ | ☐ | |
| Cabinets (i.e. storage cabinets, equip, etc) | ☐ | ☒ | ☐ | |
| Access floors | ☐ | ☒ | ☐ | |
| Storage racks | ☐ | ☐ | ☒ | Equipment |
| Appendages & ornamentations | ☒ | ☐ | ☐ | |
| Signs & billboards | ☐ | ☐ | ☒ | |
| Other: Lab & Misc. Equipment | ☐ | ☐ | ☒ | |
| Other: | ☐ | ☐ | ☐ | |
| **MEP Components** | | | | |
| Fire sprinklers | ☐ | ☐ | ☒ | |
| Mechanical equipment (i.e. HVAC, fans, air handler, boilers, furnaces, tanks, chillers, water heaters, evaporators, engines, turbines, pumps, compressors, MFR equipment, etc.) | ☐ | ☒ | ☐ | |
| Electrical equipment (i.e. generators, batteries, inverters, transformers, MCC, panel Boards, switch gears, cabinets, etc.) | ☐ | ☒ | ☐ | |
| Elevator & escalator components | ☐ | ☐ | ☒ | |
| Communication equipment, computers, instrumentation, and controls | ☐ | ☒ | ☐ | |
| Roof-mounted chimneys stacks, cooling & electrical towers | ☐ | ☒ | ☐ | |
| Lighting fixtures | ☐ | ☒ | ☐ | |
| Vibration isolated components | ☐ | ☒ | ☐ | |
| Piping & conduit systems | ☐ | ☒ | ☐ | |
| Ductwork including in-line components | ☐ | ☒ | ☐ | |
| Conveyors | ☒ | ☐ | ☐ | |
| Cable trays | ☐ | ☒ | ☐ | |
| Other: | ☐ | ☐ | ☐ | |
| Other: | ☐ | ☐ | ☐ | |

**NOTES**

1. Deferred submittals for seismic restraint of nonstructural components must be submitted to the Building Official a minimum of two weeks prior to the planned installation in order to allow for plan review and forwarding to inspectors. In the event that the submittal is deficient additional time may become necessary.
2. When seismic restraint of non-structural components is installed prior to receiving Building Official approval it shall not be covered or concealed until receiving both plan review and inspection approval. Further, installers are proceeding at their own risk until plan review and inspection approval occurs.

## 2012 Code Analysis Form

3. The requirements for seismic restraint of nonstructural components cannot be satisfied by a general reference to industry-wide Design Manuals. The design professional may utilize these manuals as a basis of their design, but most provide all supporting documentation to ensure that the design conforms to the requirements of ASCE 7-05, Chapter 13.
4. Submittals must include details of the proposed seismic restraint of nonstructural components. These details must show specific information relating to the materials, type, size, and locations of anchorages; materials used for bracing; attachment requirements of bracing to structure and component; and locations of transverse and longitudinal sway bracing and rod stiffeners. Submittals also require structural calculations, engineering reports, test data, and/or specifications to ensure code compliance.

**SPECIAL INSPECTIONS LIST**

Special Inspections for the project must be listed below in accordance with the provisions of IBC 1704 and for miscellaneous areas. Indicate required Special inspections for project by checking the appropriate boxes and provide specific instructions as to the inspection requirements and the expectations of the architect, engineer, and owner:

**FABRICATORS (IBC 1704.2.5.2)**

| | | |
|---|---|---|
| Approved Fabricator | Fabricators Name: | |
| Unapproved Fabricator | Fabricators Name: | |
| In-plant inspections | | |
| Steel Construction ☐ | Welding ☐ | Details ☐ |

| STEEL (IBC 1705.2) | | | |
|---|---|---|---|
| **ITEM (IBC REFERENCE)** | **CONTINUOUS** | **PERIODIC** | **REFERENCED STANDARD** |
| **STRUCTURAL STEEL (1705.2.1)** | | | AISC 360 |
| **STEEL OTHER THAN STRUCTURAL STEEL (1705.2.2)** | | | |
| **Material verification of cold-formed steel deck:** | | | |
| A. Identification markings to conform to ASTM standards specified in the approved construction documents. | ☐ | ☒ | Applicable ASTM material standards. |
| B. Manufacturer's certified test reports. | ☐ | ☒ | - |
| **Inspection of welding:** | | | |
| A. Cold-formed steel deck | | | |
| 1. Floor & roof deck welds. | ☐ | ☒ | AWS D1.3 |
| B. Reinforcing steel | | | |
| 1. Verification of weldability of reinforcing steel other than ASTM A 706. | ☐ | ☒ | AWS D1.4 ACI 318: Section 3.5.2 |
| 2. Reinforcing steel resisting flexural and axial forces in intermediate and special moment frames, and boundary elements of special structural walls of concrete and shear reinforcement. | ☒ | ☐ | |
| 3. Shear reinforcement. | ☒ | ☐ | |
| 4. Other reinforcing steel. | ☐ | ☒ | |
| **WELDING (1705.2.2.1)** | | | |
| **Cold-formed steel deck (1705.2.2.1.1)** | | | AWS D1.3 |
| **Reinforcing steel (1705.2.2.1.2)** | | | AWS D1.4 ACI 31.8 |

## 2012 Code Analysis Form

| STEEL (IBC 1705.2) continued | |
|---|---|
| **COLD-FORMED STEEL TRUSSES SPANNING 60 FEET OR GREATER (1705.2.2.2)** | |

| CONCRETE CONSTRUCTION (1705.3) | | | |
|---|---|---|---|
| **ITEM (IBC REFERENCE)** | **CONTINUOUS** | **PERIODIC** | **REFERENCED STANDARD** |
| **Materials (1705.3.1)** | | | |
| Inspection of reinforcing steel, including prestressing tendons, and placement. | ☐ | ☒ | ACI 318: 3.5, 7.1-7.7 (IBC 1910.4) |
| Inspection of reinforcing steel welding in accordance with IBC Table 1705.2.2, Item 2b | ☐ | ☐ | AWS D1.4<br>ACI 318: 3.5.2 |
| Inspection of anchors cast in concrete where allowable loads have been increased or where strength design is used. | ☐ | ☒ | ACI 318: 8.1.3, 21.1.8<br>(IBC 1908.5, 1909.1) |
| Inspection of anchors post-installed in hardened concrete members. | ☐ | ☒ | ACI 319: 3.8.6, 8.1.3, 21.1.8<br>(IBC 1909.1) |
| Verifying use of required design mix. | ☐ | ☒ | ACI 318: Ch. 4, 5.2-5.4<br>(IBC 1904.2, 1910.2, 1910.3) |
| At the time fresh concrete is sampled to fabricate specimens for strength tests, perform slump and air content tests, and determine the temperature of the concrete. | ☒ | ☐ | ASTM C 172<br>ASTM C 31<br>ACI 318: 5.6, 5.8<br>(IBC 1910.10) |
| Inspection of concrete and shotcrete placement for proper application techniques. | ☒ | ☐ | ACI 318: 5.9, 5.10<br>(IBC 1910.6, 1910.7, 1910.8) |
| Inspection for maintenance of specified curing temperature and techniques. | ☐ | ☒ | ACI 319: 5.11-5.13 (IBC 1910.9) |
| Inspection of prestressed concrete:<br>a. Application of prestressing forces.<br>b. Grouting of bonded prestressing tendons in the seismic force-resisting system. | ☒<br>☒ | ☐<br>☐ | ACI 318: 18.20<br>ACI 318: 18.18.4 |
| Erection of precast concrete members. | ☐ | ☒ | ACI 318: Ch. 16 |
| Verification of in-situ concrete strength, prior to stressing of tendons in post-tensioned concrete and prior to removal of shores and forms from beams and structural slabs. | ☐ | ☒ | ACI 318: 6.2 |
| Inspect formwork for shape, location and dimensions of the concrete member being formed. | ☐ | ☒ | ACI 318: 6.1.1 |

| MASONRY CONSTRUCTION (1705.4) | | | |
|---|---|---|---|
| **ITEM (IBC REFERENCE)** | **CONTINUOUS** | **PERIODIC** | **REFERENCED STANDARD** |
| Masonry Construction | | | TMS 402/ACI 530<br>ASCE 5<br>TMS 602<br>ACI 530.1/ASCE 6 |
| Empirical masonry – Cat. IV (1705.4.1) | ☐ | ☐ | TBD |
| Vertical masonry foundation elements (1705.4.2) | ☐ | ☐ | TBD |

## 2012 Code Analysis Form

| WOOD CONSTRUCTION (1705.5) | | | |
|---|---|---|---|
| ITEM (IBC REFERENCE) | CONTINUOUS | PERIODIC | REFERENCED STANDARD |
| High-load diaphragms (1705.5.1) | ☐ | ☐ | N/A |
| Metal-plate-connected wood trusses spanning 60 feet or greater (1705.5.2) | ☐ | ☐ | N/A |

| SOILS CONSTRUCTION (1705.6) | | | |
|---|---|---|---|
| ITEM (IBC REFERENCE) | CONTINUOUS | PERIODIC | REFERENCED STANDARD |
| Verify materials below shallow foundations are adequate to achieve the design bearing capacity. | ☐ | ☒ | - |
| Verify excavations are extended to proper depth and have reached proper material. | ☐ | ☒ | - |
| Perform classification and testing of compacted fill materials. | ☐ | ☒ | - |
| Verify use of proper materials, densities and lift thicknesses during placement and compaction of compacted fill. | ☒ | ☐ | - |
| Prior to placement of compacted fill, observe subgrade and verify that site has been prepared properly. | ☐ | ☒ | - |

| DRIVEN DEEP FOUNDATIONS (1705.7) | | | |
|---|---|---|---|
| ITEM (IBC REFERENCE) | CONTINUOUS | PERIODIC | REFERENCED STANDARD |
| Verify element materials, sizes and lengths comply with the requirements. | ☒ | ☐ | TBD |
| Determine capacities of test elements and conduct additional load tests, as required. | ☒ | ☐ | TBD |
| Observe driving operations and maintain complete and accurate records for each element. | ☒ | ☐ | TBD |
| Verify placement locations and plumbness, confirm types and size of hammer, record number of blows per foot of penetration, determine required penetrations to achieve design capacity, record tip and butt elevations and document any damage to foundation element. | ☒ | ☐ | TBD |
| For steel elements, perform additional inspections in accordance with Section 1705.2. | ☐ | ☐ | TBD |
| For concrete elements and concrete-filled elements, perform additional inspections in accordance with Section 1705.3. | ☐ | ☐ | TBD |
| For specialty elements, perform additional inspections as determined by the registered design professional in responsible charge. | ☐ | ☐ | TBD |

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| CAST-IN-PLACE DEEP FOUNDATIONS (1705.8) | | | |
|---|---|---|---|
| ITEM (IBC REFERENCE) | CONTINUOUS | PERIODIC | REFERENCED STANDARD |
| Observe drilling operations and maintain complete and accurate records for each element. | ☒ | ☐ | TBD |
| Verify placement locations and plumbness, confirm element diameters, bell diameters (if applicable), lengths, embedment into bedrock (if applicable) and adequate end-bearing strata capacity. Record concrete or grout volumes. | ☒ | ☐ | TBD |
| For concrete elements, perform additional inspections in accordance with section 1705.3. | ☐ | ☐ | TBD |

| HELICAL PILE FOUNDATIONS (1705.9) | | | |
|---|---|---|---|
| ITEM (IBC REFERENCE) | CONTINUOUS | PERIODIC | REFERENCED STANDARD |
| Installation | ☒ | ☐ | TBD |
| Verify records of: Installation equipment used, pile dimensions, tip elevations, final depth, final installation torque and other pertinent installation data as required by the *registered design professional in responsible charge*. | ☐ | ☒ | TBD |

| SPECIAL INSPECTIONS FOR WIND REQUIREMENTS (1705.10) | | | |
|---|---|---|---|
| ITEM (IBC REFERENCE) | CONTINUOUS | PERIODIC | REFERENCED STANDARD |
| Structural wood (1705.10.1) | ☐ | ☐ | N/A |
| Cold-formed steel framing (1705.10.2) | ☐ | ☒ | - |
| Wind-resisting components (1705.10.3) | ☐ | ☒ | - |

| SPECIAL INSPECTIONS FOR SEISMIC RESISTANCE (1705.11) | | | |
|---|---|---|---|
| ITEM (IBC REFERENCE) | CONTINUOUS | PERIODIC | REFERENCED STANDARD |
| Structural steel (1705.11.1) | ☐ | ☒ | - |
| Structural wood (1705.11.2) | ☐ | ☐ | N/A |
| Cold-formed steel framing (1705.11.3) | ☐ | ☒ | - |
| Designated seismic systems (1705.11.4) | ☐ | ☒ | - |
| Architectural components (1705.11.5) | ☐ | ☒ | - |
| Access floors (1705.11.5.1) | ☐ | ☒ | - |
| Mechanical & electrical (1705.11.6) | ☐ | ☒ | - |
| Storage racks (1705.11.7) | ☐ | ☒ | - |
| Seismic isolation systems (1705.11.8) | ☐ | ☒ | - |

| TESTING & QUALIFICATION FOR SEISMIC RESISTANCE (1705.12) | | | |
|---|---|---|---|
| ITEM (IBC REFERENCE) | CONTINUOUS | PERIODIC | REFERENCED STANDARD |
| Concrete reinforcement (1705.12.1) | ☒ | ☐ | - |
| Structural steel (1705.12.2) | ☒ | ☐ | - |
| Seismic certification of nonstructural components (1705.12.3) | ☐ | ☒ | - |
| Seismic isolation systems (1705.12.4) | ☐ | ☒ | - |

| ITEM (IBC REFERENCE) | CONTINUOUS | PERIODIC | REFERENCED STANDARD |
|---|---|---|---|
| Physical & visual tests (1705.13.1) | ☐ | ☒ | - |
| Structural member surface conditions (1705.13.2) | ☐ | ☒ | - |
| Material application (1705.13.3) | ☐ | ☒ | - |
| Material thickness (1705.13.4) | ☐ | ☒ | - |
| Material density (1705.13.5) | ☐ | ☒ | - |
| Bonding strength (1705.13.6) | ☐ | ☒ | - |

| MASTIC & INTUMESCENT FIRE-RESISTANT COATINGS (1705.14) | | | |
|---|---|---|---|
| ITEM (IBC REFERENCE) | CONTINUOUS | PERIODIC | REFERENCED STANDARD |
| Material & Installation | ☐ | ☐ | TBD |

| EXTERIOR INSULATION & FINISH SYSTEM (EIFS) (1705.15) | | | |
|---|---|---|---|
| ITEM (IBC REFERENCE) | CONTINUOUS | PERIODIC | REFERENCED STANDARD |
| Material & Installation | ☐ | ☐ | TBD |

| FIRE-RESISTANT PENETRATIONS & JOINTS (1705.16) | | | |
|---|---|---|---|
| ITEM (IBC REFERENCE) | CONTINUOUS | PERIODIC | REFERENCED STANDARD |
| Penetration firestops (1705.16.1) | ☐ | ☒ | - |
| Fire-resistant joint systems (1705.16.2) | ☐ | ☒ | - |

| SMOKE CONTROL (1705.17) | | | |
|---|---|---|---|
| ITEM (IBC REFERENCE) | CONTINUOUS | PERIODIC | REFERENCED STANDARD |
| Material & Installation | ☐ | ☒ | - |

| MISCELLANEOUS AREAS (These areas are recommended by Architect/Engineer and approved by Building Official) | | | |
|---|---|---|---|
| ITEM (IBC REFERENCE) | CONTINUOUS | PERIODIC | REFERENCED STANDARD |
| Suspended ceiling grid clips | ☐ | ☒ | - |
| Suspended ceiling wire spacing (seismic) | ☐ | ☒ | - |
| Soils backfill (specify locations and frequency) | ☐ | ☒ | TBD |
| Soils for curb and gutter (specify locations and frequency) | ☐ | ☐ | TBD |
| Soils for parking lots (specify locations and frequency) | ☐ | ☐ | TBD |
| Soils for utility trench backfill | ☐ | ☐ | TBD |
| Reinforcement for slab on grade sidewalks and drive approaches (specify locations and frequency) | ☒ | ☐ | - |
| Reinforcement for interior slab on grade (specify locations and frequency) | ☒ | ☐ | - |
| Concrete testing for slab on grade sidewalks and drive approaches (specify locations and frequency) | ☐ | ☒ | - |
| Concrete testing for interior slab on grade (specify locations and frequency) | ☐ | ☒ | - |
| Masonry veneer (specify locations and frequency) | ☐ | ☒ | - |
| Asphalt inspection (specify locations and frequency) | ☐ | ☒ | - |
| Asphalt testing (specify locations and frequency) | ☐ | ☒ | - |
| Inspection of seismic resistance (specify locations and frequency) | ☐ | ☒ | - |

**2012 Code Analysis Form**

| MISCELLANEOUS AREAS continued | | | |
|---|---|---|---|
| Steam and water line welding (specify locations and frequency) | ☒ | ☐ | - |
| Seismic supports for duct work and sealing of joints for duct work | ☐ | ☒ | - |
| Seismic supports for electrical raceways, cable trays and lights | ☐ | ☒ | - |
| Seismic supports for plumbing lines including gas, water, steam and condensation | ☐ | ☒ | - |
| Seismic bracing for mechanical units both on slab and suspended | ☐ | ☒ | - |

**SPECIAL INSPECTORS SHALL:**

- Be approved by the Building Official prior to performing any duties;
- Provide proof of licensure as a special inspector by the State of Utah for each type of inspection;
- Inspection reports are to meet the requirements of IBC 1704.1.2 and University of Utah standards;
- Inspection reports are to be submitted to the code consultant, architect, project manager, and the Building Official within 48 hrs. of inspections;
- A final inspection report shall be submitted following completion of the project documenting the types of special inspections performed and a statement indicating that the structure is in compliance with the drawings, specifications and applicable codes. IBC 1704.1.2

### 3.1.10 Testing and Inspections

The following information defines the normal construction observation duties which The State of Utah, DFCM requires as a part of an Architect /Engineer Agreement, where they apply; and normal testing requirements of a Testing Agency which is provided by a separate agreement between DFCM and the Testing Agency. The provisions are modified by the current IBC 2012 requirements.

**Observation and Testing**
Observation by the A/E will be completed on a periodic basis to satisfy the requirements of normal observations. Special observations and testing are to be coordinated by the A/E. Independent testing agencies will be hired by DFCM to complete all special inspections and testing as required by the specifications and the 2012 IBC code.

## 3.2 SPACE PLANNING ISSUES

### 3.2.1 Expansion Issues

Architectural Nexus has worked on the previous 3 phases of the Huntsman Cancer Institute. In 1994 master plans were prepared showing the Institute's expansion goals that included the present phase IV building site. During phase I the major crude oil pipe lines and the Natural Gas Pipeline were moved from the building site for phase I through IV. Presently, the lines are not within our construction area. If a new large laboratory building is built south of the phase IV site a section of the pipelines may need to be relocated. The pipe lines in question are 2-10" 200PSI Crude Oil Lines and 1-10" 200 PSI natural gas line. The addition of phase IV, will double the research space the institute presently contains in phase I. All of the Huntsman additions and the phase IV building utilizes the project site right up to the University's east boundaries.

Several additional laboratory facilities can be built south of phase IV on the East bench up to the Red Butte Garden boundaries.

**Parking**
Parking is not part of the phase IV Huntsman Cancer Institute project but is a major issue. Parking on the East Bench of the University is at capacity or beyond at this time. The new phase IV building will be adding a minimum of 300 plus staff members over time starting in early 2017. This needs to be coordinated with any future plans for additional parking in this area of the campus. Parking accommodations is the number one question raised by the user groups at this time. University parking meetings are ongoing, two structures are planned for the Health Sciences Campus. One by the Huntsman buildings and a larger 1000 stall structure west of the student housing towers. No decision has been made on which structure will be built first. The 1000 stall structure is thought to be the structure to be built first.

### 3.2.2 General Module System Design

The phase IV research building which tends to make the building will be based around a laboratory module of 10'-6". By following the 10'-6" module the building structure will be most efficient.

The exterior building dimensions will need to work within 24" block modules. The masonry (concrete block) used on the past phases has a 24" modular length. This is broken done to a 12" module for the highest efficiency. This allows a structural module of 22' which works well as confirmed in phase I, as this module was used as a basis for the laboratory building portion.

Our floor to floor height is 16'-0" on centers working well with the masonry block heights of 8" and 16". This specific height will prevent the need to cut any block horizontally.

### 3.2.3 Building Module Planning / Design Flexibility

**Office / Dry Laboratory Space**
Presently the office and open cubicle spaces are not assigned. These spaces are proposed in large areas to make the ultimate design more flexible in the arrangement of closed offices, shared offices and open cubicles and pods.

**Common Public Spaces**
Common spaces are planned to promote informal meeting spaces where accidental meeting and impromptu meetings will be held among colleagues. Conference rooms will flex in size. Larger meeting rooms can be sectioned off to create smaller meeting rooms.

**Laboratory Spaces**
Laboratories are setup in six areas in the building; each will have up to six investigators. The office spaces are in one area to allow collaboration of investigator teams. The laboratory furniture is designed to be flexible and easily moved or reconfigured. The 6 investigators pod size allows the ability for researchers to grow or shrink within the same area.

### 3.2.4 Laboratory Planning Units

The laboratory units are setup in six areas within the phase IV building. Each pod will have up to six investigators allowing for the new building to house 36 new investigators. See Section 3.3.5 for more in-depth reviews of the laboratory spaces.

### 3.2.5 Space Type Narrative

**Offices and Dry Laboratory and Open Office Areas**
The office and dry laboratory areas in the building are grouped in large areas where possible. There are closed offices, shared offices, cubicle pods and cubicles. The general building office areas works in conjunction with the wet research laboratory areas. Office sizes and cubicle sizes are shown in the room diagram section of the program.

**Public Spaces / Conference Spaces**
This portion of the building includes a coffee shop, conference rooms, an auditorium, toilet rooms, a workout facility and informal gathering spaces. These spaces are listed in the room diagram portion of the program.

**Laboratory Spaces**
The building is planned with six laboratory pods, each containing closed offices and open cubicle spaces, laboratory bench spaces and equipment space. There are six investigators in each pod. These spaces are listed in the room diagram portion of the program.

**Support Spaces**
The support areas include: housekeeping, storage rooms, glass washing area, computer areas, electrical and mechanical spaces. These spaces are listed in the room diagram portion of the program. Presently glass washing is shown as a central location for phase IV. The glass washing may move from a central location to several remote locations in phase IV during design.

## 3.3 BUILDING DESIGN CRITERIA

### 3.3.1 Architectural Narrative

The functional goal of the Wet (Laboratory) and Dry (Office) research is to expand research for children's and family cancers related to genetics. This goal will be achieved by designs which utilize the following objectives:

**The Building will be designed for interaction**
This building will be one of the primary scientific instruments used by the occupant to further cancer research. The building, along with its equipment and systems, should promote efficient scientific productivity. Therefore, the design of this research building must be approached with the same attention to detail as required of the functions served. For example, the building must provide a platform sufficiently resistant to vibration to allow research activities to proceed without degradation of the procedure and studies.

**The Building's Life Cycle Costs Will be Minimized**
The building's exterior finishes and systems shall require a minimum amount of maintenance.

The building's interior finishes shall be durable, easily maintained, and designed for the intended level of use and to withstand possible reasonable abuse.

The building's mechanical, plumbing, electrical, communications, etc. systems shall economically accommodate the level and type of use programmed with consideration of future load requirements.

The building shall be operated with reasonable costs and efforts. Control systems shall modulate mechanical systems to changing demands and requirements to conserve energy. Energy Conservation systems shall be explored to determine the cost benefit rational of these options and incorporated in the design where appropriate. Sun control devices will be used to control solar heat gain and to provide day-lighting of interior spaces.

**The Building Shall be a Pleasant and Productive Place to Work**
The building shall be pleasant to look at by complimenting its surroundings and fulfilling the goals of the University of Utah and it's long range Development Plan, The East Bench of the campus, and the Health Sciences Center.

The building will use light to enhance the interior offices and laboratories. The building will be designed to integrate interior and exterior spaces for the building's staff. Views from the building shall be used to keep the building's occupants in contact with the natural environment. This strategy will provide the psychological "corner window office" to every space consistent with functional requirements. Views to and through the site shall enhance the integration of the building with the Health Sciences Center and the Huntsman Cancer Institute buildings.

The building shall be an architectural statement which reflects and compliments the Huntsman Cancer Institute's existing facilities. To further this concept, the design should seek to incorporate special central public spaces, in order to promote interaction with and views to the exterior mountains and valley.

Interior materials shall be chosen with sufficient color, texture and scale to create an attractive, inviting environment while requiring minimum maintenance.

**Office and Dry Laboratory Areas Designed for Comfort and Efficiency**
Offices shall be designed to provide exceptional views from the building. Offices should be open and inviting to the surrounding open office spaces. Finishes shall provide a relaxing atmosphere for the staff. Office space needs to provide privacy but also invite communication and collaboration with surrounding spaces. Sound privacy is required in some areas due to information being reviewed and HIPAA requirements. Open office spaces shall have 10'-0" high ceilings and offices shall have a minimum ceiling height of 9'-0".

**Miscellaneous Requirements – Research**
Ceiling heights in the open laboratory spaces shall be 10'-0". Typically, in the shared resource and equipment spaces ceilings shall be 9'-0" or lower to accommodate mechanical and plumbing runs.

Access ways within the building shall be sized to meet code exit requirements and to provide access for the installation of equipment. Typical corridor widths shall be a minimum of 6'-0" wide and 8'-0" high minimum which is adequate for all laboratory equipment, with some exceptions as follows: Special access shall be provided to accommodate mechanical equipment cyclotron equipment and imaging equipment access for installation, maintenance and replacement.

Service elevators capable of transporting large equipment to every floor of the building including the basement from the level A loading dock shall be provided.

Passenger elevators will serve all floors of the building and shall comply with University of Utah Design Guidelines and DFCM standards. There has been a request for electronic interactive signage.

Interior graphics and signs shall comply with the University of Utah and DFCM standards.
The building design shall provide spaces for dumpsters and recycling dumpsters at the loading dock.

The building design shall provide modular and typically located telecommunications rooms, custodial rooms, toilet rooms, mechanical service rooms/shafts, electrical rooms, etc., all in compliance with the University of Utah and DFCM standards. This will accommodate both phase I and phase IV buildings.

Hazardous materials storage shall be provided in compliance with the IBC 2012 code for maximum quantities of hazardous materials for a "B" occupancy and in compliance with the University of Utah and DFCM standards.

Furnishings shall be modular systems furnishings which optimize functionality and adaptability. Finishes, including upholstery, shall be selected to optimize durability, cleanability and acoustical properties.

The building will accommodate locker rooms, shower rooms, secure bike storage and a work out space for the staff in a central location convenient to the Huntsman Cancer Institute's campus and staff.

## 3.3.2 Laboratory Narrative

### LABORATORY PLANNING

**Module Planning**

Traditional laboratory module planning is still applicable today in providing module spacing of between 10'-6" – 11'-0". This dimensional module provides safe working aisle spacing between lab benches without wasting valuable space inside the labs.

The existing lab building is designed as one long open lab space over 20 modules long. The challenge with this size space is that lab users at one end of the lab are so far away from those at the other end, they rarely see one another. Providing smaller lab environments creates a more intimate lab community that encourages better interaction between the lab users. While the open lab concept is desirable for this project, it has been proposed that lab areas be no longer than about 12 bays long.

**Relationships of Lab Space to Offices**

The existing lab building has both lab support rooms and the main building corridor separating the offices from the main lab space. Faculty have indicated that the offices feel segregated from the labs and that a closer more direct relationship between the two is desired for this new building. Building code changes since the original lab building was constructed allow for more visibility between office space and labs be considered for this project. Special consideration for more liberal use of both internal and external window systems will be investigated in the design options for this project.

**Relationships of Lab Space to Lab Support Rooms**

Relationships between labs and lab support spaces are extremely important to this project. The research work that will take place in this building will require nearly as much activity in lab support rooms as in the actual labs themselves. On observation of the existing lab building, there is a significant amount of floor standing lab equipment (refrigerators, freezers, incubators, etc.) occupying a lot of floor space. It will therefore be important to provide an adequate amount of equipment room space directly accessible to the lab users.

It is proposed to consider two levels of lab support rooms for this project – direct support and indirect support. The direct support labs will be for lab activities that occur on a daily basis with strong ties to the main laboratory space. Examples of direct support labs include special instrument rooms, tissue culture rooms, fume hood alcoves, and special lab prep spaces. Indirect support lab space will be for lab functions that do not require as direct a connection to the main lab, but still require easy access to it. Examples of indirect support labs spaces include equipment rooms and controlled temperature rooms.

**Laboratory Visibility**

A new trend in laboratory design, and one that is desired for this new facility, is to visually open up the laboratory areas of the building to better engage all the lab users together and allow faculty members better vision of the lab spaces. The existing laboratory spaces are separated from the faculty offices by the lab support rooms. This separation has been identified as a design aspect to change in this new lab building. Strategic use of internal glazing and better use of outdoor windows can better provide this new lab facility with a design approach that better addresses the needs of new research lab programs today. Along with this trend towards more internal glazing is one to re-locate the traditional lab worker computer write up desk areas from inside to outside the labs. By locating them outside but adjacent to the labs and providing the labs with large internal glass window systems, maintaining the visible connection is still achievable while also providing a safer area for non-lab functions.

**Existing and New Vivarium Space Needs**
The Vivarium in the existing research lab building currently provides space for mouse breeding as well as housing for both general Experimental and Immunodeficient mice for procedural studies and trials. Other areas in the existing vivarium include cage/rack washing, general procedure rooms, zebra fish holding/procedure, and imaging equipment. Some of the existing imaging equipment is currently located in procedure rooms making them crowded and difficult to use.

It has been requested that this project be provided with new Vivarium space with a connection to the existing Vivarium. The overall Vivarium complex will serve both research lab buildings. The new Vivarium space will accommodate all general and Immunodeficient Experimental mice holding and procedure rooms, all zebra fish holding/procedure rooms, and be provided with a new large Imaging facility. The existing zebra fish space and imaging equipment will all be moved into this new Vivarium, thereby freeing up space in the existing Vivarium that could be converted into more general breeding colony holding room space. That would leave the existing Vivarium to only have mice breeding and the cage/rack washing suite. The cage/rack wash area in the existing building will also serve the cage/racking needs of the new Vivarium.

Contamination control is extremely important to the health and wellbeing of the mice in the Vivarium complex. It is proposed that the breeding colony spaces in the existing Vivarium be treated as clean areas and require isolation from other "not so clean" areas in the complex. If a mouse leaves the breeding colony space in the existing Vivarium to go to the general holding rooms and/or Imaging Suite, it will not be allowed to return to the breeding colony without following proper quarantine protocols for re-entry. This requires an isolation type of barrier that is provided between the existing Vivarium and new Vivarium areas.

Renovation of the existing Vivarium space is not included in the initial scope of work in this project program. However, the planning for the connection from this new Vivarium to the existing Vivarium is in the initial scope of work.

A survey of the existing laboratory building Vivarium users has indicated that their current maximum capacity Vivarium needs include the following mice caging requirements:

- General Breeding – General Mice Holding Rooms 2,115 cages
- General Breeding – Immunodeficient Holding Rooms 191 cages
- Experimental/Procedure General Mice Holding 855 cages
- Experimental/Procedure – Immunodeficient Holding Rooms 401 cages

It has initially been proposed that the capacity of the whole Vivarium complex be sized to accommodate twice those numbers to plan for new faculty as well as growth of the existing faculty programs. Therefore, it is recommended that the following mice caging requirements establish the program needs for the combination of the old and new Vivarium space:

- General Breeding – General Mice Holding Rooms 4,230 cages
- General Breeding – Immunodeficient Holding Rooms 382 cages
- Experimental/Procedure General Mice Holding 1,710 cages
- Experimental/Procedure – Immunodeficient Holding Rooms 802 cages

General Mice Holding Room Requirements
Through discussions with the Vivarium people from both Huntsman and the University of Utah Campus, it was decided that general mice holding within one large holding room is acceptable given the fact that micro-isolator style cages will be utilized. However, further discussion is required to integrate some flexible mice/fish holding room space into the design of this Vivarium.

Immunodeficient mice are engineered for specific research needs by eliminating their resistance to certain diseases, and therefore require isolation from other general population mice. Separate holding rooms will be required for these special strains of mice. It is proposed that separate smaller mice holding rooms dedicated to Immunodeficient mice be provided in this project.

Cage / Rack systems
Micro-isolator type of mice caging systems will be required for this project. While no determinations have been made yet on the cage/rack manufacturers, a system by Animal Care Systems (ACS) is being considered. This system utilizes a compact rack design that allows a higher density of cages/racks than conventional cage/rack systems.

Cage/Rack Washing
Cage and rack washing will be provided in the Cage/Rack Wash room in the existing Vivarium. No additional Cage/Rack washing equipment is required in this project.

Zebra Fish Suite
It has been proposed to provide new Zebra Fish space to accommodate up to about 50 racks along with equipment room space, prep kitchen space, storage space, and specialty micro-injection stations. The injection stations can be located inside of the large fish holding room. It has also been proposed that the Vivarium and Zebra Fish suite be designed such that a couple of rooms can be used for either mice holding or zebra fish holding. This will require a higher level of flexibility and require floor drains as well as options for work counters for fish work. Special consideration to the overall design of the Zebra Fish Suite will be required to also allow this level of flexibility for these mouse/fish rooms.

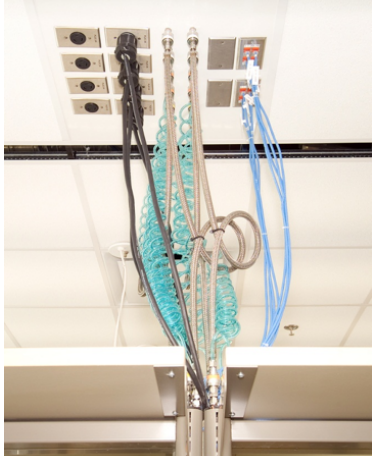
Vivarium Service Spaces
The new Vivarium will be provided with entry changing rooms, rest rooms, entry office/ break room, walk in feed storage cooler, bedding storage, Necropsy, and general cage/rack storage rooms.

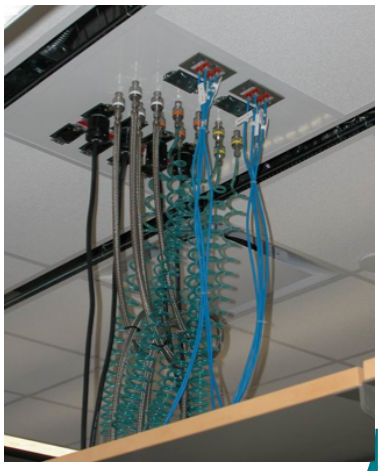
**Imaging Suite**
In addition to the new Vivarium, this project is proposing a new Imaging Suite which is a relocation/expansion of the existing Imaging Instrumentation that is currently housed in the existing Vivarium. This existing equipment will be moved into the new facility to a new Imaging Suite that will be generically designed to accommodate many different imaging modalities the largest of which would be a 7.5 – 9.4 T MRI. The new Vivarium and the Imaging Suite will be co-located with adjacent connections for joint use. The new Imaging Suite and Vivarium will have separate security access from each other to accommodate different user needs.

The new Imaging Suite requires a BSL2+ suite for use with Biological hazardous components with Mice. Caging needs for the holding rooms are yet to be determined. The BSL2+ Suite will require animal holding and separate gowning entry.

**Flexible Laboratory Casework Systems**
Flexibility is very important for the success of the facility and the individual spaces within the building. The laboratory designs should accommodate the functional needs of the lab users today, plus allow easy changes to occur in the near and long range future of the building. To provide that level of flexibility, a flexible casework system is proposed that allows easy user friendly systems that do not always require outside vendors to be hired to make such revisions. Those aspects of the flexibility that are proposed for this project include a system that allows users to easily move benches and cabinets around to accommodate equipment changes in the labs, systems that allow raising and lowering the counter tops to accommodate stand up and sit down activities, and a system that is non-proprietary that doesn't require specific vendor's products to be purchased in the future.

The following photographs illustrate the type of casework system proposed for this project that accommodates these flexibility needs. The lab benches are movable tables that are adjustable in height. The base cabinets are on casters that allow users to easily move and reposition them. The lab utilities are mounted overhead on adjustable shelving so the table tops are left clean and open. Lab Utilities feeding the benches are provided with quick disconnect fittings that plug into service access points in ceiling service panels. Where plumbing (water) needs occur, fixed floor standing benches are provided for sink stations.





## ARCHITECTURAL CRITERIA

### Typical Lab Planning Module

A typical laboratory planning module is the smallest practical laboratory environment and is the basis for all other laboratory sizes. Laboratory planning modules can be combined and/or subdivided to create appropriately sized laboratories based on head count and/or function. The planning module for this project is dimensioned as follows:

| Module Type | Width | Depth |
|---|---|---|
| Laboratory Module | 10'-6" O.C. | TBD |
| Laboratory Support Module | 10'-6" O.C. | TBD |
| Laboratory Office | 10'-6" O.C. | TBD |

### Ceiling Height

Laboratories and Imaging Suite - Recommended minimum clear obstruction height is 10'-0". A hung ceiling is recommended for this facility to reduce HVAC loads (volume reduction), sound transfer and reverberation and dust accumulation (exposed pipes, ducts, pendant mounted lighting fixtures and spray-on fireproofing, if required).

Vivarium – Recommended minimum ceiling height shall be 9' throughout. A partial interstitial space (catwalk) with a minimum 4' clear width x 6'-8" height above catwalk is recommended.

### Floor Loading

Recommended live load capacity for the laboratory portion of building is 100 PSF. Laboratory Linear Equipment Rooms shall be 125 PSF. (Local codes shall govern the design live load selection for the building). Floor loading for the instrumentation room areas in the Imaging Suite shall be determined by the structural engineer. Fiberglass or 316L stainless steel rebar is recommended for areas of greater than 5 gauss or where indicated (this applies to X, Y & Z axes).

- Magnet floor/foundation requirements will vary with imaging equipment type.
- A separate footer may be required if a heavy passive magnetic shield is used.
- An isolated slab may be recommended by the magnet manufacturer due to site conditions.

### IMAGING SUITE SPECIAL REQUIREMENTS

Below are architectural considerations specific to imaging areas:

- No large ferrous or magnetic construction materials (e.g. I-beams) should be used around magnet rooms in regions experiencing magnetic flux greater than 5 gauss. Ferrous rebar is not acceptable within the 5 gauss field.
- A magnetic shield may be required to reduce the magnetic flux to acceptable levels outside of which standard construction materials can be used. Within magnetically shielded MRI installations ferrous material is not acceptable within the shield enclosure.
- Magnet rooms must be positioned away from other high-field electromagnets (i.e. elevator shafts, roads and other locations where large, moving ferrous objects occur). The weight of the elevators will affect how far away they must be located from a magnet room. Elevators shall not be located within the 1 gauss field of any magnet.
    1. Elevator weight: 6000 pounds.
    2. Minimum distance of elevator from magnet centerline: TBD. If the distance from the magnet is unavoidable consider using iron elevator weights and review with the magnet manufacturer. Counter-weight free, belt drive type elevators are also an option.

- Static magnetic object restrictions for MRI:
  1. Iron or steel beams: 14'-0" from iso-center (IC) of Spectrometer.
  2. Steel reinforced walls: 12'-0" from IC of Spectrometer.
  3. Radiators and/or plumbing piping: 14'-0" from IC of Spectrometer.
  4. Metal tables or doors: 14'-0" from IC of Spectrometer.
  5. Large object (i.e.: Boilers): 14'-0" from IC of Spectrometer.
- Dynamic magnetic object restrictions for MRI:
  1. Steel Cabinet Doors: 20'-0" from iso-center (IC) of Spectrometer.
  2. Large metal doors, hand trolleys, cylinder transports: 30'-0" from IC of Spectrometer.
  3. Elevators: 45'-0" from IC of Spectrometer.
  4. Cars, forklifts and snow-blowers: 45'-0" from IC of Spectrometer.
  5. Trains, Subways, Trams, etc.: 120'-0" from IC of Spectrometer.
- Magnet stray field must not exceed 5 Gauss in public access areas. Magnet stray field should not exceed 10 Gauss in equipment or control rooms. Consider the effect of even low-level (~1 Gauss) stray field on adjacent facilities, which may be ultra-sensitive to magnetic flux (i.e.: surgical suite, electron microscope, etc.).
- Cable run from the service end of the magnet to equipment rooms is limited (check with manufacturer length limits) and usually is not more than 40'-0", however this distance varies by type and manufacturer of equipment.
- An ambient electromagnetic field (EMF) survey must be done at the site to investigate and determine if the site requires active compensation or if it simply meets vendors' specifications.
  1. DC EMF restrictions for MRI.
  2. DC trains, subways, trams: 600'-0" from iso-center (IC) of Spectrometer
  3. DC elevators: 45'-0" from IC of Spectrometer
  4. Mass spectrometer (slow ramp): 45'-0" from IC of Spectrometer
  5. Mass Spectrometer (sudden flyback): 100'-0" from IC of Spectrometer
- Consider the proximity to male/female/disabled bathrooms, changing facilities, and lockers for personal property.

**Imaging Suite Doors**
The design team will work with the owner to determine if any doors in the Imaging suite are required to be RF Shielded.

**VIVARIUM SPECIAL REQUIREMENTS**

Below are architectural considerations specific to the vivarium:

**Vivarium Floor Construction and Slope**
A two step structural and topping slab not less than 2" is recommended in certain areas to insure slope and drain requirements.

**Vivarium Wall Construction**
Walls shall be constructed of high impact, water resistant gypsum wall board on heavy-guage metal studs or lightweight sand-aggregate concrete masonry units. Typically, partitions shall extend 6" above ceiling. Designated partitions may extend to the underside of the structural slab for fire rating, noise, or cross contamination control.

**Vivarium Corridors**
Main and secondary (within suites) corridors shall be a minimum of 8'-0" and 7'-0" wide, respectively.

**Vivarium Doors**
Doors shall be constructed and/or equipped as follows (and meet ADA requirements):

- Minimum 42” wide by 84” high.
- Hollow metal door with welded edges and filled cavity (sound attenuation material). Top and bottom to be flush, not recessed.
- Hollow metal frame with hospital stop terminating 4” AFF. Provide jamb guards, equal to LSP, mounted on corridor side.
- Hollow metal components shall be epoxy painted.
- Stainless steel protection plates full width of door and 36” AFF in height. **(Must be stamped with UL fire rated label)**
- 12”x24” view window with red laminated glass (minimal transmission below 580nm; outer layers of 1/8” clear annealed glass with inter-layer between glass of Solar Graphics Color Rose/ Chocolate 3). Provide magnetic vinyl black-out panel for all animal room doors.
- Surface mounted sweep on Corridor side. Recessed mounted sweeps or drop seals are not acceptable. Gaps shall not exceed 1/4”.
- Lever handles with cylinder locks on animal room doors and card readers on suite doors and facility entry doors. Strike plate to have cup design. Key rings or finger pulls are unacceptable.
- Stainless steel continuous piano hinge.
- Self-closing closer with variable delay and hold open surface mounted on room side.
- No sill or transfer grill.

**ACCESS**

**Clearances**
For purposes of safe passage of occupants past people and equipment in aisles, minimum recommended clearance between benches, or between a bench and a designated equipment area, is 5’-0” in laboratories. Recommended clear corridor width leading into a laboratory is 5’-0”.

**Personnel/Equipment Access**
Provide one 42” wide door to facilitate personnel and equipment access to laboratories and support rooms (except environmental rooms and dark rooms, provide a 36” door). All laboratories will have at least two (2) means of egress unless a functional laboratory unit is sufficiently small (e.g.: environmental room; dark room, single module lab, etc.).

**ADA Requirements (Access and Workstations)**
Access to and within all laboratory areas shall meet ADA requirements. Provide ability to modify workstations in all laboratory modules to meet ADA requirements as needed in future. To meet disabled workstation requirements, we recommend following:

- Counter top at standard low bench height of 31” A.F.F.
- Knee space at least 32” wide with a clear height of at least 29” to underside of nearest obstruction (typically front apron). Provide 6” wide and 10” high toe space on at least one side of workstation.
- Service fixtures located maximum 18” from front edge of counter top. Fixtures can be either standard or remote control type.

- Sink drops shall occur at least 8” from front edge of counter top and trap shall be minimum 9” A.F.F.
- Fume hoods modified to meet the above requirements.
- Confirm additional conformance requirements for sink stations and fume hoods.

**NOISE**

Ambient noise level in the laboratories and support rooms shall not exceed the NC levels as noted in the tables below.

**General Open Laboratory Environment**

| Economical | Moderate | Excellent |
|---|---|---|
| NC40 | NC35 | NC30 |

*(This is for open lab – not equipment room.)*

**Equipment Lab Support Room**

| Economical | Moderate | Excellent |
|---|---|---|
| NC50 | NC45 | NC40 |

Prevent acoustical levels due to intermittent activity originating outside animal holding rooms from exceeding background sound level by more than 10 dB. Typically, partitions shall be constructed with a sound transmission coefficient of STC30, except in cage wash provide STC40.

**ARCHITECTURAL FINISHES**

| 1. LABORATORY, ALCOVE, PROCEDURE ROOM | |
|---|---|
| Floor: | **Vinyl products and integral base or epoxy resign as required for freezer rooms.** |
| Wall: | Gypsum wall board (GWB) with paint. Provide water-resistant GWB at sink with paint. |
| Ceiling: | Vinyl coated acoustic lay-in tile. |
| Casework: | Wood with epoxy resin counter top. Sinks shall be lipped drop in epoxy. Mobile casework shall consist of adjustable height movable tables and movable independent under-counter cabinets on casters. Three-tier adjustable shelving in laboratories and two-tier adjustable shelving in alcoves and procedure rooms shall be plastic laminate with wood edge-banding. Cabinets shall be provided without pull-out boards. |

| 2. DRY DARK ROOM | |
|---|---|
| Floor: | **Seamless vinyl flooring and integral coved base** |
| Wall: | GWB with paint. |
| Ceiling: | GWB with paint. |
| Casework: | Wood with an epoxy resin counter top. |
| Doors: | Hinged with light-tight hardware. |
| Special: | Accommodate through-the-wall auto-processor with CW, HW, drain and point exhaust. Provide safelight and externally mounted illuminated “DARK ROOM IN USE” sign. |

| 3. ENVIRONMENTAL ROOM (4°-37°C) | |
|---|---|
| Floor: | Prefabricated 2” thick metal clad insulated panels with seamless vinyl and 4” high integral coved base. Depress structural floor slab to a finished depth of 4” for recessed installation. |
| Wall: | Prefabricated 4” thick metal clad insulated panels with baked-on white polyester finish on galvanized steel. |
| Ceiling: | Prefabricated 4” thick metal clad insulated panels with baked-on white polyester finish on galvanized steel. |
| Casework: | Stainless steel counter top, sink and adjustable two-tier shelving. |
| Special: | BMS shall monitor environmental rooms. |

| 4. TISSUE CULTURE ROOM | |
|---|---|
| Floor: | Seamless sheet vinyl with 4” high integral coved base |
| Wall: | GWB with Epoxy paint. |
| Ceiling: | GWB with Epoxy paint. |
| Casework: | Wood with an epoxy resin top. |
| Special: | Positive Pressure Mechanical air relative to adjacent rooms. |

| 5. TYPICAL VIVARIUM SPACES | |
|---|---|
| Floor: | Epoxy with 4" high integral coved base |
| Wall: | HIWRWB with Epoxy. Provide wall protection equal to LSP Sani-Rail. |
| Ceiling: | WRWB with Epoxy. |

| 6. IMAGING SUITE INSTRUMENT ROOMS | |
|---|---|
| | Finish requirements to be determined. |

**Magnetic Shielding**
Passive magnetic shielding should be considered with stray field flux likely to impact:

- Public access areas: 5 gauss limit.
- Road or elevator shaft: 1 gauss limit.
- Equipment room: 10 gauss limit.

**RF Shielding**
An RF shielded room shall be used to encase the MRI magnet where 5 Gauss field extends beyond room limits. It will be integrated into walls, ceiling and floor and have a patient viewing window centered at the front of the magnet [or CCTV]. A window may not always be possible depending upon the sense frequency of the magnet. Door to room will be an integral component of shield. One penetration panel (filter plate) is required in a cupboard for all magnet systems entering shielded room. User should consider secondary penetration panels for non-electrical services only (i.e.: optical fibers, odorant lines, projection beams for visual display to a patient). All services/ penetrations into shielded room must be either filtered (electrical) or pass through a wave guide (non-electrical, including quench duct), as specified by console vendor. RF shielding for small bore systems may not be required due to narrow bore size. Shielding consultant/equipment vendor to provide and/or confirm shielding requirements, if any, for equipment.

- Magnetic shielding shall be designed by magnet vendor [or shielding vendor with review by magnet vendor]. Penetrations in magnetic shield should be kept to a minimum, and openings, both size and location, should be reviewed and approved by magnet vendor.
- RF shielding must be insulated from all grounds.
- Any electrical interconnections entering the RF enclosure that are not part of imaging equipment (i.e.: HVAC sensors, lighting, power, etc.), will require electrical filters.
- Any non-instrument services such as lab gasses, medical air, etc. will require additional wave guides.

**Vivarium Penetrations / Vermin Control**
Special consideration shall be given to all floor, wall, and ceiling penetrations to prevent unsanitary conditions and vermin infestation. Following precautions are recommended:

- Sealing (caulk with pure silicone rubber) of crevices around plumbing fixtures, work surfaces, baseboard, etc., which may provide harborage for insects. All wall penetrations (plumbing and electrical fixtures) shall be fully sealed and covered with an escutcheon, if appropriate.

All ceiling penetrations (access panels, diffusers, grills, lights, etc.) shall be fully gasketted and recess mounted.

- Pre-treatment for vermin control (boric acid or amorphous silica applied at a rate of 5 g/sq. m.) before occupancy in walls and above ceiling.

**Vivarium Fixture Mounting**
All wall and ceiling mounted fixtures (electrical, plumbing, fire safety, etc.) shall be recess flush mounted.

**Natural Light**
Laboratories and offices shall have direct access to natural light. Window treatment (shades or blinds) shall be provided where appropriate to vary the amount of natural light entering the laboratory or office. Darkrooms, tissue culture rooms and environmental rooms shall avoid access to natural light.

**Laboratory Unit Hazard Classification**
Laboratory unit hazard classification shall be as per International Building Code (IBC).

**Vibration Criteria**
At laboratory areas, velocity of slab due to walker induced (moderate walking speed; 75 steps/minute) or building mechanical vibration shall not exceed 2,000 micro inches per second.

**Seismic Design**
Laboratory shelving, cabinets, and equipment shall be provided with seismic restraints/tie downs as required by code. All seismic calculations must be stamped with a Utah licensed structural engineer's seal.

## HEATING, VENTILATING AND AIR CONDITIONING CRITERIA

**General**
Mechanical design shall be developed to meet requirements of the OSHA Laboratory standard, ASHRAE and the ANSI Laboratory Ventilation Standard #Z9.5 and IBC. For Vivarium areas, the most recent Guide for Care and Use of Laboratory Animals (the "Guide") shall be used as a basis for all minimum HVAC requirements.

**Space Temperature and Humidity Criteria**
Following inside design temperature (degrees Dry Bulb) and humidity (% Relative Humidity) conditions are recommended for all laboratory areas. Provide one thermostat per two laboratory modules, one per laboratory support room and one per office.

**Space Temperature and Humidity Criteria**

| | | Summer Temperature | Humidity | Winter Temperature | Humidity |
|---|---|---|---|---|---|
| a. | Laboratory | 72 +/-2 | 50% max | 72 +/-2 | 30% min |
| b. | Laboratory Support | 72 +/-2 | 50% max | 72 +/-2 | 30% min |
| c. | Instructional Laboratory | 74 +/-2 | 55% max | 74 +/-2 | 30% min |
| d. | Office/Amenity | 75 +/-3 | 60% max | 70 +/-3 | 20% min |
| e. | Mouse Holding | 72+/-2 | 45%+/- 10% | 72+/-2 | 45%+/- 10% |
| f. | Imaging Instrument Rooms | TBD | TBD | TBD | TBD |

### Air Change Criteria

Provide following air changes per hour (ACPH) for dilution and/or removal of odors in laboratories as per below chart. Engineer shall calculate actual ACPH requirements based on exhaust device requirements and heat loads generated by equipment, people, lighting and solar heat gain.

### Ventilation Criteria

One hundred percent of air supplied to wet laboratory areas shall be exhausted. There shall be no recirculating of wet laboratory air. Supply air quantities shall be based upon heat loads, minimum dilution/ventilation requirements, and/or required make-up air for exhaust systems, whichever is greatest. Office and dry lab zones shall employ recirculated air.

**Air Change Criteria**

| Space Type | | Occupied | Unoccupied | Remarks |
|---|---|---|---|---|
| a. | Laboratory | 6 min | 2 min | |
| b. | Lab Support | 6 min | 2 min | |
| c. | Office | 2 min | 2 min | |
| d. | Vivarium Holding | 15 Max | 10 min | |
| e. | Imaging Instrument Rooms | 10 - 12 | 5 - 6 | |

### Pressurization Criteria

All laboratories shall be negative with respect to corridor or adjacent space, unless otherwise noted.

### Filtration/Dedicated Exhaust Criteria

All laboratory areas shall be supplied with air through 30% ASHRAE (atmospheric dust spot efficiency) efficient roll pre-filters and 95% ASHRAE efficient final supported bag filters. Laboratories or equipment, which require dedicated and/or special filtration of supply or exhaust air are listed below:

- Cold and Warm Rooms used as cold or warm laboratories will be ventilated at 0.5 CFM/square foot.

### Building Operating Schedule

All laboratory mechanical, electrical and plumbing systems shall be operable 24 hours, 7 days a week with varying degrees of occupancy in a 24-hour period.

### Flexibility Criteria

Air distribution systems shall be designed to afford flexibility for future redesign, primarily by providing accessibility to duct systems throughout facilities and, where feasible, by applying a modular layout of air distribution devices and by providing symmetry and uniformity to branch duct layout.

### Vivarium HVAC Redundancy

Redundant and parallel systems are required for supply, exhaust, heating and cooling so that environmental conditions can be maintained in animal holding rooms with one unit out of service.

**Watts/Square Foot**
HVAC System shall be sized to compensate for following equipment heat loads (not including lights, people or solar heat gain). Any room exceeding these values may be serviced with a local chilled water fan coil unit that will recirculate and cool room air.

| | Space | Watts / SF |
|---|---|---|
| a. | Laboratory | 8 |
| b. | Procedure Room | 16 |
| c. | Environmental Room (4-37C) | Provide 4kw/room for equipment load (2@ 20 circuits). |
| d. | Imaging Suites Rooms | To Be Determined |

**Vivarium Building Automation System**
Building automation system (BAS) shall monitor and/or control following in all rooms:

- Monitor temperature and humidity with an accuracy of +/-1°F and +/-5%RH.
- Control temperature and humidity within +/-2°F and +/-10%RH of set point.
- Monitor and control air flow (supply/exhaust CFM and room air changes per hour) with an accuracy of +/-10%.
- Monitor pressure relationship relative to corridor or adjacent space derived from summing supply/exhaust air flows in non-ABSL3 areas.
- Control animal level lighting on an adjustable time and duration schedule.
- Monitor animal level lighting state (on or off) with a photocell.

**Noise Criteria**
Ambient noise levels from the HVAC system shall not exceed NC45-50 in laboratories. Noise levels shall not exceed NC50 at 36" from the center of a fume hood with the sash 50% open.

**HVAC Concept**
The following HVAC concept is proposed for this facility:

- Exhaust Location: Each module shall be exhausted at a common location in the laboratory alcove or Procedure Room and can accommodate an initial or future 5' or 6' fume hood or room exhaust register.
- Supply Location: Supply air diffusers shall be located so as not to create drafts or turbulence at fume hoods or biological safety cabinets.

**Quench Ducting**
A dedicated pipe connecting the magnet to an outside area is required to provide a vent path for cryogenic gas in event of a magnet quench. Diameter, number of bends and maximum length of the pipe must be determined in conjunction with magnet vendor. Pipe must exit to an area away from public access. Pipe exit must be kept free from blockages and must have suitable design to prevent rain, snow, leaves and other materials from entering pipe. A cryogen wave-guide must be provided at RF shield by shield vendor. Connections from magnet to wave-guide are by magnet vendor or HVAC contractor.

Connections from wave-guide to outside of building vent are by HVAC contractor. Vent glass wrapping is recommended as connection material to cryogen vent to ensure ground isolation. Orientation of the quench vent and duct must be placed so that it does not interfere with a 4" radius cylinder extending up from magnet's room temperature bore.

**Fume and Exhaust Hood Criteria**
Chemical fume hoods shall typically be 5' or 6' bench type with vertical/horizontal restricted sashes, one 30" wide flammable base cabinet, one 18" wide corrosive acid base cabinet and one 12" wide base cabinet to conceal cup sink waste piping. Corrosive cabinets will be vented behind the fume hood baffle and 12" above the counter top. Fume hoods shall have an average face velocity of 100 feet per minute at an 18" sash opening. Fume hoods will be equipped with an audible-visual low flow alarm.

## ELECTRICAL CRITERIA

**Primary Voltage**
Laboratory areas will require 208/120 volt, 3-phase, 4 wire service for receptacles, small appliances and small (1/3 horsepower or less) motors. Power requirements for Imaging Suite instruments are to be determined.

**Service Distribution**
Each double laboratory module shall have an individual circuit breaker panel. Each panel shall have at least 25% spare breaker capacity above initial requirements. Each 120V/20A circuit shall not exceed four (4) duplex receptacles. Alternate circuiting of adjacent duplex receptacles to minimize outages. Electrical distribution will be via surface-mounted electrical raceways at wall benches and peninsula benches. Duplex outlets shall be provided at a maximum of 2'-0" O.C., unless otherwise noted. Ground fault protection will be provided for outlets within 6'-0" (distance to be confirmed by electrical engineer based on local codes) of a sink edge. Circuits shall be confined to one side of the bench to facilitate identification if the laboratory is subdivided or enlarged in the future. All receptacles, 120V and 208V, to be permanently labeled with a Panel and Breaker number.

**Stand-by Power**
It is recommended that the following items are placed on stand-by power, and this shall not be confused with Life Safety requirements:

- Laboratory supply and exhaust system (60 – 75% of full load) to maintain environmental conditions, relative negative pressure of labs, exhaust from fume hoods (sash shall be completely closed in a power outage) and vented base cabinets (acid and flammable) under the hood.
- Fume hood air flow monitor/audible–visual alarm.
- Dedicated exhaust from radio-chemical fume hoods.
- Environmental rooms (Warm, Cold).
- Provide the following for freezers and incubators - 208V/20A/3ph@3'-6" OC, 120V/20A@2'-6" OC.
- Vivarium HVAC system to maintain living conditions for animals.
- MRI Magnet Room and Equipment Room.

**Uninterruptible Power Supply (UPS) System**
A central UPS system is not recommended for the laboratories. Users will be responsible to provide local UPS systems for equipment requiring this service. Emergency generator will accept load transfer within 10 seconds. A UPS system will

be incorporated at the server room to provide uninterrupted power until the generator is fully powered.

**Voice/Data System**
Voice/data outlets (4-gang junction box with conduit to cable tray) shall to be provided at each workstation pair, bench pair, alcove (2), lab support room (4), office (2), conference rooms (2) and lounges (2). Provide cable tray in the people corridor. Provide conduit between data junction boxes and cable tray.

**Special Lighting**
The recommended illumination level to be achieved in all laboratory areas at the work surface (37" A.F.F) is 60 foot-candles. LED lighting will be acceptable in all laboratory areas except Dark rooms where LED is required. Direct/indirect lighting fixtures are preferred in the laboratories. Provide task lighting at each workstation in the open laboratory.

**Vivarium Lighting**
Each animal holding room shall be equipped with 3 independently controlled lighting systems, 1 for animals and 2 for humans. The 3 systems are as follows:

- Animal White (full spectrum fluorescent). Animal lighting system shall provide a programmable, automatic day/night cycle on an adjustable time and duration schedule with photocell confirmation of cycle controlled and monitored by BAS. Lights shall flicker 5 minutes before shut-off. Animal lighting system shall provide 30-35 FC at 3' AFF.
- Human White (full spectrum fluorescent). Human fluorescent lighting system shall be manually controlled by an integral light switch/programmable (through BAS) timer mounted inside animal room near door. Lights shall flicker 5 minutes before shut-off. Human lighting system shall provide 60-70 FC at 3' AFF. Human and animal lighting systems can be accommodated in same multi-bulb fixture. Human light level can only override animal night cycle with programmable timed manual override switch in room.
- Human Red (full spectrum fluorescent with red film). Human red light system shall be manually controlled by an integral light switch/programmable (through BAS) timer mounted outside animal room near door. Lights shall flicker five minutes before shut-off. Human red light system shall provide <10 FC at 3' AFF (the visual spectrum for rodents ends in the red range above 650nm). Human and animal lighting systems can be accommodated in same multi-bulb fixture.

**Imaging Suite Lighting**
The recommend illumination level to be achieved in all MRI support space areas at the work surface (30" A/. F. F.) is 80 foot candles. Fluorescent lighting will be acceptable in all Imaging related areas except Magnet Room and other designated rooms where dimmable incandescent is required. Lighting in the Magnet Rooms shall automatically switch to a CD voltage supply when magnet is in use.

**Special Wiring in Hazardous Areas**
Hazardous areas and equipment shall be equipped with explosion-proof lighting fixtures, power outlets, switches and grounding (as necessary to prevent static build-up).

**Vivarium Security**
A biometric reader based access system shall be provided for at each entry/exit door and designated animal rooms/suites. A closed-circuit television (CCTV) system shall be provided to monitor each entry/exit door and designated locations. Security system shall be controlled and monitored locally and remotely.

## PLUMBING CRITERIA

### General
Piped services shall be available for potential distribution to all individual laboratories. System sizing and diversity factor to be determined by Engineer. The use of vacuum breakers on all domestic water fixtures to be evaluated by project engineer.

### Cold Water System
A non-potable cold water system shall be provided to laboratory sinks and cup sinks (in fume hoods). Capacity will be based on 1 sink outlet (3 GPM @ 35 - 40 PSIG) per double laboratory module, 1 cupsink outlet per fume hood and 1 sink outlet per support module.

### Hot Water System
A non-potable 120°F hot water system shall be provided to laboratory sinks. Capacity will be based on 1 sink outlet (3 GPM/outlet @ 35 - 40 PSIG) per double laboratory module and 1 sink outlet per support module. Provisions for supplying water at higher temperatures for individual pieces of equipment shall be provided by dedicated steam boosters that will be supplied with the equipment.

### Tempered Potable Water
A tempered potable water system shall be provided to support the operation of the eye wash and safety showers.

### Natural Gas
Natural gas shall be provided to laboratory benches and fume hoods as required. Capacity will be based on 2 outlets (3 CFH/outlet; all single outlets) per laboratory support module.

### Specialty Gases
Laboratory gases (i.e. N2, H2, He, Instrument Air, NO2, O2, etc.) require all piping components lubricated, cleaned, capped, protected, and delivered certified for “Oxygen” service. Outlet pressure shall be 150 psig with line pressure not to exceed 200 psig.

### Compressed Air System
Oil free, compressed air shall be provided to laboratory benches and laboratory fume hoods at 60 psig @ -40 degree F dew point, 15 PSI, not instrument grade. Capacity will be based on 4 outlets (1 scfm/outlet; all single outlets) per laboratory module, 2 outlets per laboratory support module.

### Type III Reagent Grade Water System
A centralized Type III reagent grade water system CAP/NCCLS with a continuous loop design shall be provided to designated laboratory sinks. Capacity will be based on 2 outlets per double module laboratory (1 GPM/outlet @ 25-60 psig plus specific equipment consumption rates glassware washers and local water polishers). Local in-laboratory polishing units will be utilized to increase the quality of the Type III reagent grade water to Type I.

**Type III Reagent Grade Water Basic Specifications:**

| | Professional Association* | CAP/NCCLS | ASTM |
|---|---|---|---|
| a. | Resistivity (megohms/cm): | 0.1 | 1.0** |
| b. | Conductivity (microhms/cm): | 10.0 | 1.0 |
| c. | Silicate (microg/L): | 1000 | 500 |
| d. | Total Organic Carbon (microg/L): | N/A | 200 |
| e. | Sodium (microg/L): | 100 | 10 |
| f. | Chlorides (microg/L): | | 10 |
| g. | Bacterial Count Type C (CFU/100ml): | N/A | 1000 |

**Professional Association – College of American Pathologists (CAP), National Committee for Clinical Laboratory Standards (NCCLS), and American Society of Testing and Materials (ASTM).*

*** We acknowledge that the current ASTM standard for Type III water is 4. However this lower criterion was established to minimize the equipment’s life cycle cost.*

**Type I Reagent Grade Water**
A centralized Type I reagent grade water system will be provided. Type I reagent grade water will be provided by owner furnished and installed local polishing units fed by the Type I reagent grade water system. Provisions for installing local units above sinks shall include additional valved reagent grade water Type I outlet and electrical outlet above designated sinks.

**Steam**
High pressure (60 PSI) process steam shall be provided to glassware washers and other equipment with built-in steam-fired hot water temperature boosters. Equipment requiring clean steam will be provided with steam to steam generators.

**Chilled/Process/Condenser Water**
Chilled water (45-55°F) supply and return shall be provided to all water cooled environmental room condensing units, fan-coil units and specific laboratory equipment identified by owner.

**Floor Drains**
Floor drains shall be provided in laboratory areas at emergency shower, in glass wash rooms, photographic dark rooms and at specific equipment locations (i.e.: sterilizers, glassware washers, ice machines; specialized research equipment). Environmental room condensate will drain into floor drain located on the exterior of the room and easily accessible.

**Silver Recovery**
Not required for this project.

**Laboratory Waster (Drain) System** Policy and procedure will be to segregate and dispose of any toxic, radioactive or high concentration wastes through local "in-lab" safety containers, without the use of the piped waste system.

**Waste Dilution/Monitoring**
All laboratory waste will pass through a chemical dilution system with a sampling port prior to connection to sanitary sewer.

**Sprinkler System**
All laboratory areas shall be provided with automatic wet sprinkler system protection. The system shall be designed with provisions that permit replacement of sprinkled areas with specialized local systems such as pre-action as warranted by special requirements. If a dry system is required, provide a FM 200 system.

## SAFETY CRITERIA

**General**
It is recommended that the following safety features be provided in, or accessible to, each laboratory and meet OSHA and/or ANSI requirements for configuration, operation and location.

**Placement**
Emergency eyewash and shower equipment should be available for immediate use, but in no instance should it take an individual longer than 10 seconds to reach the nearest facility. It is recognized that the average person covers a distance of approximately 55ft. in 10 seconds when walking at a normal pace. The physical and emotional state of a potential victim (visually impaired, with some level of discomfort/pain, and possibly in a state of panic) should be considered along with the likelihood of personnel in the immediate area to assist. The installer should also consider other potential hazards that may be adjacent to the path of travel that might cause further injury. A door is considered to be an obstruction. Where the hazard is not corrosive, one intervening door can be present so long as it opens in the same direction of travel

as the person attempting to reach the emergency equipment and the door is equipped with a closing mechanism that cannot be locked to impede access to the equipment.

**Safety Stations**
Provide safety stations consisting of a deluge shower and eye/face wash within 10 seconds travel distance from areas using chemicals. Locate 2 safety stations per open lab and inside/adjacent to any lab support room that uses hazardous chemicals. Eye/face wash is to operate independently of deluge shower. Height of eye/face wash basin, deluge shower operating handle deluge showerhead should meet ADA and ANSI requirements. A safety shower shall be provided in handicap stalls in toilet rooms on lab floors.

**Eye/Face Wash Stations**
A hand-held, counter top mounted eye, face and body wash/drench hose unit should be provided at every laboratory sink station.

**Fire Extinguishers**
Fire extinguishers should be located in each laboratory suite and adjacent corridor as determined by code.

**Emergency Communications**
A telephone should be located in each laboratory, to summon appropriate safety personnel or emergency aid.

**Signage**
Appropriate signage indicating, but not limited to, Radioisotope, Flammable, Caustic, Microwave or Biological Hazard, should be posted on each appropriate laboratory entry door. Signage to be furnished by Owner or accommodated in the wall mounted room name/occupants signage system, including room by room emergency egress signage.

**Shielding Requirements**
Registered Health Physicist shall check and/or determine shielding requirements and approve architectural and equipment plans of spaces associated with radiation exposure. Vendors and/or manufacturers to verify and/or determine the magnetic and RF noise directions. Presented in this document are concrete wall and/or slab shielding thicknesses based on assumption of using standard density (147 pounds per cubic foot) concrete.

**MRI Scanner/MRI Animal Scanner/MRI Magnet Room**

- Magnetic and RF shielding shall be developed. Contact vendor and/or manufacturer for specs and requirements.
- Unit must be protected against RF noise and magnetic field from the outside. Spaces adjacent to the MRI have to be protected against the magnetic field from the lab (magnetic field power less than 5 Gauss required by regulations.)
- Create a copper Faraday cage to protect the lab against electro-magnetic, static electricity, and whirling currents. Design additional wave-guides and extra RF penetration panels if additional devices can be used in the room during research and/or treatment to avoid disruptions and modifications of the Faraday cage. Use steel sheets in between the drywall layers to protect the adjacent spaces from MRI activities.]
- Grounding. If installed in the slab or walls the copper-cadmium net shall be grounded. [Installation of 0.5mT magnetic field counter flooring in the lab.] Use color-coded signage to prevent entering the area with ferro-magnetic objects (Owner to Confirm). Additional

special grounding requirements to be determined with vendor and/ or manufacturer specifications and requirements.

- HVAC Cooling System. MRI scanner heat-exchange and internal cooling system to be water-cooled. Coordinate final coolant water requirements with vendor and/or manufacturer.
- HVAC Air Conditioning System. RF proof honeycomb filters and aluminum grilles with adjustable louvers to be used.
- Electrical and Data. Locate power, low voltage and communication conduits/ cables in a slab slit trench and/or vertical wall slot. [or overhead rack; Vendor dependent] Conduits and cables shall be protected copper-cadmium filters/ covering against RF and magnetic interference. The protection shall provide the necessary shielding characteristics at a minimum leakage current (<3mA). See vendor and or manufacturer for specs and requirements.
- Piping. Treat medical gases with special wave-guide panels/devices.

**MRI/PET**

*(the above criteria plus the following)*

- Radiation shielding shall be developed. Configuration and parameters of MRI/ PET scanner (Owner to Provide). The recommended methodology for shielding calculations are American Association of Physicists in Medicine (AAPM) Report #39, British Institute of Radiology(BIR)/ Institute of Physics and Engineering in Medicine (IPEM) and National Council on Radiation Protection and measurement (NCRP) 49 rewrite. Final configuration will depend on weekly design exposure rate, occupancy factor, distance from iso-center to barrier and workload.
- Recommended use of 1/8" thick lead layer for primary barrier (including floor) and 1/16" thick lead barrier for secondary barriers. The shielding is required to extend from the floor to a height of at least 7'-0" above the floor of the scanner enclosure. Shielding is required to be lapped along corner and any pull-out sections. At least 2'-0' wide perimeter of the floor is required to be shielded with 1/16" lead, with the perimeter lead palled with wall shielding. Additional sources of radioactivity to be considered are research subject syringes (before and after injection), storage areas for sealed sources and waste, and subjects after injection during radiotracer uptake.
- Observation Window. Window shall be centered 5'-0" AFF and not less than 2'-0" from the open edge of the control alcove [or CCTV].
- Copper-cadmium meshes for shielding and protection against electro-magnetic, static electricity and whirling currents are [not] required.
- Grounding. If installed in the slab or walls the copper-cadmium net shall be grounded. Metal-galvanized net (meshes) for shielding and protection against electro-magnetic, static electricity and whirling currents shall [not] be used.
- Air conditioning system shall include radiation absorbing filters. Air conditioning system ducts, grilles, structural elements and other parts located within the room and/or in the walls prior to the radiation absorbing filters are to be fabricated from

welded 316L stainless steel. Air conditioning system ducts allocated between the room and radiation absorbing filters are to be enclosed with lead foil.

- Electrical and Data. Locate power, low voltage and communication conduits/cables in a slab slit trench and/or vertical wall slot. Conduits and cables shall be protected with a lead lined cover and against RF and magnetic interference.
- Piping. Treat medical gases with special wave-guide panels/devices.

**Safety Closet or Emergency Response Team Room**
Provide a central Emergency Response Team (ERT) Room in the building near the Loading Dock. Equipment will be Owner furnished and installed and typically consists of the following:

- Decontamination equipment/spill kit
- HEPA filtered, explosion proof, wet/dry vacuum
- Full-face respirator
- Tyvek suits with gloves, boots, and hoods
- Stretcher

### 3.3.3 Structural Narrative

The structural design for this project should provide a building system which will integrate with the program requirements for space layout, as well as with the architectural and building service needs, while meeting current code standards for vertical and horizontal load carrying capacity. User needs in terms of current flexibility of the spaces and future adaptability of use should be considered. The level of user comfort and the ability to complete motion sensitive tasks as determined by the acoustic and vibration sensitivity of the structure should also be addressed.

**Structural/Service Coordination**
Layout of the structural grid will need to respect the planning modules established for the various building and laboratory functions. During the design phase, a completely integrated approach to building systems is recommended. Distribution of HVAC, plumbing and electrical services must be carefully coordinated with the structural elements, particularly at framing intersections and major crossover points. This close coordination must be achieved in order to avoid conflicts between building systems and limit penetrations of major structural members.

**Codes and Standards**
The building structure shall be designed in accordance with the 2012 International Building Code (IBC 2012).

Codes and standards that apply to the design of this building are:

- 2012 International Building Code
- State of Utah (DFCM) Standards, Nov. 1, 2013
- University of Utah Design Standards, Nov. 1, 2013

- American Institute of Steel Construction (AISC) with Commentary
- ACI 318 Building Code Requirements for Reinforced Concrete
- American Iron and Steel Institute (AISI) Specifications for the design of Cold-Formed Steel Structural Members
- American Welding Society (ANSI/AWS) D1.1 Structural Welding Code
- Steel Joist Institute (SJI) for open web Joists and Girders
- Steel Deck Institute (SDI) for Metal floor and roof Decks

**Geotechnical Criteria**
A geotechnical report for the project has not been completed at this time. Based on experience on previous phases of the Huntsman Cancer Institute, it is anticipated that the soil profile will consist of a fairly thin, but variable, layer of native granular soil overlying bedrock. The elevation of the top surface of the bedrock on previous phases has generally followed the slope of the site, but there has been significant variation in the depth of the bedrock surface relative to the ground surface.

The presently planned configuration of the building has one level below grade at the western edge of the building with the building extending into the hillside to the east. At the eastern wall the lower levels of the building may be located as much as three levels below finish grade. Because of this building configuration and the anticipated soil profile, the foundations for the building will most likely be founded on the bedrock underlying the site. It is anticipated that the building will be founded on a spread footing foundation system, and that the design soil bearing pressure will be quite high.

Because the lower levels of the building will extend significant depth below finish grade at the east side, the large magnitude of lateral soil pressure on the east wall of the building will be one of the driving factors in the design of the structural systems. Further evaluation will be performed during the schematic design phase of the project to study potential methods to resist this large lateral soil pressure. The evaluation will focus on methods that are both cost effective and perform well under the imposed soil loads.

It is likely that the lateral soil pressure will be resisted by one of two basic methods. At locations where the lower level is two or more levels below grade, the lateral pressure might be resisted by a permanent tie-back anchored wall with a mote space or void between the anchored wall and the building foundation wall. At locations where the lower level is less than two levels below grade, the lateral pressure might be resisted by the east foundation wall and the lateral force resisting system of the building. Further study will be performed to make a final decision on the actual method used to resist lateral soil pressure, and if multiple methods are used, the depth at which these methods change from one to another.

The seismic spectral accelerations of the ground at the site are high as indicated in the Earthquake Design section of this program. The nearest known potentially active fault of concern is the Wasatch Fault located approximately 1,500 feet to the west of the site. It does not appear that active mapped faults pass through the site, but this will need to be verified by the final geotechnical report. The actual distance to the nearest know fault will also need to be verified by the final report.

## BASIS OF DESIGN

**Loading Criteria**
The structural systems in the facility shall be designed to meet the requirements of the 2012

# 3 Building Requirements

## Building Design Criteria

International Building Code (IBC), Minimum Design Loads for Buildings ASCE 7-10, University of Utah Design Requirements effective Nov. 1, 2013, and the Design Requirements Manual adopted by the Utah State Building Board. Copies of the Design Requirements can be obtained from the University of Utah and the Division of Facilities Construction Management (DFCM). The following minimum requirements should be anticipated:

- Basic Wind Speed: 115 mph per Figure 26.5-1A of ASCE 7-10
- Risk Category II building
- Exposure C, as appropriate to the site
- Seismicity: 2012 IBC and ASCE 7-10 Seismic requirements with a "Seismic Importance Factor" of Ie = 1.00 for a risk category II building in accordance with Table 1.5-2 of ASCE 7-10.
- Roof Snow Load Pf: 40 psf minimum plus snow drift where appropriate.
- Site elevation = 5,100 ft.
- Ground Snow Load Pg: 57psf
- Snow Load Importance Factor Is = 1.00 in accordance with Table 1.5-2 of ASCE 7-10.
- Snow loads calculated according to Utah Statewide Amendments to the IBC.
- Floor Design Live Loads: Floor design live loads shall be in accordance with the latest edition of the University of Utah Design Requirements and as follows:
    1. 100 psf, unreduced at lab areas, except for column and footing designs. Further evaluation of the appropriate live load capacity shall take place during the schematic design phase of the project.
    2. 125psf at laboratory linear equipment rooms
    3. 80 psf plus 20 psf movable partition load at office areas
    4. Floor areas supporting high density rolling files – 225 psf
    5. UPS Battery Storage areas – 250 to 450 psf as appropriate
    6. Mechanical Equipment Rooms – 125 psf, minimum, or more as required by the final design

Areas where heavy load concentrations exceed the normal loading requirements shall be designed for the specific load case.

The more stringent requirement between the 2012 IBC, the DFCM Design Criteria Manual and the loads given above shall govern.

**Structural System Selection Cost Comparison**
The structural system chosen for the building shall be selected based upon the following criteria:

- A cost comparison of at least three structural systems shall be investigated. The comparison should be broken down in detail with each component of cost significance being listed separately. The overall cost impact of alternate foundation systems as they relate to the foundation load magnitudes from different structural systems (i.e. steel versus concrete) shall be considered as part of this investigation.
- Various structural systems comparing building construction time, material availability, coordination of various trades, lead times for ordering materials, appearance, owner preference, maintenance costs, flexibility for future remodeling and compatibility with surrounding buildings should be considered when choosing the final structural systems for the building.

- The structural system comparison shall include considerations of vibration performance of the finished structural system to provide the vibration environment needed for the proposed research endeavors that are to be undertaken within the facility for the near and distant future.
- Damage to the building structure and its contents due to lateral earthquake and/or wind loads should be evaluated between various structural systems. Damage control to building non-structural systems is a pertinent and important consideration when selecting the building structural system.

A more rigid shear wall and/or braced frame lateral force resisting system will provide greater damage control to a building's non-structural systems and contents than does a more flexible movement frame type lateral force resisting system. On the other hand, a moment frame lateral force resisting system provides almost unlimited programmatic and planning flexibility initially and during the life of the building. Moments frames are also more conducive to the transmission of natural light into the facility and are typically less obstructive to views out of the building.

Cast-in-place reinforced concrete shear wall lateral systems usually work most economically with a cast-in-place reinforced concrete structural floor framing system, while diagonally braced steel lateral systems are usually most economical in conjunction with composite steel floor framing systems.

All cost comparisons between structural systems should include interface costs between other building components such as architectural finishes, exterior enclosure systems, mechanical systems, and electrical systems. Life cycle costing methods should be used where applicable.

**Future Building Expansion**

- Future vertical expansion is not anticipated because of the significant amount of mechanical equipment located above the rooftop, but this topic must be discussed and decided upon by the design team in the early phases of the design process.
- Future horizontal expansion of the structure is a possibility and merits further consideration during the design phase. It is anticipated that any future horizontal expansion of the building will be separated from the building by an expansion/seismic joint.

**Earthquake Design**

The proposed structure shall be designed according to the requirements of the 2012 International Building Code and "Minimum Design Loads for Buildings" ASCE 7-10. According to the project geotechnical report, the closest distance to a known seismic source for this facility is approximately 1,500 feet to the west of the site. Spectral acceleration values for the site taken from the 2012 IBC maps are Ss = 1.167 and S1 = 0.427. These spectral acceleration values shall be verified during the design phase of the project.

Laboratory buildings with lower quantities of toxic materials are classified as Risk Category II buildings per Table 1604.5 of the 2012 IBC. An Earthquake Importance Factor, "Ie" of 1.00 shall be used in earthquake design analysis according to Table 1.5-2 of ASCE 7-10.

**Wind Design**

Laboratory buildings are classified as Risk Category II buildings. A Basic Wind Speed of 115 mph shall be used in the wind design analysis according to Figure 26.5-1A of ASCE 7-10.

**Roof Snow Load Design**
Laboratory buildings are classified as Risk Category II buildings. A Snow Load Importance Factor, "IS" of 1.00 shall be used in snow load design analysis according to Table 1.5-2 of ASCE 7-10.

**New Vivarium Tunnel**
It is likely that a new sub-grade tunnel will be constructed to link the existing vivarium space in the basement level of the phase I building to the new vivarium space in the basement of the phase IV building. The most likely route for this new tunnel is to penetrate through the existing east foundation wall at basement level between grids 14 and 15, and run to the south along the exterior side of the east foundation wall. The tunnel will also penetrate the concrete walls that are part of the existing air intake tunnel, and run below the concrete slab on grade inside the tunnel between grids 15 and 17. The new tunnel will also run southward outside the east retaining wall at the loading dock and cooling tower area located to the south of the phase I building. There will be a gap of approximately 12 feet between the new tunnel and the east retaining wall.

A review of the record drawings for the phase I building has indicated that the elevations of the existing footings is either low enough that they will be below the elevation of the new tunnel footings, or they are only slightly higher than the new tunnel footings and no underpinning of the existing footings should be necessary. A possible exception is a short section of a wall at the air intake tunnel that may require some limited underpinning depending on the width of the new tunnel. At the loading dock and cooling tower area the gap between the tunnel and the retaining wall should be large enough that the tunnel will not overlap onto the existing retaining wall footings.

The most challenging aspect of constructing the new tunnel will likely be the deep excavation on the east side of the phase I building that will be required to construct the tunnel. The existing concrete slab on grade inside the air intake tunnel will also need to be demolished and re-built as part of the tunnel construction since the new tunnel will run below this slab. The relative cost of sub-grade tunneling rather than an open excavation should be evaluated during future design phases of the project, in collaboration with the selected CM/GC.

**Relocation of Existing Cooling Towers**
The existing reinforced concrete cooling tower structures located at the south end of the phase I building will most likely be demolished and relocated to the east of their present location. This relocation will accommodate the placement of a new emergency generator and the reconstruction of the truck loading dock. Existing reinforced concrete wall and cooling tower elements will need to be demolished and reconstructed in their new location. The adjacency of the new vivarium tunnel to the east will need to be considered in the design of the new structures.

**Imaging Suite**
The imaging suite will house sensitive equipment that must be adequately separated from ferrous metals so the proper function of the equipment is not impaired. During the design phase of the project adequate separation distances shall be coordinated with the equipment manufacturer, and considered in the design of structural systems. The primary structural consideration will be the proximity of steel beams, steel columns, and concrete reinforcing steel relative to sensitive imaging equipment. The arrangement of steel beams and columns may need to be modified from the more typical placement at other areas of the building depending on the equipment requirements. It is likely that fiber reinforced

polymer rebar will need to be placed in the concrete slab on grade below sensitive imaging equipment. See the Laboratory Narrative section of the architectural program for a more detailed discussion on the placement of ferrous metals relative to imaging equipment.

**Cyclotron Enclosure**
It is very likely that a reinforced concrete structure will be constructed to enclose the new cyclotron that will be placed in phase IV. Required shielding characteristics will be coordinated with the equipment supplier and considered in the design of the concrete structure. The primary consideration will be the thickness of concrete elements that enclose the cyclotron space. The weight of the cyclotron will also be an important consideration in the design of the floor slab.

The existing cyclotron enclosure in the phase II building was constructed with a 24" thick floor slab on grade, 16" thick concrete walls, and an 18" thick roof slab above. All concrete elements were reinforced with conventional mild steel reinforcing bars. It is anticipated that the construction of the new cyclotron enclosure will consist of structural elements similar in thickness and reinforcing to the existing cyclotron enclosure, but further coordination with the equipment supplier will be needed to verify this.

**Testing and Inspections**
The Architect/Engineer, and the selected testing lab, shall perform periodic construction observations, testing, and special inspections, as outlined in Chapter 17 of the International Building Code. The design engineer shall list all required special inspections on the contract drawings, and perform periodic construction observations as required by the A/E agreement. Costs for special inspections and testing services will be paid for directly by the owner.

**Sustainable Design Principles**
The selection and design of structural systems for the building shall consider and implement sustainability measures to achieve the desired LEED rating for the building, and as outlined in the DFCM High Performance Building Rating System. The following design attributes shall be considered as possible sustainability credits for the project.

- Recycled content for structural steel and reinforcing steel should be considered for the project.
- Specify recycled content in the concrete mix as needed and appropriate. Investigate the use of concrete mixes with high fly ash content, or a combination of fly ash and slag cement
- Investigate the possibility of achieving an innovation credit for use of a combination of slag cement and portland cement in the concrete mix.
- Specify the use of regionally produced materials including, but not limited to, open web steel joists, structural steel sections, reinforcing steel, cement, and fly ash.
- Design and configure the lateral force resisting system to be compatible with the desired daylighting credits for the building. Consider the possibility of using more open lateral force resisting systems such as braced frames or moment resistant frames rather than more obstructive systems such as shear walls. Locate the lateral force resisting elements to reduce obstructions and achieve the desired level of day lighting within the building.

### 3.3.4 Vibration Narrative

The following recommendations for vibration design considerations for Administration Areas and Research Areas are based on accepted and documented criteria for the limitation of vibration.

**General**
This Section includes the following:

- Suggests criteria for the limitation of vibration,
- Identifies major vibration sources and transportation paths, and
- Recommends measures to reduce source levels and impede transmission paths.

**Vibration Sensitive People and Equipment**
All people and laboratory equipment have a threshold above which they will be disturbed by vibration. The source of these vibrations are (1) impact testing equipment, (2) mechanical equipment, (2) people moving within the building, and (3) external sources such as vehicular traffic. The sensitivity threshold for any person or piece of equipment is determined by its purpose, the mechanisms involved and, to some extent, the person using it.

**Control of Suspended Floor and Roof Structure Vibrations**
Control of suspended floor and roof structure vibrations due to human and mechanically induced excitation forces shall be considered in the selection of the building's structural floor and roof framing systems. Generally accepted vibration performance guidelines for structural systems are as follows:

- Floors supporting office and administrative functions shall be designed to provide a maximum floor framing vibration velocity of 16,000 micro-inches per second at 100 paces per minute.
- Floor framing systems that will exhibit barely perceptible vibrations and be suitable for computer equipment, semi-conductor probe test equipment of low sensitivity shall be designed to provide a maximum floor framing vibration velocity of 8,000 micro inches per second at 100 paces per minute.
- Floor framing systems that will exhibit vibration non-perceptible characteristics and be suitable in most instances for surgical suites, microscopes to 100x and for other equipment of low sensitivity shall be designed to provide a maximum floor framing vibration velocity of 4,000 micro inches per second at 100 paces per minute.
- Floor framing systems suitable for optical microscopes to 400x, microbalances, optical balances, proximity and projection aligners, mass spectrometers other than MALDI and quadruple or high-resolution, conventional spectrometers, etc. shall be designed to provide a maximum floor framing vibration velocity of 2,000 micro inches per second at 100 paces per minute (Class VC-A).
- Floor framing systems suitable for optical microscopes greater than 400x, inspection and lithography equipment (including steppers) to 3 micro-meter line widths, microtomes and cryotomes for 5-10 micron slices, most tissue and cell culture except as noted below shall be designed to provide a maximum floor framing vibration velocity of 1,000 micro inches per second at 100 paces per minute (Class VC-B).
- Floor framing systems suitable for standard optical microscopes to 1000x, lithography and inspection equipment (including moderately sensitive electron

microscopes) to 1 micro-meter detail size, TFT-LCD stepper/scanner process, digital imaging and/or fluorescence with optical microscope, high-precision balances measuring quantities less than 1 mg, MALDI mass spectrometer, nano-drop spectrophotometers, microtomes and cryotomes for slices less than 5 microns, tissue and cell culture of the following types: hanging drop, unstirred layers, embryonic stem cells, weakly adherent cells, very long-term cultures, chemotaxis, invasion assays except as noted below shall be designed to provide a maximum floor framing vibration velocity of 500 micro inches per second at 100 paces per minute (Class VC-C).

- Floor framing systems suitable in most instances for demanding equipment, including many electron microscopes (SEMs and TEMs) and E-Beam lithography systems working at nanometer scales, and other systems requiring extraordinary dynamic stability shall be designed to provide a maximum floor framing vibration velocity of 250 micro inches per second at 100 paces per minute (Class VC-D).

- Floor framing systems assumed to be adequate for the most demanding of sensitive systems including microscopy, imaging, nano-fab floor, long path, laser based small target systems, E-Beam lithography systems working at nanometer scales, and other systems requiring extraordinary dynamic stability shall be designed to provide a maximum floor framing vibration velocity of 125 micro inches per second at 100 paces per minute (Class VC-E).

Isolation Air Tables have been used effectively by researchers to conduct highly sensitive research functions on existing building floor framing systems not suitable for the highly sensitive research otherwise.

Vibrations from a roof structure supporting rooftop mounted mechanical equipment have interfered with the use of inhabited spaces below on many facilities. Careful consideration in the design of roof framing systems shall be given so as to isolate and dampen all mechanical equipment vibrations. Ceiling mounted equipment is very susceptible to vibrations emanating from floor and roof framing systems above.

The owner/programming team will ultimately need to decide:

1. Whether to design the entire new building to the most stringent vibration performance level so as to provide ultimate use flexibility for the life of the structure
2. Whether to design different areas or floors within the structure for varying vibration performance levels to match projected types of use. The second option will save initial construction dollars but will limit the types of uses that can be accommodated within the new structure because of the varying floor framing system vibration performance levels.
3. The appropriate vibration design criteria for the anticipated laboratory functions in the building.

There is a significant cost impact on the structural system framing cost to achieve very high vibration performance levels. Future studies will be conducted with the assistance of the vibration consultant and the selected CM/GC to estimate the relative cost of floor structures with various vibration performance levels.

Based on the information received to date, the following vibration design criteria appear to be appropriate for the anticipated laboratory functions in the building. These design criteria shall continue to be evaluated during the design

process, and coordinated with the anticipated laboratory functions that will be housed in the building.

**Administrative Areas**
The suspended levels of Administrative Areas shall be designed to provide a maximum floor framing vibration velocity of 16,000 micro inches per second at 100 paces per minute.

**Research Areas**
The suspended levels of Research Areas shall be designed to provide a maximum floor framing vibration velocity of 2,000 micro inches per second at 100 paces per minute unless noted otherwise. This is a Class "VC-A" vibration environment. Consideration shall be given to providing an area at the floor level at grade where very sensitive equipment may be located. The slab on grade at this area will likely need to be thicker than the typical concrete slab on grade.

**Vibration Sources**
There are four common primary sources of vibration in buildings as follows:

1. Ambient site vibration including those generated by traffic.
2. Building occupant foot traffic
3. Building services plant and mechanical equipment.
4. Laboratory equipment (vacuum pumps, centrifuges, shakers, etc.) and machinery in the building.

Buildings also experience intermittent vibration from the following sources; door slams, movement of service carts and equipment, and loading/ unloading impacts. Of the above, control of intermittent vibration produced by people activities depends almost entirely upon the characteristics of the building structural design. The adequate control of vibration from mechanical equipment and systems is much more straight forward and relatively simple to accomplish through judicious choice of appropriate vibration isolation hardware.

**Transmission Paths**
Vibration is transmitted through, and is attenuated or amplified by elements of the structure and the internal fittings of the building. Common transmission paths are the structural walls and columns. In addition, vibration is transmitted efficiently via ducted and piped services. The amplification occurs in floor slabs and often in the laboratory furniture.

**Recommendations for Schematic Design Phase - Building Planning**
Many potential problems associated with vibration sources and their transmission paths can be overcome by considering them at the programming stages of the building design. The general guiding principles are as follows:

1. Identify vibration producing and vibration sensitive activities in the building.
2. Locate vibration producing areas remote from vibration sensitive areas.
3. Establish vibration limits for each area where vibration sensitive tasks or equipment may be in use, grouping together tasks and equipment with similar sensitivities wherever possible.
4. Select a building design that minimizes the response of the structure to vibration.

**Sources of Vibration - External Environment**
The design of the building must act to control vibration that exists on the site. A survey of the site has been conducted to assess vibration levels of traffic on adjacent roadways and from heavy machinery or loading dock areas.

Sources of vibration located within the building are best dealt with at the source. This is done by providing careful vibration isolation measures to all machinery and services, and good laboratory planning. As a general policy, powerful sources of vibration should be located:

1. As far as possible from the more vibration sensitive tasks and laboratory areas.
2. On a slab on grade, and/or carried independently to grade.
3. Possibly in a structurally separate part of the building.

**Traffic Vibrations**
There are potential concerns associated with vibrations from roadways near the building site. This is generally an issue only with facilities with vibration performance criteria more stringent than 500 micro-inches per second. In those cases, traffic within 100 feet might be an issue. Since the vibration performance criteria are most likely less stringent than 500 micro-inches per second vibration velocity, traffic related vibration problems are not anticipated.

**Research Laboratory Planning**
Research Laboratory areas should be planned to minimize the risk of vibration disturbance to sensitive tasks or instruments. This planning can be achieved by the following:

- Keeping sources and receivers of vibration separate (as described above).
- Locating both sources and receivers of vibration on the least responsive parts of the structure. The least responsive parts of the structure are likely to be on the slab on grade, and within a seven-foot radius of column locations on suspended slabs. The most responsive parts of the structure are likely to be in the center of structural bays.
- Installing solid and vibration resistant laboratory benching.
- Utilizing optical or vibration isolation tables and other passive dampening systems where highly vibration sensitive tasks and experimental techniques are in use.

Massive (marble or concrete) balance tables are very useful in limiting the amplification of vibration between the floor and balances. Small vibration sensitive experimental setups are best mounted on vibration isolation tables to prevent vibration disturbances. The floor loading should take account of these mounting arrangements.

**Electromagnetic Interference**
In order to mitigate EMI problems, it is recommended that fiberglass reinforcing bars be used in concrete areas surrounding the most sensitive characterization spaces such as electron microscopes (TEM's and SEM's) if this type of equipment may be located in the facility.

**Architectural Treatments and Finishes**
With attention to general architectural finishes and details, significant benefits can be achieved in reducing sources of impact vibration. This is accomplished by the following:

1. Reducing the impact from slamming doors by appropriate measures, such as:
   a. Minimizing the mass of the door leaf.
   b. Installing damped closure mechanisms.
   c. Fitting door jambs with soft resilient seals.
2. Incorporating resilient flooring surfaces wherever possible.
3. Minimizing floor joints and raised door sills to prevent impacts as wheels pass over them.

## 3.3.5 Mechanical / Plumbing Narrative

### BASIS OF DESIGN

**Codes and Standards**

The HVAC System will comply with the following codes and design standards:

- University of Utah Design Standards-April 2012
- DFCM Design Criteria B March 2012
- University of Utah East Campus Central /Chilled Water Plant, Design Manual B August 2013
- International Building Code B2012
- International Mechanical Code B 2012
- International Plumbing Code B 2012
- International Fire Code 2012
- International Energy Conservation Code 2009

**Design Criteria**

| | Summer | Winter |
|---|---|---|
| Design Temperatures, Dry bulb | 97F | 3F |
| Design Temperatures, Wet bulb | 64F | - |

**Indoor Design Conditions:**

| | |
|---|---|
| Summer: | 72F |
| Winter: | 75F |
| Humidity: | Animal Areas 40%-60%, |
| Humidity Labs: | Max. 50% |
| Humidity offices: | Max. 60% |
| Humidity: | Mouse holding, 45% +/- 10% |
| Laboratory: | 100% Outside Air |
| Animal Area: | 100% Outside Air |
| Office Areas: | Recirculated Air |
| Occupancy: | 24 hrs./day, 7 days/wk. |

**Internal Equipment Heat Gains**

In addition to people and lighting loads, heat gains in all rooms will be based on anticipated equipment to be used in each room together with appropriate diversities. The following equipment heat gain rates for certain areas will be considered for preliminary load estimates. These internal heat gains will need to be discussed with the owner to determine what a reasonable number will be before the design progresses further.

| | |
|---|---|
| Research Labs: | 30 Btuh/sf |
| Tissue Culture Labs: | 60 Btuh/sf |
| Glasswash / Sterilization: | 480 Btuh/sf |
| Equipment Spaces: | 130 Btuh/sf |
| Office Areas: | 10 Btuh/sf |

### MECHANICAL

**Heating**

The building will be heated with heat from the East Campus High Temperature Water Plant. High Temperature Water will be supplied at 390F and will be returned at 250F. High Temperature Water will be supplied to the primary side of the heat exchangers. The secondary (building side) of the heat exchangers will have building pumps for water distribution to the building mechanical systems. The maximum allowable pressure drop from the HTW mains, into the building and through the heat exchangers is 20 psig. The design of the HTW system will conform to the University of Utah Design Standards. The piping will be connected to the existing 8” mains designated as Z-5A located in the road west of the project.

The building will be designed for a variable flow secondary heating hot water system. Control valves will be two-way with tight shut-off. A glycol hot water heating system will be provided for preheat coils with appropriate heat exchanger and pumps.

**Central Chilled Water**
Chilled water will be provided from the East Campus Chilled Water Plant. Chilled water from this plant will be supplied at 43°F and will be returned to the plant at 59°F. The piping from the plant to the building will be in buried pipe. Plate and Frame heat exchangers will be required to separate the building from the plant hydraulically. Huntsman Phase 1, as an option, may also be converted from a stand alone chilled water plant to chilled water from the East Campus Chilled Water Plant.

The building will be designed for a variable flow chilled water pumping system. Control valves will be two-way with right shut off.

**Cooling Towers**
Both of the cooling towers from Huntsman Phase 1 will be rebuilt and relocated to a position east of the building to allow the phase 4 building to be constructed closer to phase 1. These cooling towers will provide pre-cooling water to the air handlers to reduce the load of chilled water from the central campus plant. One tower will serve phase 1 and one tower will serve phase 4.

**Humidity and Sterilization**
Steam for building humidity Vivarium needs and sterilization will be generated with the east campus high temperature water. High Temperature Water will be supplied at 390F and will be returned at 250F.

It is the intent to provide humidity in the laboratories from air washers in the supply air units.

An emergency back-up gas fired steam boiler will be provided for humidity, steam for cage washers and reheat for the vivarium.

**Air Conditioning**
The building laboratory areas will be air conditioned with a thee or four stage cooling systems consisting of heat recovery coils, pre-cooling water from a cooling tower, chilled water coils with chilled water from a central chilled water plant, and a spray evaporative cooling section and will required 100% outside air. The building office areas will air conditioned with a three stage cooling system consisting of recycled air with code related outside air quantities, pre cooling from the cooling tower and chilled water coils with chilled water from the central plant.

A primary/secondary pumping system will be utilized in the building and chilled water valves will be two-way tight shut-off. See campus design manual for piping instructions.

**System Design**
The Laboratory HVAC system will consist of supply air, general room exhaust, and fume hood exhaust systems. These systems will be managed and controlled by a sophisticated control system to maintain the following operation:

- Fume hood face velocity will be constant at 100 fpm, independent of sash height.
- Rooms will be maintained at negative pressure relative to the corridor or adjacent spaces by varying room supply and exhaust air in conjunction with the fume hood exhaust system.
- Laminar flow type diffusers will be used to keep room supply air turbulence to a minimum around the fume hood.
- A hydronic heating coil will be used to reheat the supply air to maintain a specified room temperature and humidity settings.
- Further consideration will be given to adding motion sensors at the fume hoods to allow for decreased air flow when the hood is not in use or the room is unoccupied.

The HVAC system will be designed for 100 fume hoods.

Room supply and exhaust air will be controlled through linear or nonlinear air terminal devices utilizing either a volumetric or pressure differential room control device. The recommendation to use such a system will be dependent upon the results of the engineering analysis.

## LABORATORIES GENERAL

All laboratory areas will be served by 100% outside air systems.

- Rooms will be maintained at a negative pressure with respect to adjacent areas. (see ANSI/AIHA Z9.5 - latest edition).
- Rooms will have a minimum of 6 air changes per hour with final air changes per hour based on agreed upon internal loads.
- High air discharge velocities will be avoided (not more than 50 feet per minute in the immediate vicinity of the fume hood).
- Fume hood face velocity will be maintained at 100 fpm all sash positions. The system design will be based on 100 feet per minute hood face velocity when the fume hood sash is opened to a height of 18 inches. Fume hood will be equipped with a motion sensor which will reduce face velocity to 60 FPM when the hood around the area is occupied.

The HVAC system will have features that enable control of the following:

- Supply and exhaust air volume
- Laboratory pressurization
- Hood face velocity
- Energy consumption
- Room Temperature

Laboratories will be provided with variable volume fume hoods. Room supply and exhaust air will be controlled through linear or nonlinear air terminal devices utilizing either a volumetric or pressure differential room control device. The recommendation to use such a system will be dependent upon the results of the engineering analysis.

**Vivarium**

The design of the vivarium will incorporate a heating, cooling, ventilation and humidification system that will respond to the type and quantity of animals required for the building. The system will require 100% outside air and a complimentary exhaust system and will provide a level of control which will meet the demands of the animals used in the facility. The outside air and exhaust systems will be fitted with an appropriate heat recovery system as noted under laboratory systems above.

**Offices**

Design criteria for the office space HVAC system is based on the following:

- Office areas may be served by 100%, fresh-air, central station VAV air handling units which may also service the laboratory and laboratory support areas on that floor if the office area is incidental to the area of building on that floor that is provided by the laboratory system. Otherwise:
- Office/lobby areas will be served by recirculating VAV air handling units provided with outdoor air economizer controls.

**General Exhaust**
Each toilet will be exhausted to atmosphere via penthouse exhaust fans. Air will be supplied at a constant volume through the non-laboratory air system.

**Electrical and Elevator Machine Rooms**
Each room will be exhausted to atmosphere via a designated exhaust fan.

**Special Exhaust Considerations**
The selection of the fume hood and local exhaust type is critical to the design of the laboratory HVAC system.

The chemical exhaust ducting from the laboratories will be either type 304 or 316 stainless steel. The minimum recommended exhaust duct velocity will be 2000 feet per minute.

To achieve acceptable concentration levels and desired concentration rates, the exhaust system will combine and mix exhaust volumes from multiple uses in a commonly ducted (or manifolded) exhaust system. Exhaust concentrations of noxious or hazardous substances would be diluted both within ducts and at roof top plenums prior to exhausting to the atmosphere.

Manifolding of laboratory exhaust ducting will be permitted if ducts do not penetrate rated walls.

Laboratory exhaust fans will be housed with in the penthouse and will be resistant to corrosion from the air stream vapors.

The exhaust to atmosphere is an important design consideration. Code requires a minimum discharge height of 10 feet above the highest roof level. The discharge velocity will be a minimum of 4000 feet per minute. At a minimum, the fresh air intake will be 60 feet horizontally and 20 feet vertically from the exhaust stack position.

Consideration will be given to providing additional shaft space for the future accommodation of separate ducting for special fume hood exhausts, such as those from perchloric acid and high-energy radioisotope hoods, that cannot be combined on a commonly manifolded system.

**Controls**
Provide individual room temperature controls. Laboratory controls will include volume and pressure control for each space to assure that a negative pressure relationship will exist between each laboratory and the surrounding non-laboratory spaces.

The control system will be a direct digital control (DDC) system with electric driven actuators. The direct digital control system will monitor, control and adjust the building controls from an in building location. The following items of equipment will be monitored and/or controlled:

- All central HVAC equipment including air handling units, heat exchangers, pumps, variable speed drives and exhaust fans.
- All decentralized HVAC equipment such as variable air volume units, reheat coils, thermostats, meters, air and water temperature sensors, system pressure sensors.

The control system will be connected to the campus Metasys network or to the campus telecommunications Ethernet network.

**Energy Conservation**
As laboratory buildings necessitate the use of 100% outside air for air conditioning purposes, and the resulting energy requirements are high. In order to conserve energy the following design and control methods will be evaluated for incorporation into the building:

- Window blinds, heat absorbing or reflective glazing, external shading devices and heavyweight structure.
- Energy efficient motors will be used for all items of equipment.
- Variable air volume systems will be used wherever permitted.
- Variable speed drives will be used in lieu of inlet vane control.
- A heat recovery system of the glycol runaround type, flat plate heat exchangers or molecular sieve heat wheel, will be considered.
    1. Air handlers will be designed at tunnel velocities of 350 fpm +/- to reduce static pressures and thus reduce fan energy required to move the air.
    2. Air ducts will be designed at reduced air velocities to reduce static pressures and thus reduce fan energy required to move the air.

The design of this building will be in compliance with the Standard for Energy in New State Buildings dated July 11, 2001 and as follows: This new state owned building will be designed to be at least 25% more energy efficient than the performance of a similar reference building that just meets the minimum requirements of the International Energy Conservation Code 2009. The energy conservation design for each building system will be part of the Value Engineering Sessions conducted during the design phases of the project. The design team, will coordinate with the Utah State Office of Energy Services to model the energy consumption of proposed designs as required to arrive at an acceptable energy conserving design consistent with the goal above.

**Air Handling Systems**
Air handling systems will be designed to meet all of the above heating, cooling, ventilation and exhaust requirements of the project. Each supply and exhaust system will have multiple fans arranged such that if one fan is down the other fan can still supply some air to the space. Air supply systems will be variable volume type with hot water reheat as needed. Laboratory supply and exhaust systems will be 100% outside air supply and 100% exhausted and will be variable volume. Laboratory areas will be kept at a negative pressure relative to the rest of the building at all times. All portions of the system will be ducted.

**Air Intakes and Exhaust**
Air intakes will be positioned to avoid short-circuiting of exhaust air back into the building. Exhaust from laboratories must be discharged to the atmosphere through stacks at the top of the building with a minimum velocity of 4000 fpm. Each exhaust air handler will be provided with filters, an evaporative cooling section, heat recovery coils and fans.

**Supply Air Filtration**
In all air conditioned spaces pre-filters and final filters will be provided per latest codes and standards. Pre-filters will have an efficiency of 30% and final filters an efficiency of 90% based on ASHRAE Test Standard 52-76.

## PLUMBING

**Water Supply**
Water meters will be installed where lines enter the building and will interface with existing campus distribution system.

A pressure reducing valve assembly will be provided to limit water pressure at the building to an acceptable level. A triplex water pump will be installed if available pressure is not sufficient to maintain at least 40 psi at the furthest outlet.

**Domestic Water**
A domestic water system will be provided for all non-laboratory spaces in the building. The system will be designed to provide a minimum of 40 psig at the farthest building fixture on the highest floor of the building.

- Domestic Cold Water: Domestic cold water will be connected to all laboratory and non-laboratory plumbing fittings and fixtures, including emergency eye wash and shower stations. Emergency eyewash units will be installed with a check valve and in-line back flow preventer and provided with independent control valves to regulate water pressure. Emergency shower and eyewash water is to be preheated to 70 degrees.
- Domestic Hot Water: Provide a domestic hot water system with heating being supplied from the campus High Temperature Water System. Redundant instantaneous heat exchangers will be provided separate from the building heating heat exchangers. Water will be generated at 160F and be mixed down to be supplied to the building at 120F with no storage tanks. Water meters will be provided on hot water and hot water return piping and will interface with the building automation system to determine domestic hot water usage.

**Laboratory Water**
A separate laboratory cold and hot water system will be provided with appropriate back flow prevention systems in place to prevent laboratory water from entering into the building's domestic water system. Separate instantaneous hot water heaters will be required to supply 140F water to the lab benches. All laboratory fittings will be provided with vacuum breakers. Water meters will be provided and will interface with the building automation system to determine laboratory water usage.

**Purified Water**
A laboratory pure water reagent grade system will be provided to supply Type 1, 18 megohm water for all lab benches. The system will consist of dual softener, carbon filters, primary and secondary cartridge filters and a reverse osmosis system. Polishing will be accomplished through a separate bed deionizer, and ultraviolet sterilizer, pre and final filters and storage tanks and pumps. This piping system will have continuous recirculation using unpigmented virgin polypropylene.

For higher purity water requirements than is generated from the central system point of use polishers will be used and are part of user supplied equipment.

Water meters will be provided and will interface with the building automation system to determine purified water usage.

**Emergency Showers**
Emergency showers will be provided in all laboratories with adjacent floor drains with trap primers.

**Sterilization**
Glass washing, autoclaves and other steam needs will be supplied from a central steam generator supplying steam at 90 psig. This steam will be generated with High Temperature Water from the campus central system.

**Laboratory Vacuum**
A central laboratory vacuum system will be provided and designed to deliver vacuum at 18.2" Hg to laboratory fittings. The distribution piping system will deliver vacuum to each laboratory. Piping will be Sullest Type L medical grade copper with brazed joints. If deeper vacuums are required, they will be generated locally with special vacuum pumps located in the laboratories.

**Laboratory Air**
A central laboratory compressed clean, dry, oil free air system will be provided and designed to deliver compressed air to all laboratory fittings. Piping systems will be SIlest Type L medical grade copper with brazed joints.

**Natural Gas**
A low pressure natural gas system will deliver gas to fittings in each laboratory as required.
Gas piping will be welded or screwed Schedule 40, black steel pipe.

The existing gas meter for phase 1 will be relocated.

**Service Distribution Materials**
Piped services, except for laboratory waste and vent, will be distributed in a double ended horizontal loop, which can be sectionalized for alterations and repair. Tees, valves, and caps will be provided on a modular basis to facilitate extension of the services in the future to points of use in each laboratory module without disruption to services in adjacent modules.

**Isolation Valves**
Each laboratory will be provided with isolation valves above the ceiling as the laboratory utilities enter the laboratory.

**Sanitary Sewer and Waste**
A complete sanitary waste and vent system will be provided in accordance with International Plumbing Code (IPC) throughout the building. Extend to exterior mains as shown on site utilities plan. Provide grease, sand and or oil traps as needed. The existing grease interceptor from phase 1 will be relocated.

**Laboratory Waste**
A separate drainage and vent system constructed of acid resistant materials will be provided for laboratory waste. Laboratory waste may be piped into the sanitary sewer after it exits the building. Vents will be routed up through the roof and will not connect to sanitary vent piping.

Provisions will be made in the design of the wet laboratories for storage of appropriate containers for the collection of waste materials, such as solvents, oils, greases, sediments, and other materials. A central collecting area near the loading area will be provided for collection and for pickups by contracted waste disposal firms or disposed by other methods.

**Storm Drainage**
A complete roof drainage system that will tie into the existing storm drain systems will be provided. A separate overflow drain system will be provided by means of a piping system or a scupper system. The storm drainage from the roof may be collected into a cistern, water treatment will be provide and the water will be pressurized and pumped throughout the building to provide gray water supply for flushing water closets and urinals. This feature will be discussed at the Value Engineering pre design meeting.

**Fire Protection System**
The building will be protected by a hydraulically calculated class I stand pipe and automatic wet sprinkler system based upon a ordinary Hazard Group II occupancy. Hydraulic calculations will be based on water pressures available for design as noted in a water flow analysis report. The report will be prepared by a licensed engineer as required by the Utah State Fire Marshal Department.

A double check/alarm valve assembly will be provided at the fire sprinkler system riser to protect the city water supply from contamination. The riser assembly will meet the requirements of the Utah State Fire Marshal Department.

Each floor will be supplied with a floor control assembly that includes a flow switch and method of testing. Sprinkler systems will be supplied from the standpipe system.

Pre-action sprinkler systems will be included in the sprinkler system design where requested by an owner's representative.

Interstitial mechanical spaces, if provided, located above lab spaces will be provided with sprinkler protection.

**Snow Melting**
Snow melting will be provided for the walkway ringing the building and in the walkway east of phase 1. Primary heat will come from the HTW system and a glycol solution will be pumped to the heating piping which will be embedded in the concrete walk.

### 3.3.6 Electrical / Technology Narrative

**Codes**
The electrical work will comply with the laws, ordinances, and rules of the State of Utah, and local government. In addition, the following codes are applicable:

- NEC (National Electrical Code) 2011
- IFC (International Fire Code) 2012
- IBC (International Building Code) 2012
- ASHRAE 90.1 (Energy Code) 2009

**Standards**
The Applicable standards are as follows:

- University of Utah Design Standards Nov 1, 2013
- State of Utah (DFCM) Standards Nov 1, 2013
- UL (Underwriters Laboratories)
- ASTM (American Society for Testing and Materials)
- ANSI (American National Standards Institute)
- NEMA (National Electrical Manufacturer's Association)
- IEEE (Institute of Electrical and Electronics Engineers)
- EIA/TIA (Electronic Industries Association/Telecommunications Industries Association)
- IESNA (Illuminating Engineering Society of North America)
- LEED (Leadership In Energy and Environmental Design)

**Raceways**
Raceways shall be steel; EMT conduit (Electrical Metallic Tubing) shall be used throughout for branch circuits and feeders. Rigid Metal Conduit shall be used for service entrance conductors. PVC Conduit shall be used under slab and below grade with rigid elbows. Final conduit connections to lighting fixtures shall be by means of a flexible conduit whip, not exceeding 6 feet in length. Conduit connections to vibrating equipment shall be by means of flexible seal-tite conduit. Conduit fittings shall be malleable steel. Aluminum conduit and conduit fittings shall not be acceptable. Minimum raceway size shall be 3/4 inch, except for HVAC controls, which may be 1/2".

**Cable Tray**
Provide UL-listed cable tray, hot-dipped (after fabrication) galvanized corrosion-resistant finish systems of sizes, types and capacities indicated, and meeting all requirements of NEMA VE-1.

Grind all rough edges, drip concentrations, etc, to smooth finish. Apply cold zinc spray to all field cut surfaces.

**Conductors**
Conductors shall be copper. Solid conductor for sizes #14 AWG and smaller; stranded conductor for sizes #12 AWG and larger. Insulation shall be THHN/THWN, rated for 600 volts. Aluminum conductors shall not be acceptable. Minimum conductor size for branch circuits shall be #12 AWG. All 20 amp branch circuits over 100 feet in length shall be #10 conductor. All conductors will be color coded according to the NEC and the campus standard.

**Voltage Drop**
The voltage drop for feeders shall be limited to 2 percent. The voltage drop for branch circuits shall be limited to 3 percent.

**Site Utilities**
The new facility will be approximately 220,000 square foot.

- Power: Will be fed to the building via a new electrical service to the west of the building. The University will run a new duct band from the medical substation to Hunstman Phase IV.
- The main service transformer will be pad mounted oil-filled, provided and installed by the project. Primary voltage 12470 voltage, and secondary voltage 277/480 volts, 3 phase, 4 wire.
- Communication: Communication service to the building will be from the west of the building. The project does not have the funds in the project to provide a new separate dual service. This would require a new communications ductbank from Red Butte. The University also does not have the cost of this expansion in the capital improvement fund. At present, the dual communications service is routed through the School of Medicine that is projected to be torn down in the future. This will need to be in place when the school of medicine is demolished.

**Power Distribution**

- Distribution of power within the building will be 277/480 volts, 3 phase, 4 wire.
- An electronic meter will be provided at the main electrical service entrance to monitor volts, amps, kW hours, power factor, etc. This meter will have the ability to connect to the Internet for remote data collection.
- Surge Protection will be provided at the main electrical service entrance equipment.
- Distribution switchboards and appliance panelboards shall be UL listed, with steel enclosure, with 16-gauge minimum thickness, and dead-front construction. Distribution boards shall be equipped with copper bus bars, full-sized neutral bus, and ground bus.
- Lighting and appliance panelboards shall be UL listed, with steel enclosure. Panel front shall include hinged door-in-door construction, with flush locks and keys, all panels keyed alike. Panels shall include interior index card in a clear plastic holder, and engraved formica label on the outside of the enclosure. Panels shall be equipped with copper bus bars, full-sized neutral bus, and ground bus. Lugs shall be copper rated (CU-AL lugs are not acceptable). Circuit breakers shall be bolt-on type, thermal magnetic trip. Panels shall have 20 percent spare space and capacity.
- Lighting will be 277 volt as far as is acceptable. Large mechanical motor loads will be circuited to 480 volts. Dry-type transformers will be installed to reduce the voltage from 480 volts to 120/208 volt 3 phase, 4 wire for receptacle loads and smaller equipment.

- Motor starters shall be rated for the type and size of motor served. Manual type starters with thermal overload shall be provided for single phase, fractional horsepower motors. Line voltage multi-phase combination magnetic starters with integral fused disconnect, dual element fuses and thermal overload protection in all phases shall be provided for three phase motors.

- Variable frequency controller shall be provided for mechanical HVAC equipment, which requires adjustable speed control, per applicable standards. Variable frequency controllers shall be of the pulse-width modulation type. All units shall be tested after installation for voltage and current harmonic distortion to ensure it is within acceptable limits. Provide a manual bypass as part of controller. Controls, indicators and keypad will be on the front panel – door mounted. Each variable frequency controller unit shall carry a three-year warranty for parts and labor.

**Wiring Devices**
Wiring devices shall comply with NEMA standards Pub. No. WD 1. Switches and receptacles shall be specification grade, and rated at 20 amps and 120 volts AC. Receptacles shall be 3-wire grounding type. GFI (Ground fault circuit interrupter) type receptacles shall be rated 20 amps, 120 volts AC, with solid-state ground fault sensing and 5 milliamp trip level. Receptacles in toilet rooms, wet areas, or within 6 feet of any sink shall be GFI type. Receptacles on the building exterior shall be GFI type. All coverplates shall be stainless steel.

**Lighting**
Lighting will be primarily of the LED type. Fixtures will be provided with 4000 K LEDs. Fluorescent fixtures shall generally be equipped with 4 foot, 32 watt, 4100 K, super long life 55,000 hour, energy-saving T8 lamps. Lamps shall be low mercury content. Biax and compact fluorescent lamps shall also be used where the light fixture style does not readily lend itself to 4 foot lamps. Ballasts for fluorescent lamps shall be high frequency, electronic energy-saving type, with power factor above 95 percent and harmonic distortion of less than 10 percent.

Exterior building light fixtures shall be surface mounted with LED lamps or compact fluorescent and high power factor, cold weather ballasts. Provide full cut-off luminaries; comply with light pollution and light trespass (LZ4) reduction requirements as described for LEED.

**Exterior Lighting**
Exterior light poles will match the existing parking lighting fixtures of the upper medical campus. Compact fluorescent lamps will be used on exterior building mounted fixtures. Emergency egress lighting will be provided at building exits.

**Ballasts**
Provide electronic rapid start fluorescent lamp ballasts. Ballast shall be programmable start capable of operating lamp types indicated, with power factor (ratio of actual power to apparent power) above 95%, ballast factor of .71, and operating with audible noise level lower than the quietest C.B.M. certified ballast for the same application, listed as class A. Provide ballasts which operate at a frequency above 20K Hz from an input frequency of 60 Hz; have an efficacy

factor (relative light output per watt consumed) at least 10% above the C.B.M. certified electromagnetic system for the same application; and have a lamp crest factor (ratio of peak to R.M.S. lamp current) of 1.7 or less. Ballasts shall have a total current harmonic distortion of less than 10%. Provide HID ballasts, of ratings, types and makes as recommended by lamp manufacturer, which properly match lamps to power line by providing appropriate voltage and impedances for which lamps are designed. Equip exterior fixtures with low temperature starting ballasts. Provide high power factor, or power factor improved ballasts.

**Lighting Control**

Control of exterior lighting will be by photocell and time clock. Lighting in the common spaces will be controlled by time clock and automatic daylight sensors. Lighting in office spaces will be controlled with a toggle switch in combination with automatic occupancy sensors. Lighting in toilet rooms will be controlled solely by occupancy sensors. Rooms and areas with daylight will have occupancy daylight sensors to provide dimming.

**Lighting Illumination Levels as recommended by IESNA are as follows:**

| Space Description | Illumination Level (Lux) | Footcandles |
|---|---|---|
| Offices | 500 Lux | 50 footcandles |
| Labs | 600 Lux | 60 footcandles |
| Cyclotron | 50 Lux | 50 footcandles, dimmed |
| Vivarium | 100-500 Lux | 10-50 footcandles, dimmed |
| Conference Rooms | 500 Lux | 50 footcandles, dimmed |
| Corridors | 100-150 Lux | 10-15 footcandles |
| Toilet Rooms | 200 Lux | 20 footcandles |
| Storage Rooms | 150 Lux | 15 footcandles |
| Communication Rooms | 250-300 Lux | 25-30 footcandles |
| Electrical Room | 250-300 Lux | 25-30 footcandles |
| Mechanical Room | 250-300 Lux | 25-30 footcandles |
| Imaging | 800 Lux | 80 footcandles |

**Emergency Power**

Emergency power shall be provided and sized for life safety including exit and egress lighting, telephone, data, fire alarm, security, and lab equipment as applicable. The equipment branch of the emergency power system will provide power to the equipment that must stay operable during an outage such as lab equipment, data center and freezers. There will be equipment that will require Uninterruptable Power System (UPS) power that will back up the power to the equipment between the time that normal power from the power company is disrupted until the emergency generator comes to full power and is capable of handling the load. The emergency power will be provided from a diesel emergency generator. The generator will be located outside of the building. The generator fuel capacity is 72 hours of emergency power at full load. The generator will be capable of starting and assuming the emergency load within 10 seconds of a power outage.

Automatic transfer switch (closed transition) will be provided in the Main Electrical Room and will be wired to automatically start the generator upon loss of utility power. Emergency feeder conductors and control wiring will be provided for the emergency panels.

Emergency power will be provided for the fire pump.

**Grounding**
Grounding shall be provided for the entire raceway, service entrance, enclosures and equipment system. Grounding shall be provided in accordance with the NEC. A separate grounding conductor shall be provided for all feeders, equipment circuits and branch circuit runs. Grounding conductors shall be sized in accordance with the NEC.

**Fire Alarm**
The fire alarm system shall incorporate State Fire Marshals Rules section R710-004 and the design shall be in accordance with the latest version of NFPA 72 Style D initiating circuits, Style Z notification circuits and Style 6 or 7 signaling line circuits (State Fire Marshal Requirement 3.3.3.3.1). Speaker/strobe devices shall be 95 dB and a minimum of 15 candela and white in color. Smoke detector devices shall be photoelectric type. Manual pull station devices shall be single-action type with key reset. Duct detectors shall be provided in return air ducts for air handling units, which have a capacity in excess of 56.6 cubic meters/minute (2000 cubic feet/minute). Elevator recall function will be provided to recall the elevator to the floor of building egress. Control modules shall be provided for fan shutdown. Monitor modules for fire sprinkler flow and tamper switches shall be provided.

All fire alarm wiring shall be installed in 3/4 inch conduit. The fire alarm panel will report alarms to the campus master central fire alarm panel.

**Security**
A security system shall be provided. Card readers will be located at each exterior door. System will include exterior cameras and interior cameras at entries, card readers, entry communication and “buzz’-in” system for door control.

**Clocks**
Clocks will be provided in the facility as directed by the Owner. Minimum size of clock will be 12” in diameter with 120V power and a battery. Clock correction equipment will be located in Communication Rooms.

**Telecommunications**
Provide a dedicated main communication room (EF/ER). Provide dedicated communication rooms throughout the building (TR). Power outlets located in communications rooms shall be connected to the back-up generator.
A structured cabling system for voice and data shall be provided within the building and will include both backbone cabling and horizontal distribution cabling. Backbone cabling for voice and data will be provided from the (ER) room to the (TR) locations within the building so that no cable exceeds 250’ in length. All cabling, both voice and data shall be Category 6. fiber may be urn in special circumstances of specialized equipment for data transfer speed. All outlets will serve as a combination telephone and data outlet.

**Audio/Visual**
Provide audio/visual system for wireless projector operation and web conferencing.

**Energy Utilization**
The standard that governs the requirements for energy utilization is ASHRAE 90.1. This standard outlines the power density requirements for electrical lighting systems as well as energy related to mechanical cooling and heating.

**Lightning Protection**
A lightning protection risk analysis will be performed per NFPA 780. If risk exceeds moderate risk a lightning protection system will be provided.

## 3.3.7 Vertical Transportation Narrative

**Stairways**
Presently there will be four stairways allowing vertical access to all floors. All stairways that run to level six will be considered high rise stairways and will be pressurized to meet high rise requirements.

Stairways are a minimum of 4' clear width between the handrails. All stairways are card access controlled unless the fire alarm is activated and the card readers go into unlock fail safe mode, allowing free access at all doors. Gates are provided at the stairs to prevent going in the wrong direction to exit the building. As with phases II and III, some stairwells will access up. Additional large wall-painted access up arrows with wording indicating that exiting direction is up will be provided in the stairwells similar to phases II and III.

**Elevators**
Huntsman Phase IV will have four passenger elevators servicing all 7 floors. Two freight elevators will be provided for the building. Both will service all 7 floors with a minimum of one opening directly into the mechanical penthouse on the sixth floor. Both elevators have closets and no overhead penthouses will be needed.

**Passenger Elevators**
Passenger elevators will be accessed from the public central lobbies. The elevators will have card access controls located inside the elevator cabs for office hours security issues.

| | |
|---|---|
| Finishes: | The passenger elevators have wood wall panels and tile floors |
| Capacities: | 3500 pounds |
| Speed: | 350 FPM |
| Door: | Four foot width |

**Freight Elevators**
Freight elevators will have access from the dock area and service directly into the lab and office areas. The freight elevators are behind the first security line and are isolated from public use. The elevators will also have card access controls inside to provide security to the office spaces, laboratories and the main mechanical penthouses.

| | |
|---|---|
| Finishes: | The freight elevators have sheet vinyl flooring and stainless steel wall panels |
| Capacities: | 6000 pounds |
| Speed: | 250 FPM |
| Door: | Five foot width |

## 3.3.8 Food Service Narrative

Huntsman Phase IV will have limited food services. The main food services will remain in phase I directly to the north of phase IV. Phase IV will be connected to phase I with bridge connections to easily access the existing Point Restaurant which serves breakfast and lunch. The Point Restaurant also provides a catering service when needed for functions in phase IV. Phase IV will have a Coffee Shop in the main entry lobby on the first floor. In addition to serving drinks there will also be grab-and-go refrigerated cases that will serve sandwiches and salads prepared and stocked by the point restaurant to be sold at the coffee shop. Indoor and outdoor seating will be provided at the coffee shop location. In addition to the coffee shop, 9 break rooms will be provided for the staff which will include microwaves, refrigerators for food storage and coffee machines at each location.

See the room data sheet section for further details on the coffee shop.

### 3.3.9 System Commissioning Controls

It is the intent that the entire project be commissioned by an Independent Commissioning Agent under contract directly with owner. The commissioning agent shall be responsible for seeing that all mechanical and electrical equipment and controls are functioning as they were designed to function.

The Commissioning Agent shall be contracted to begin his services as soon as contracts allow and will follow the project from that time to the end of construction. The agent shall be responsible for developing progress and reporting systems to document his services. The agent shall work closely with the design team to fully understand the scope and intent of the design and shall endeavor to see that the contractors install all elements as per the design.

A final report shall be provided to the design engineers to be included in the permanent Operations and Maintenance Manuals which will be delivered to the owner at the conclusion of the project.

The Commissioning agent will be involved with LEED Certification of the project.

### 3.3.10 High Performance Buildings

**Overview**
The Primary Children's & Families' Cancer Research Center at Huntsman Cancer Institute (Huntsman Phase IV) shall be designed such that it achieves a minimum certification of Silver under the USGBC's LEED-NC rating system. This reasonable goal, consistent with DFCM requirements, provides the Architectural and Engineering team as well as the various constituent groups that comprise this unique facility a great opportunity to foster sustainability within our respective organizations and the community-at-large. The effort required to achieve that goal will set an example for other buildings and facilities regarding a more sensitive and better way to build, it will create a more efficient facility that is more enjoyable to be in, and it will promote the responsible stewardship of the natural environment while providing a means for the public to learn how architecture can play a significant role in improving the quality of our built environment.

Such an endeavor starts with a clear understanding of values. On Wednesday December 4th a Sustainability Charrette was conducted at the offices of Architectural Nexus as part of the overall programming effort. Over 30 participants from within and without the Project Development Team (PDT) gathered in order to set the sustainability vision for the project. Following a review of the programming effort to date a facilitated conversation took place amongst stakeholders regarding the prioritization of sustainability values for the project. It should be noted that all items below were ranked as important; the order simply reflects their relative priority with 1 being the most important:

1. Energy – Active & Passive Concepts (daylighting, heat recovery systems, fixed shading, window to wall ratio)

2. Occupant Health and Well-Being (natural light, indoor air quality, individual occupant control)
3. Water Resources – CAMPUS FOCUS (water reducing plumbing fixtures, process water reuse)
4. Resource Conservation – INSTITUTE FOCUS (recycled content, waste reduction, regional materials)
5. Site Considerations (transportation & connectivity)

As supported by information found in other portions of this document, the Programming Team has responded to this prioritization of values accordingly. Although there are a few LEED credits that are simply not available to the project (e.g. SSc3 Brownfield Redevelopment), such credits are most typically not high on the above priority list. As a result we are on track to meet the goal of Silver Certification.

**LEED Certification is not the end game of sustainability for this project, however.** The Design Team will need to take a holistic approach to design and avoid the common pitfall of credit-by-credit thinking in order to achieve the true goal of creating a high performance building full of high performance occupants. An integrated process that includes a broad spectrum of facilities stakeholders combined with robust Life Cycle Assessment (LCA) will lead to the inclusion of the most appropriate technologies and strategies for the building that are both budget appropriate and sustainable. In so doing, LEED Silver certification will become an outcome rather than a purpose.

The primary risk of the writing that follows in this section is that it is mistaken for a LEED-centric approach to sustainability. Rather, LEED is simply the common vocabulary that the Programming Team has elected to use in terms of translating the sustainability agenda between the many dialects spoken on the project. The following narrative quantifies and briefly discusses the efforts that are being made to meet sustainable building strategies in support of the prioritized values list described above. Please note that while programming continues to indicate that many initiatives are clearly attainable others will require close monitoring over the course of the design and documentation phases of the project in order to ensure that they are achieved.

## Sustainable Sites

**SS – Prerequisite 1 – Construction Activity Pollution Prevention**

The creation of an Erosion and Sedimentation Control Plan by the Civil Engineer and carried out by the Contractor will prevent the loss of soil, reduce sedimentation and prevent dust from polluting the air. This will protect and ensure that surrounding surface drainage systems as well as the storm sewers and the natural drainages they feed into are not polluted or otherwise disturbed. This is of critical importance on the project-at-hand given the surrounding sensitive ecosystem and the adjacent Bonneville Shoreline Trail.

**SS – Credit 1 – Site Selection**

This credit encourages development to occur in areas that preserve open space, protect wetlands and waterways as well as farmlands and endangered species. Given the location of the project on the current site all of the requirements will be met. Additional considerations relative to this credit are similar to that which is discussed in SSp1 – it is important that both the Design and Construction Team's act as good stewards of the natural open space that will surround the project.

**SS - Credit 2 – Development Density & Community Connectivity**

The Health Sciences Campus of the University of Utah is, in many ways, a small city. Such a site promotes development in a location that

already has developed infrastructure in the form of commercial and residential options, public transportation and subgrade utility systems of all kinds. As a result, the project will likely meet all the requirements of this credit. But because some GBCI reviewers have periodically balked at allowing campus services (Bookstore convenience grocery) count toward compliance, coupled with the low priority for site initiatives established at the Charrette, this credit remains in the maybe column of the in-progress scorecard.

**SS – Credit 3 – Brownfield Redevelopment**
The requirements for this credit will not be met because the site is not a Brownfield (contaminated site).

**SS – Credit 4.1 – Public Transportation Access**
By promoting public transportation many single-occupant vehicle trips to and from the building will be eliminated. This, in concert with the narratives regarding parking capacity and fuel-efficient vehicles below, has the project well positioned to help mitigate pollution associated with occupant commuting behaviors. The Health Sciences campus is well covered by public transportation options. Though not all of them are currently within LEED required walking distances, it is clear that the intent of this credit can be met if a stop is relocated. It is likely that the campus shuttle system be the means by with this particular credit is achieved, however. The Design Team will need to clarify the remaining open issues as early in the design process as possible in order to capture potential costs that could be associated with compliance, however unlikely.

**SS – Credit 4.2 – Bicycle Storage & Changing Rooms**
The Design Team shall study the feasibility of providing several different types of bike storage and employee shower facilities as part of the project. It will be necessary to provide facilities sufficient to accommodate 5% of the estimated peak occupant load. The bike storage shall come in two forms, both indoor and outdoor. A secure bike storage room for full-time building occupants is recommended. It shall be accessed via card reader in order to ensure that only authorized personnel gain access to that space. Additionally, outdoor racks shall be in close proximity to the main public entrance.

**SS - Credit 4.3 – Low-Emission/Fuel Efficient Vehicles**
At the time of this writing the plan regarding parking is to support the building with robust public transit and campus shuttle access rather than overly convenient storage for personal vehicles. As a result, this credit may not be a candidate for inclusion since the more sustainable alternative of promoting alternative transportation is the likely outcome. In the event parking is provided please consider the following: In order to promote the reduction of pollution caused by automobile use 5% of the available parking spaces shall be reserved for low emitting and fuel-efficient vehicles. These stalls shall be located near the main entrance near the accessible stalls. With the gaining popularity of hybrid vehicles these stalls will not likely sit unoccupied.

**SS – Credit 4.4 – Parking Capacity**
This credit requires that either no new parking is added or that no more than the minimum number of stalls required by ordinance is provided. In concert with the narrative found in SSc4.3 above, this project is in good shape since it is not adding parking to the Health Sciences campus.

**SS – Credit 5.1 – Site Development, Protect or Restore Habitat**
The Design Team shall ensure that the limits of construction fall within the requirements of the credit. This will be a reasonable effort in most areas, but close attention will need to be paid to managing the slope condition at the rear of the building, as it will be a challenge to maintain a maximum of 40' from the final footprint.

**SS – Credit 5.2 – Site Development, Maximize Open Space**

The project site falls under Case 2 identified in this credit: sites with no local zoning requirements (the site does not fall under the jurisdiction of Salt Lake City or Salt Lake County as it is State land). As a result, there is a requirement for open space equal to the building footprint within the LEED Project Boundary. While other credits may desire a compact Boundary (e.g. SSc5.1), this credit favors a large one. The Design Team will have to carefully balance these issues while keeping in mind that the Boundary is not the point – long-term sustainable development is. That is to say that future adjacent development must be considered when establishing the Boundary so as to ensure that even those projects have an appropriate claim upon and access to open space.

**SS – Credit 6.1 – Storm Water Design, Quantity Control**

The HCI site is part of a larger drainage basin that is served by a regional detention basin located near the Primary Children's Hospital. Existing storm drain infrastructure is available to discharge storm flows. While there are a number of approaches to achieving this credit, the best option involves limiting the post-development peak discharge rate and quantity from exceeding the pre-development peak discharge rate and quantity for the 1- and 2-year, 24-hour design storms. The biggest contributor to a higher rate from post-development conditions as compared to pre-development conditions is the amount of impervious area designed into the site. In the case of this project, the biggest difference is the proposed building itself.

Several design elements can be employed to help realize this credit. A rooftop garden is planned for a portion of the building's roof. Some of the natural rainfall will be consumed by this garden. Additionally, rain water that falls on the roof can be captured and stored in cisterns for use in some irrigation uses or reuse applications inside the building for various non-potable processes. Utah limits the volume of captured water to 2,500 gallons in a below-ground containment device. The design team intends to explore the latitude of this impractical restriction. It appears that the University's Law School has found some success working through this same issue. Should this effort prove unfruitful, excess water (over the 2,500 gallon threshold) can be discharged into the ground via percolation to help achieve this credit. Sub-surface storm water chambers are routinely used to accomplish this result.

The debris/detention basin employed east of the building will capture some of the storm flows from the upper portion of the site. There will be capacity in this basin to meter the water out at a slower rate in order to minimize the post-development peak discharge rate. A strategy to consider is to over-detain the flows on the upper portion of the site while allowing a larger release on the lower portion of the site. Through this type of mass-balance approach, the amount of water that is released from the site as a whole can be limited to pre-development conditions.

**SS – Credit 6.2 – Storm Water Design, Quality Control**

The best opportunities to realize this credit involve a combination of nonstructural and structural measures. These measures include strategic use of the rooftop garden, vegetated swales and depressions that promote infiltration. These measures encourage water to naturally filter through the soil where pollutants are broken down by microorganisms. The nonstructural approach requires verification that the soils can absorb at least 90% of the average annual rainfall volume. Structural measures such as cisterns, sub-surface storm water chambers, and manhole treatment devices help to improve water quality before discharging it into the campus collection

infrastructure. Structural measures should be able to remove 80% of the average annual post-development load of total suspended solids.

**SS – Credit 7.1 – Heat Island Effect, Non-roof**
In the site areas around the building shall employ light colored concrete and a mixture of climate-appropriate plantings to reduce on-site heat retention. By reducing the heat island effect immediately adjacent to natural areas the project can help reduce the increase in ambient temperature that campus experiences due to the large amounts of dark, non-reflective heat absorbing surfaces. Decreasing the temperature differential between developed and non-developed areas is an important first step toward creating developments that do less harm to sensitive adjacent and nearby ecosystems.

**SS – Credit 7.2 – Heat Island Effect, Roof**
This credit addresses measures that need to be taken to reduce the heat island effect contribution from the building's roof. Budget willing, green roof systems are the preferred method for achieving this credit. Providing architecturally landscaped roof patios is the next best option. Additionally, rooftop PV support systems can provide shading for the roof and these roof patios. Exposed roofing areas shall incorporate the use of roofing materials that have an aged Solar Reflectance Index (SRI) equal to or greater than 78. By utilizing these types of roofing surfaces much of the solar heat gain will not be absorbed into the building and later emitted into the surrounding area raising the localized temperature. Most importantly, the cooling loads required for the building will be reduced and much energy will be saved over the life of building operations.

**SS – Credit 8 – Light Pollution Reduction**
While an important initiative, the Electrical Engineer reports that this particular credit is too challenging to pursue given the relative prioritization of credit categories outlined earlier in this section. That said, lighting systems shall be designed to be nigh-sky initiative compliant – full cut-off exterior fixtures, automated timer controls, interior perimeter design sensitivity, etc. in order for the project to enjoy the benefit of this particular sustainable initiative.

## Water Efficiency

**WE – Prerequisite 1 – Water Use Reduction**
The purpose of this prerequisite is to help sustainable projects implement modest water savings measures above code minimums, an initiative that has particular importance in our desert climate. Laboratory facilities offer many opportunities for water-use reduction in both building process and user level use. Based on our team's past experience this prerequisite will be easily achieved.

**WE – Credit 1 – Water Efficient Landscaping**
On par with DFCM requirements, the Design Team is targeting a minimum of 50% irrigation water use reduction through the application of high-efficiency drip systems serving only native or adaptive plantings. As ditch water is not available on site and insufficient precipitation is available in our climate, a non-potable irrigation solution is not available to the project. Process water (e.g. cooling towers) reuse shall be explored during the Charrette, however, in order to discover possible synergies that could lead to enhanced water use reduction strategies.

**WE – Credit 2 – Innovative Wastewater**
Initial estimates suggest that wastewater reduction strategies could result in savings on the order of 50% depending on the clients' disposition on particular fixture types such as waterless urinals. Over the course of design several of the more aggressive water-saving strategies should be carefully considered. Based on past experience, it seems unlikely that this credit will be achieved, but it is put forth here for examination at a later date.

**WE – Credit 3 – Water Use Reduction**
Employing water efficient strategies such as low flow faucets, showerheads, urinals, and water closets will result in a reduction on the order of 35% of water used compared to a typical baseline situation. These strategies are good ways to make a difference given the high demand for water in our State, and are congruent with the values of key Campus stakeholders present at the Sustainability Charrette.

## Energy and Atmosphere

**EA – Prerequisite 1 – Fundamental Building Systems Commissioning**
Fundamental commissioning of building energy systems is an essential part of any high performance project. DFCM includes a Commissioning Authority (CxA) on all of its sizeable projects in order to improve energy use reduction outcomes. The practical application of this particular prerequisite starts in the Construction Documents phase of the project and concludes with project close-out efforts that will take place around the time the occupants move-in. These efforts are further expanded as part of the related credit that follows.

**EA – Prerequisite 2 – Minimum Energy Performance**
In accordance with both DFCM and University of Utah requirements, the building and its systems shall significantly exceed the energy efficiency requirements as set forth in ASHRAE 90.1-2006 (the University of Utah targets are based on this edition of the reference standard). Targeting significant levels of energy savings means that the project has the opportunity to be 2030 Challenge compliant (www.architecture2030.org). The Design Team shall create a building that, in all manners possible, reduces energy consumption in order to optimize the Energy Use Intensity (EUI) of the project on the path to achieving this lofty goal.

Please note that Energy Star Target Finder does not return a reasonable benchmarking result for this project. What's more, the projects particular mix of uses does not make it eligible for future Energy Star Certification. Architectural Nexus and VBFA have conducted a precedents study in order to fill this gap, however. Based on review of several recent and similar laboratory projects for the State of Utah along with published data from the Labs21 research project, an initial benchmark EUI of 350 is recommended. It goes without saying that this number is subject to change and will be refined over time as energy modeling efforts commence during the design phase of the project.

**EA – Prerequisite 3 – Fundamental Refrigerant Management**
In an effort to not contribute to the depletion of ozone, none of the building systems shall contain CFC-based refrigerants. The Montreal Protocol, an initiative that has been in place for years that strives to reduce ozone depleting substance release into the atmosphere, has been very effective at curbing this particular kind of human impact on the planet; NASA has evidence that the hole in the ozone is no longer growing and, in fact, may be shrinking.

**EA – Credit 1 – Optimize Energy Performance**
The University of Utah requirements permit a blended rate or pro-rated calculation for energy use reduction in buildings such as Huntsman Phase IV that are comprised of more than one use type. At the time of this writing, approximately 46% of the total gross program area is slated for lab use (actual bench space, not lab support or office areas). Per University requirements, lab areas are to target 20% energy use reduction while office and support space shall be 40% below ASHRAE 90.1-2006 baseline. The resultant minimum expectation for this facility is 31% energy use reduction by calculation. This is equivalent to 10 points under the LEED-NC rating system. As previously noted in the related

prerequisite, this number is subject to change and will be refined over the course of the design process.

It is anticipated that the use of various building strategies will increase the energy performance of the building by as much as 40% over the relevant baseline. Strategies such as a ground coupled heat exchange system, high efficiency heat pumps, heat recovery units, high performance glazing and building envelope, calculated overall window-to-wall-ratios (W2WR) of 25% or less, natural ventilation and significant daylighting are but a few of the potential strategies for achieving this level of performance. The Design Team will shall focus on strategies that maximize return on investment by minimizing energy costs over the life of the building. Moreover, they shall employ energy modeling and Life Cycle Assessment protocols as prescribed by DFCM in order to measure the validity of any given energy efficiency or conservation measure.

**EA – Credit 2 – On Site Renewable Energy**
The preferred means to carbon reduction via renewable energy is on-site generation – all other forms are considered dubious in that they abstract the relationship between cause and effect. For this reason, a modest on-site photovoltaic (PV) array is recommended. Due to site constraints this array shall be located on one or more roof planes or over outdoor amenities. Consideration should be given to configuring this array as a shading device for glazing and/or cover for an outdoor space. Another option is building-integrated PV (BIPV) glazing systems on skylights or the façade, though at the time of this writing such systems are significantly less effective per construction dollar than traditional unitized PV panels. Solar hot water systems should also be considered once the mix of mechanical and plumbing systems is fully fleshed out during Schematic Design.

**EA – Credit 3 - Enhanced Commissioning**
DFCM requirements will get the project off to a great start by involving a CxA as early in the Schematic Design process as possible. This will offer the oversight of a third party independent stakeholder who will be responsible to review heating, ventilation, air conditioning and refrigeration systems as well as lighting and daylighting controls, elevator energy conservation features, domestic hot water systems and renewable energy systems during design and construction. This oversight provides an additional level of assurance that these critical building systems operate as intended. Their efforts will span the warranty period following move-in and conclude roughly one-year after occupancy.

**EA – Credit 4 - Enhanced Refrigerant Management**
This credit further extends the intent to reduce ozone depletion set forth in EAp3 by prohibiting the use of additional classes of refrigerants that contribute to ozone depletion. As the mechanical design is developed and equipment selections come into focus (submittals during Construction) the potential for claiming this credit will be more certain. Until that time this credit is designated as an opportunity for the project.

**EA – Credit 5 - Measurement & Verification**
The University of Utah no longer requires that Design Team incorporate LEED compliant Measurement & Verification (M&V) systems into each project. As many building owners have discovered, the LEED requirements relative to this important sustainable initiative often greatly exceed their value. Instead, a common sense approach will be taken to the extent supported by the project budget. The value of M&V systems is straightforward; to provide real-time feedback to building managers in order to ensure that ongoing operations are carefully tuned in pursuit of aggressive energy-use reduction goals.

A fundamental issue, however, is whole building metering and primary system sub-metering. The Design Team shall provide building-level meters for each energy use type and shall also provide sub-metering sufficient to differentiate lighting, HVAC and plug load energy use one from another. Future Mechanical/Electrical/Plumbing (MEP) narratives will more thoroughly review the specifics relative to this item.

**EA – Credit 6 - Green Power**
While less desirable than on-site alternatives, renewable energy credits (REC's) are a reasonable opportunity to reduce the carbon footprint of the building (not to be confused as a means for achieving net zero). In our market Rocky Mountain Power (RMP) offers a Green-e Certified REC product that has garnered significant exposure; Blue Sky. In our region this energy is most often generated by windmills, but could also come from a number of other sources in RMP's portfolio. The purpose of this credit is to bridge the gap between coal generation and on-site renewable energy production with an eye on improving air quality.

## Materials and Resources

**MR - Prerequisite 1 - Storage & Collection of Recyclables**
In order to reduce the amount of material sent to landfills as a result of ongoing building operations the project shall implement a facility wide recycling program that handles waste material of all types, including those not regulated by LEED (e.g. batteries and other eWaste). In order to facilitate this the project shall include a centralized and exhausted recycling storage area of not less than 500 SF accompanied by distributed collection stations. As part of the recycling plan coordination with possible disposal companies shall to take place. Additionally, instruction to staff and patrons on procedures will further enhance recycling efforts. There is a strong opportunity to extend learning on this project to previous phases of the Huntsman campus as well.

**MR - Credit 1 - Building Reuse**
The project-at-hand is a new building and is not eligible for this credit as a result.

**MR - Credit 2 - Construction Waste Management**
A construction waste management plan shall be implemented that identifies materials to be diverted from landfills to facilities that process such materials for use in other products. Identification of hauling and recycling companies on the part of the General Contractor will be necessary to generate a robust waste management plan. Coordination with haulers is important because most provide sorting services that will affect the way in which construction debris is disposed of on-site. Diversion of at least 75% of all debris is required to achieve both credit points. This is an achievable goal in our market due to the ever-increasing number of vendors providing recycling services.

**MR - Credit 3 - Materials Reuse**
This intent of this credit is the same as MRc1 above; make good use of that which has already been consumed. The difference is that individual building components and materials are considered, and those materials need not come strictly from the same location as the project. One very good example of materials that might help to earn this credit in our construction market is reclaimed wood from the railroad trestle that used to span the Great Salt Lake.

**MR - Credit 4 - Recycled Content**
A minimum of 20% of materials used to construct the building shall be specified to meet the complex credit requirements associated with LEED recycled content calculations. Materials such as concrete, steel, gypsum board and other

interior and exterior finishes will be among many of the items that contribute to the overall effort. By specifying products high in recycled content, the Design Team will help to make a market for the construction waste collected in MRc2.

**MR - Credit 5 - Regional Materials**
To decrease the environmental impacts of transportation of building materials and increase the demand on indigenous resources, a minimum of 20% of all the materials in the building shall be extracted, processed and manufactured within 500 miles of the project site. Locally sourced materials and material suppliers will be identified that can help in achieving this goal. Decreasing our dependence on fossil fuels is only a part of this initiative – supporting local economies and increasing our collective awareness of the detrimental effect that consumption has on the environment is part and parcel to the credit as well.

**MR - Credit 6 - Rapidly Renewable Materials**
This credit endeavors to avoid use of natural resources that cannot be readily replenished. The total value of the project that comes from materials that are harvested within a 10 year cycle or shorter must be 2.5% or greater. While all wood door cores and millwork substrates shall be constructed of agrifiber/wheat board, this amount will be insufficient to achieve the credit. It will take a concerted effort on the part of the Design Team to find the right solutions for this project during the design phase.

**MR - Credit 7 - Certified Wood**
Wood that comes from responsibly managed forests must make up a minimum of 50% of the wood based products found in the project. Solid wood trims as well as door and cabinet veneers are among the products that would contribute to this requirement. Efforts to support environmentally friendly forest practices help protect wildlife, prevent erosion, and reduce pollution and waste. Since it is unlikely that a great deal of wood material will find its way into the project, this credit has a the potential for success without having much impact on the overall project budget.

## Indoor Environment Quality

**IEQ – Prerequisite 1 – Minimum IAQ Performance**
The requirements set forth in ASHRAE 62.1-2007 specifying acceptable indoor air quality ventilation rates shall be met. Research suggests that doing so will increase occupant comfort and well-being, thereby improving productivity by decreasing sick day lost time and health insurance burdens.

**IEQ – Prerequisite 2 – Environmental Tobacco Smoke Control**
Smoking shall be prohibited inside the building and within 25 feet of any entry, air intake or operable window. Signage shall be provided to this effect. Beyond fulfilling this basic LEED requirement (supported by State law), a suggestion is hereby made to make the entire site a smoke free zone. This is a trend that is increasing in our community that can only extend associated health benefits to smokers and non-smokers alike. The obvious synergy with the mission of cancer research makes this sustainable initiative an obvious one.

**IEQ – Credit 1 - Outdoor Air Delivery Monitoring**
To sustain occupant comfort and well-being, the Design Team shall specify that CO2 sensors be installed sufficient to monitor levels in densely occupied spaces. This monitoring will ensure that proper ventilation is occurring in highly used spaces regardless of temperature or other HVAC controls criteria. In less densely occupied spaces direct airflow will be measured to ensure that amounts are within acceptable tolerances.

**IEQ – Credit 2 – Increased Ventilation**
To earn this credit the Design Team must provide a system that exceeds the standards for ventilation set forth in ASHRAE 62.1 by at least 30%. Doing so will decrease the energy efficiency of support areas (e.g. office) at the expense of energy use reduction goals. It is important to note that while occupant well-being and comfort are a high priority for the project, energy efficiency is number one. It has been Nexus' experience that the extra energy spent on increased ventilation is not a good value given that an appropriately designed ventilation system keeps CO2 levels and odors well below recommended thresholds to begin with. In consideration of all these issues, this initiative has been left in the "maybe" column for the time being. Please note that this discussion has no relationship to highly regulated areas in the lab proper.

**IEQ – Credit 3.1 – Construction IAQ Management Plan, During Construction**
During construction the General Contractor shall safeguard the indoor air quality of future occupants by several means. Standards set forth by the SMACNA IAQ Guidelines for Occupied Buildings under Construction shall be met or exceeded. Additional measures such as replacing HVAC filtration media before permanent occupancy and protecting on-site or installed absorptive materials from moisture damage during construction shall also be implemented. The intent of this credit and all of the credits in this section is to protect the air quality within the building for the benefit of all occupants, including those that build the building.

**IEQ – Credit 3.2 – Construction IAQ Management Plan, Before Occupancy**
While the credits that follow endeavor to minimize the quantity of volatile organic compounds (VOC's) that make their way into the building during construction, it is the state of the industry that no amount of regulation or oversight can prevent 100% of toxins from entering the building. As a result, it is recommended that a building flush-out occur after punch-listing and before final occupancy. This effort consists of changing the HVAC filters, running a large quantity of fresh air through the building, then again changing the HVAC filters. LEED V3 (2009) provides an occupied building flush-out option that the Design Team has first hand experience implementing that permits owner move-in and occupancy for the majority of the flush-out period. But be advised; winter flush-outs in our climate can be very protracted due to the effect low outdoor air temperatures have on interior temperature and humidity levels. If this is not practical then in-place testing alternatives should be explored during punch-listing.

**IEQ – Credit 4.1 through 4.4 – Low Emitting Materials**
A comprehensive plan shall be implemented that minimizes and reduces indoor air contaminants that are odorous, irritating, and harmful. Adhesives, sealants, paints, carpet, and composite wood/agrifiber products shall have limits on the amount of VOC's that they can emit. These standards are set forth in California's South Coast Air Quality Management's Rule #1168. When VOC's are minimized occupants have better air to breath inside the building. VOC's also contribute to the amount of ground level ozone that exists. Ground level ozone has detrimental effects on humans, agriculture, forests and other ecosystems.

**IEQ – Credit 5 – Indoor Chemical & Pollutant Source Control**
This is the only credit that took a step backward from LEED V2.2 to V3 (2009). Previously, reasonably sized walk-off mats were required and copy rooms were simply permitted to be negative relative to adjacent spaces with respect to pressurization. In the current version of LEED it is necessary to provide 10' long walk-off mats and fully enclosed copy rooms. Despite these

concerns but in concert with stakeholder values, the Programming Team has recommended this credit for consideration during the design phase.

**IEQ – Credit 6.1 – Controllability of Systems, Lighting**
Measures that give occupants control over the lighting systems shall be provided. Individual lighting controls such as after-hours schedule overrides and individual task lighting (low energy LED type) shall be provided throughout the building. Worker productivity, patron satisfaction and general well being are benefits of providing increased individual lighting control, not to mention the significant energy savings potential.

**IEQ – Credit 6.2 – Controllability of Systems, Thermal Comfort**
An extension of the above credit, thermal controls such as localized thermostats, airflow controls and "power-sipping" desk fans will be options that serve to satisfy the requirements of this credit. More detail is required regarding the final controls system before the status of this credit can be finalized, however.

**IEQ – Credit 7.1 - Thermal Comfort, Design**
ASHRAE 55-2004 sets forth conditions are acceptable to most individuals as a basis for thermal comfort. Humidity levels, air speeds, and temperature are some of the factors that affect thermal comfort. Please note that adjusting heating or cooling setpoints outside the hyper-typical norm (72 degrees year round) to save energy is not recommended based on feedback received at the Charrette. Simply put, the goal of this initiative is to provide the maximum potential for thermal comfort of the majority of occupants (100% satisfaction is not a realistic goal).

**IEQ – Credit 7.2 - Thermal Comfort, Verification**
To ensure that the efforts made to meet the requirements of the credit above and that the building is well-maintained in order to provide the desired results, a thermal comfort survey shall be administered to building patrons and staff between 6 and 18 months after initial occupancy (likely at the same time that M&V efforts are being concluded around the time the warranty period is coming to an end). This survey will provide useful feedback related to thermal comfort related problems. From this feedback corrective actions and monitoring shall be implemented to maintain desired conditions and significantly reduce the number of "hot calls" and "cold calls" to which maintenance staff must respond.

**IEQ – Credit 8.1 - Daylight**
**Providing a visual connection for occupants between indoor spaces and the outdoors through the introduction of daylight for 75% of regularly occupied spaces is the goal of this credit. Daylighting shall been a fundamental form-giver for this project and numerous simulations will be required over the course of the design process. This notoriously difficult credit is achievable if an integrated process is undertaken. What's more, the most pervasive comment during the Sustainability Charrette was the need for abundant, natural light in the facility.**

**IEQ – Credit 8.2 – Views**
This credit tends to be slightly less rigorous though directly related to the credit above. Access to views creates a periodic and necessary distraction in order to help alleviate stress associated with normal workday tasks, and office areas need to be located and organized appropriately as a result. This credit cannot be fully evaluated at this early stage of project development, but should influence early decision-making relative to building planning.

## Innovation and Design Process

There are two types of credits in this category that will be pursued; Exemplary Performance and Innovation credits. Regarding the former, speculating on which credits might achieve greatness is not a productive effort. Instead, and based upon the Design Team's experience and an extensive review of the LEED Innovation Credit Catalog, there are several Innovation Credits that should be considered for implementation:

- Living Building Challenge Education + Inspiration Imperative (the single best way to infuse social equity into the project is to invite the public in once a year for education).
- Green Cleaning Policy (dovetails nicely with the second highest sustainability value in the project; a healthy indoor environment)

It is typical that these targets will adjust and change over time as project priorities are refined through design and construction. Additionally, one credit point will be awarded to the project for having a LEED Accredited Professional as part of the Design Team.

## Regional Priority

The local Chapter of the USGBC has designated the following credits as especially important to our region and the project's zip code given our climate (low water use targets) and great access to daylight (energy reduction, renewable energy and daylighting targets). Up to four may be used to enhance credit totals.

- SSc8: Light Pollution Reduction (not pursued)
- WEc1: No Potable / Irrigation (not pursued)
- WEc3: 40% Water Use Reduction (GOAL)
- EAc1: Option 1, 36% New (GOAL)
- EAc2: 5% Renewable Energy (out of reach for this project)
- IEQc8.1: Daylight 75% of Spaces (GOAL)

## Conclusion

The threshold is 50 points for the required certification level of Silver. Currently there are at least that many points that appear to be readily available to the project. Only eleven points have been ruled out at this time, which leaves about 49 points that can serve as options should targets need to change during design. These sustainable efforts will be spread over all of the credit categories, with an appropriate emphasis on energy and indoor environmental quality. The Scorecard that follows indicates the percentage of credits by category that have been targeted in accordance with the priorities enumerated at the beginning of this section of the Program. Please note that while IEQ results have outpaced EA results on a percentage basis, EA targets represent more points than any other single credit category.

**Huntsman LEED v2009 BD+C.xlsx**

**LEED™ Scorecard of 12/18/13**

**HUNTSMAN CANCER INSTITUTE PHASE IV**
2000 Circle of Hope Drive
Salt Lake City, Utah 84112

Nexus Project # 13095

| 50 | 49 | 11 | Total Project Score - 50 | Possible Points 110 |
|---|---|---|---|---|

Certified 40 to 49 points Silver 50 to 59 points Gold 60 to 79 points Platinum 80 or more points

## Sustainable Sites — Possible Points 26

| Y | ? | N | | | |
|---|---|---|---|---|---|
| 10 | 14 | 2 | | | |
| Y | | | Prereq 1 | **Construction Activity Pollution Prevention** | |
| 1 | | | Credit 1 | **Site Selection** | 1 |
| | 5 | | Credit 2 | **Development Density & Community Connectivity** | 5 |
| | | 1 | Credit 3 | **Brownfield Redevelopment** | 1 |
| | 6 | | Credit 4.1 | **Alternative Transportation**, Public Transportation Access | 6 |
| 1 | | | Credit 4.2 | **Alternative Transportation**, Bicycle Storage & Changing Rooms | 1 |
| | 3 | | Credit 4.3 | **Alternative Transportation**, Low-Emission/Fuel Efficient Vehicles | 3 |
| 2 | | | Credit 4.4 | **Alternative Transportation**, Parking Capacity | 2 |
| 1 | | | Credit 5.1 | **Site Development**, Protect or Restore Habitat | 1 |
| 1 | | | Credit 5.2 | **Site Development**, Maximize Open Space | 1 |
| 1 | | | Credit 6.1 | **Stormwater Design**, Quantity Control | 1 |
| 1 | | | Credit 6.2 | **Stormwater Design**, Quality Control | 1 |
| 1 | | | Credit 7.1 | **Heat Island Effect**, Non-Roof | 1 |
| 1 | | | Credit 7.2 | **Heat Island Effect**, Roof | 1 |
| | | 1 | Credit 8 | **Light Pollution Reduction** | 1 |

## Water Efficiency — Possible Points 10

| Y | ? | N | | | |
|---|---|---|---|---|---|
| 5 | 3 | 2 | | | |
| Y | | | Prereq 1 | **Water Use Reduction** | |
| 2 | | 2 | Credit 1 | **Water Efficient Landscaping**, Reduce by 50% | |
| | | | | 2 Reduce by 50% | 2 |
| | | | | No Potable Water Use | 2 |
| | 2 | | Credit 2 | **Innovative Wastewater Technologies** | 2 |
| 3 | 1 | | Credit 3 | **Water Use Reduction** | |
| | | | | 2 30% Reduction | 2 |
| | | | | 1 35% Reduction | 1 |
| | | | | 40% Reduction | 1 |

## Energy & Atmosphere — Possible Points 35

| Y | ? | N | | | |
|---|---|---|---|---|---|
| 18 | 14 | 3 | | | |
| Y | | | Prereq 1 | **Fundamental Building Systems Commissioning** | |
| Y | | | Prereq 2 | **Minimum Energy Performance** | |
| Y | | | Prereq 3 | **Fundamental Refrigerant Management** | |
| 13 | 6 | | Credit 1 | **Optimize Energy Performance** | |
| | | | | 1 12% for New Buildings or 8% for Existing Buildings | 1 |
| | | | | 1 14% for New Buildings or 10% for Existing Buildings | 1 |
| | | | | 1 16% for New Buildings or 12% for Existing Buildings | 1 |
| | | | | 1 18% for New Buildings or 14% for Existing Buildings | 1 |
| | | | | 1 20% for New Buildings or 16% for Existing Buildings | 1 |
| | | | | 1 22% for New Buildings or 18% for Existing Buildings | 1 |
| | | | | 1 24% for New Buildings or 20% for Existing Buildings | 1 |
| | | | | 1 26% for New Buildings or 22% for Existing Buildings | 1 |
| | | | | 1 28% for New Buildings or 24% for Existing Buildings | 1 |
| | | | | 1 30% for New Buildings or 26% for Existing Buildings | 1 |
| | | | | 1 32% for New Buildings or 28% for Existing Buildings | 1 |
| | | | | 1 34% for New Buildings or 30% for Existing Buildings | 1 |
| | | | | 1 36% for New Buildings or 32% for Existing Buildings | 1 |
| | | | | 38% for New Buildings or 34% for Existing Buildings | 1 |
| | | | | 40% for New Buildings or 36% for Existing Buildings | 1 |
| | | | | 42% for New Buildings or 38% for Existing Buildings | 1 |
| | | | | 44% for New Buildings or 40% for Existing Buildings | 1 |
| | | | | 46% for New Buildings or 42% for Existing Buildings | 1 |
| | | | | 48%+ for New Buildings or 44%+ for Existing Buildings | 1 |
| 1 | 6 | | Credit 2.1 | **On-Site Renewable Energy** | |
| | | | | 1 1% Renewable Energy | 1 |
| | | | | 3% Renewable Energy | 1 |
| | | | | 5% Renewable Energy | 1 |
| | | | | 7% Renewable Energy | 1 |
| | | | | 9% Renewable Energy | 1 |
| | | | | 11% Renewable Energy | 1 |
| | | | | 13% Renewable Energy | 1 |
| 2 | | | Credit 3 | **Enhanced Commissioning** | 2 |
| 2 | | | Credit 4 | **Enhanced Refrigerant Management** | 2 |
| | | 3 | Credit 5 | **Measurement & Verification** | 3 |
| | 2 | | Credit 6 | **Green Power** | 2 |

## Materials & Resources — Possible Points 14

| Y | ? | N | | | |
|---|---|---|---|---|---|
| 6 | 4 | 4 | | | |
| Y | | | Prereq 1 | **Storage & Collection of Recyclables** | |
| | | 3 | Credit 1.1 | **Building Reuse,** Maintain Existing Walls, Floors and Roof | |
| | | | | Reuse 55% | 1 |
| | | | | Reuse 75% | 1 |
| | | | | Reuse 95% | 1 |
| | | 1 | Credit 1.2 | **Building Reuse**, Maintain Interior Nonstructural Elements | 1 |
| 2 | | | Credit 2 | **Construction Waste Management** | |
| | | | | 1 50% Recycled or Salvaged | 1 |
| | | | | 1 75% Recycled or Salvaged | 1 |
| | 2 | | Credit 3 | **Materials Reuse** | |
| | | | | Reuse 5% | 1 |
| | | | | Reuse 10% | 1 |
| 2 | | | Credit 4 | **Recycled Content** | |
| | | | | 1 10% of Content | 1 |
| | | | | 1 20% of Content | 1 |
| 2 | | | Credit 5.1 | **Regional Materials** | |
| | | | | 1 10% of Materials | 1 |
| | | | | 1 20% of Materials | 1 |
| | 1 | | Credit 6 | **Rapidly Renewable Materials** | 1 |
| | 1 | | Credit 7 | **Certified Wood** | 1 |

## Indoor Environmental Quality — Possible Points 15

| Y | ? | N | | | |
|---|---|---|---|---|---|
| 10 | 5 | | | | |
| Y | | | Prereq 1 | **Minimum IAQ Performance** | |
| Y | | | Prereq 2 | **Environmental Tobacco Smoke** (ETS) **Control** | |
| 1 | | | Credit 1 | **Outdoor Air Delivery Monitoring** | 1 |
| | 1 | | Credit 2 | **Increased Ventilation** | 1 |
| 1 | | | Credit 3.1 | **Construction IAQ Management Plan**, During Construction | 1 |
| | 1 | | Credit 3.2 | **Construction IAQ Management Plan**, Before Occupancy | 1 |
| 1 | | | Credit 4.1 | **Low-Emitting Materials**, Adhesives & Sealants | 1 |
| 1 | | | Credit 4.2 | **Low-Emitting Materials**, Paints & Coatings | 1 |
| 1 | | | Credit 4.3 | **Low-Emitting Materials**, Flooring Systems | 1 |
| 1 | | | Credit 4.4 | **Low-Emitting Materials**, Composite Wood & Agrifiber Products | 1 |
| | 1 | | Credit 5 | **Indoor Chemical & Pollutant Source Control** | 1 |
| 1 | | | Credit 6.1 | **Controllability of Systems**, Lighting | 1 |
| 1 | | | Credit 6.2 | **Controllability of Systems**, Thermal Comfort | 1 |
| 1 | | | Credit 7.1 | **Thermal Comfort**, Design | 1 |
| 1 | | | Credit 7.2 | **Thermal Comfort**, Verification | 1 |
| | 1 | | Credit 8.1 | **Daylight & Views**, Daylight 75% of Spaces | 1 |
| | 1 | | Credit 8.2 | **Daylight & Views**, Views for 90% of Spaces | 1 |

## Innovation & Design Process — Possible Points 6

| Y | ? | N | | | |
|---|---|---|---|---|---|
| 1 | 5 | | | | |
| | 5 | | Credit 1 | **Innovation in Design** | |
| | | | | Innovation or Exemplary Performance | 1 |
| | | | | Innovation or Exemplary Performance | 1 |
| | | | | Innovation or Exemplary Performance | 1 |
| | | | | Innovation | 1 |
| | | | | Innovation | 1 |
| 1 | | | Credit 2 | **LEED™ Accredited Professional** | 1 |

## Regional Priority — Possible Points 4

| | | | | | |
|---|---|---|---|---|---|
| | 4 | | | | |
| | 4 | | Credit 1 | **Regional Priority** | |
| | | | | Regionally Defined Credit Achieved | 1 |
| | | | | Regionally Defined Credit Achieved | 1 |
| | | | | Regionally Defined Credit Achieved | 1 |
| | | | | Regionally Defined Credit Achieved | 1 |

**RESPONSIBILITY MATRIX**

| | |
|---|---|
| Credit | Unassigned |
| Credit | Owner |
| Credit | Contractor |
| Credit | Civil |
| Credit | Landscape |
| Credit | Architectural Nexus |
| Credit | Mechanical |
| Credit | Electrical |
| Credit | Commissioning Authority |

### 3.3.11 Value Engineering

The preliminary cost estimate indicated a budget over-run. Upon investigation, there was $5,700,000 in equipment shown on the construction budget. This has been adjusted from the separate equipment budget.

Originally, the square footage program was developed to include 36 wet laboratory investigators. In reviewing the proforma it was noted that the proforma should be generated to include only 30 wet laboratory investigators. The program and square footages have been adjusted to reflect 30 wet laboratory investigators.

Additional VE sessions will be held once the CM/GC has been selected as part of the team.

### 3.3.12 Building Occupancy Classification / Hazardous Materials

Huntsman Phase IV is a research Laboratory which falls under a B Occupancy classification and a Risk Category II. A complete chemical list is provided in the Appendix for the phase IV building. The building will contain fire rated vented cabinets for flammable chemicals and vented cabinets for corrosive chemicals.

**Distributed Flammable Chemicals**
Flammable Chemicals will be stored in the following methods. In the laboratory shared resources area of each laboratory module 3 (60 gallon capacity) vented flammable materials cabinets will be provided. There is a maximum of two laboratory modules per floor creating a maximum flammable material storage capacity at 360 gallons per floor. Three floors in the laboratory will contain two laboratory modules. The cabinets are 100% vented to the exterior of the building at the roof level.

**Distributed Corrosive Chemicals**
Corrosive Chemicals will be stored in the following methods. In the laboratory shared resources area of each laboratory module 2 (60 gallon capacity) vented corrosive materials cabinets will be provided. There is a maximum of two laboratory modules per floor creating a maximum corrosive material storage capacity of 240 gallons per floor. Three floors in the laboratory will contain two laboratory modules. The cabinets are 100% vented to the exterior of the building at the roof level.

**Central Storage Room for Flammable and Corrosive Chemicals**
A 300 square foot central storage room is being provided on the first floor to house flammable and corrosive materials for distribution to the laboratory modules. This room is fully vented and fire rated. All materials will be stored in Flammable and Corrosive cabinets which are 100% vented to the exterior of the building at the roof level.

## 4.1 SPACE AND AREA PROGRAM

The matrix below outlines the total facility net square feet (NSF) and designated gross square feet (DGSF) per level in the The Primary Children's & Families' Cancer Research Center at Huntsman Cancer Institute facility. There are two separate options as noted.

### Option 1

| Space Summary | | Phase IV New Construction | | | Renovation of Phase I | | | |
|---|---|---|---|---|---|---|---|---|
| No. | Unit | NSF | Factor | DGSF | NSF | Factor | DGSF | Comments |
| 1 | Level A | 29,766 | 1.20 | 35,720 | 3,632 | 1.10 | 4,000 | |
| 2 | Level 01 | 24,288 | 1.22 | 29,630 | 1,592 | 1.25 | 1,990 | |
| 3 | Level 02 | 25,735 | 1.18 | 30,370 | 5,285 | 1.20 | 6,340 | |
| 4 | Level 03 | 26,751 | 1.18 | 31,570 | 600 | 1.10 | 660 | |
| 5 | Level 04 | 26,691 | 1.18 | 31,500 | - | 1.20 | - | |
| 6 | Level 05 | 26,507 | 1.15 | 30,480 | - | 1.20 | - | |
| 7 | Level 06 | 27,806 | 1.10 | 30,590 | 600 | 1.10 | 660 | |
| | | NSF | | DGSF | NSF | | DGSF | |
| | **Totals** | **187,544** | | **219,860** | **11,709** | | **13,650** | |
| | **Circulation (main Corridors only)** | | 2% | **4,397** | | 2% | **273** | |
| | | | | | | | | |
| | **Building Gross Area** | | | **224,257** | | | **13,923** | |
| | | | | 1.20 | | | 1.19 | |

# 4 Space Program

## Space & Area Program - Option 1

| Level A | | Phase IV New Construction | | | | Renovation of Phase I | | | |
|---|---|---|---|---|---|---|---|---|---|
| No. | Description | Qty | NSF | Total | | Qty | NSF | Total | Comments |
| | **Mechanical Spaces** | | | | | | | | |
| 1 | High Temp Water Room | 1 | 800 | 800 | | | | | 2 exits from room |
| 2 | Mechanical Room (pumps, heat exchangers, plate and frame exchangers and pure water systems | 1 | 8,000 | 8,000 | | | | | Mech pumps, Heat exchangers, plate and frame exchangers and pure water systems |
| | **Electrical Spaces** | | | | | | | | |
| 1 | Main Electrical Room | 1 | 1,200 | 1,200 | | | | | 2 exits |
| 2 | Remote Electrical Panel Room | 1 | 110 | 110 | | | | | |
| | **Informatics Spaces** | | | | | | | | |
| 1 | Level A IT Room | 2 | 120 | 240 | | | | | |
| | | | | | | | | | |
| | | 1 | 110 | 110 | | | | | |
| | **Subtotal** | | | **10,460** | | | | | |
| | **Dock Spaces (Interior)** | | | | | | | | |
| 1 | Exterior upper dock and ramp | 1 | 800 | 800 | | | | | |
| 2 | Dock Office | 1 | 130 | 130 | | | | | |
| 3 | Mail Room | 1 | 64 | 64 | | | | | |
| 4 | Receiving area | 1 | 1,300 | 1,300 | | | | | |
| 5 | Cryo Storage (Freezer Room) | 1 | 800 | 800 | | | | | |
| 6 | Stock Room | 1 | 600 | 600 | | | | | |
| 7 | Furniture Storage | 0 | 600 | 600 | | | | | |
| 8 | Delivery cart storage space | 1 | 100 | 100 | | | | | |
| 9 | Toilet Room | 1 | 56 | 56 | | | | | |
| 10 | Secure mechanics work area, tool storage | 1 | 700 | 700 | | | | | |
| 11 | Gas Cylinder Storage Out Going | 1 | 120 | 120 | | | | | |
| 13 | Hazardous Material Storage | 1 | 200 | 200 | | | | | |
| 12 | Gas Cylinder Room | 1 | 200 | 200 | | | | | |

| Level A | | Phase IV New Construction | | | Renovation of Phase I | | | |
|---|---|---|---|---|---|---|---|---|
| **No.** | **Description** | **Qty** | **NSF** | **Total** | **Qty** | **NSF** | **Total** | **Comments** |
| 13 | Equipment Area | 1 | 400 | 400 | | | | |
| 14 | Rebuild Cooling Towers PH 1 | | | | 2 | 816 | 1632 | Built at east side of dock |
| | **Subtotal** | | | **6,070** | | | | |
| | **Dock Spaces (Exterior)** | | | | | | | |
| 1 | Truck Area | | | - | | | | 6000 SF exterior space |
| 2 | Generator Space | | | - | | | | 400 SF (Possible 2000KW Generator) Exterior space |
| | **Vivarium Spaces** | | | | | | | |
| 1 | Vivarium Zebra Fish holding and injection area | 1 | 1,540 | 1,540 | | | | |
| 2 | Zebra Fish Procedure Rooms | 2 | 120 | 240 | | | | |
| 3 | Zebra Fish Equipment Room | 1 | 410 | 410 | | | | |
| 4 | Zebra Fish Kitchen | 1 | 320 | 320 | | | | |
| 5 | Zebra Fish Storage | 1 | 170 | 170 | | | | |
| 6 | Imaging MRI | 1 | 400 | 400 | | | | |
| 7 | Imaging MRI Observation Console | 1 | 100 | 100 | | | | |
| 8 | Imagining MRI Equipment Room | 1 | 150 | 150 | | | | |
| 9 | Imaging MRI Prep | 1 | 150 | 150 | | | | |
| 10 | Imaging Micro CT | 1 | 120 | 120 | | | | |
| 11 | Imaging Imcro Spec | 1 | 120 | 120 | | | | |
| 12 | Imaging Intravital Microscopy | 1 | 200 | 200 | | | | |
| 13 | Imaging Ultrasound | 1 | 120 | 120 | | | | |
| 14 | Imaging Computer Room | 1 | 200 | 200 | | | | |
| 15 | Imaging PET | 1 | 330 | 330 | | | | |
| 16 | Imaging Hot Holding | 1 | 70 | 70 | | | | |
| 17 | Imaging Hot Procedure | 1 | 120 | 120 | | | | |
| 18 | Imaging General Lab | 1 | 500 | 500 | | | | |

# 4 Space Program

## Space & Area Program - Option 1

| Level A | | Phase IV New Construction | | | Renovation of Phase I | | | |
|---|---|---|---|---|---|---|---|---|
| No. | Description | Qty | NSF | Total | Qty | NSF | Total | Comments |
| 19 | Imaging Office | 1 | 120 | 120 | | | | |
| 20 | Imaging Mice Holding | 3 | 150 | 450 | | | | |
| 21 | Imaging Internal Circulation | 1 | 600 | 600 | | | | |
| 22 | Imaging Gas Cylinder Closet | 1 | 50 | 50 | | | | |
| 23 | Break Room | 1 | 320 | 320 | | | | |
| 24 | House Keeping | 1 | 80 | 80 | | | | |
| 25 | Toilet Rooms/Locker Room | 2 | 189 | 378 | | | | Male and Female includes lockers and one shower each |
| 26 | Vivarium Tunnel Connection | | | | 1 | 2,000 | 2,000 | Connecting tunnel for Phase 1 Vivarium |
| 27 | Imaging Gas Cylinder Circulation | 1 | 50 | 50 | | | | |
| | **Subtotal** | | | **7,308** | | | | |
| | **Cyclotron Space** | | | | | | | |
| 1 | Cyclotron Room | 1 | 820 | 820 | | | | |
| 2 | Hot Cell / Lab Room | 1 | 560 | 560 | | | | |
| 3 | Clean Room Ante Room | 1 | 80 | 80 | | | | |
| 4 | Clean Room | 1 | 190 | 190 | | | | |
| 5 | Shipping Room | 1 | 240 | 240 | | | | |
| 6 | Ante Room to Cell Lab and Clean Room | 1 | 80 | 80 | | | | |
| 7 | Lab | 1 | 200 | 200 | | | | |
| 8 | Tank Room | 1 | 150 | 150 | | | | |
| 9 | Electronics Room | 1 | 290 | 290 | | | | |
| 10 | QC Lab | 2 | 330 | 660 | | | | |
| 11 | Clean Storage | 1 | 260 | 260 | | | | |
| 12 | Entry Area to Unit | 1 | 150 | 150 | | | | |
| 13 | Offices | 1 | 140 | 140 | | | | |
| 14 | Toilet Room | 2 | 80 | 160 | | | | |
| 15 | House Keeping | 1 | 60 | 60 | | | | |

| Level A | | Phase IV New Construction | | | Renovation of Phase I | | | |
|---|---|---|---|---|---|---|---|---|
| **No.** | **Description** | **Qty** | **NSF** | **Total** | **Qty** | **NSF** | **Total** | **Comments** |
| 16 | Radioactive Decay Storage Room | 1 | 80 | 80 | | | | Vented to roof |
| | **Subtotal** | | | **4,120** | | | | |
| | **Common Spaces** | | | | | | | |
| 1 | Passenger Elevators | 4 | 80 | 320 | | | | Full Height |
| 2 | Freight Elevators | 2 | 120 | 240 | | | | One full height and one to level four |
| 3 | Stair Towers | 4 | 312 | 1,248 | | | | Two full height and two to level four |
| | **Subtotal** | | | **1,808** | | | | |
| | | | | | | | | |
| | **SUBTOTAL LEVEL 'A'** | | | **29,766** | | | **3,632** | |
| | | | | | | | | |
| | **Sub Total Net SF (NSF)** | | | **29,766** | | | **3,632** | **33,398** |
| | **Net to Gross Ratio** | | | **1.20** | | | **1.10** | **1.23** |
| | **Department Gross SF (DGSF)** | | | **35,720** | | | **4,000** | **40,860** |

# 4 Space Program

## Space & Area Program - Option 1

| Level 1 | | Phase IV New Construction | | | Renovation of Phase I | | | |
|---|---|---|---|---|---|---|---|---|
| **No.** | **Description** | **Qty** | **NSF** | **Total** | **Qty** | **NSF** | **Total** | **Comments** |
| | **Lab Support Space** | | | | | | | |
| 1 | Glass Washing | 1 | 1600 | 1,600 | | | | Central Glass Wash for Phase IV |
| 2 | General Storage | 1 | 500 | 500 | | | | General laboratory supplies |
| 3 | Micro Array | 1 | 440 | 440 | | | | |
| 4 | Chemical Storage | 1 | 300 | 300 | | | | Central for Phase IV, vented flammable cabinets and corrosive storage cabinets |
| | **Subtotal** | | | **2,840** | | | | |
| | **Coffee Shop/Grab and Go Station** | | | | | | | |
| 1 | Backbar Counter Area/Cashier Stand | 1 | 270 | 270 | | | | Secured in off hours |
| 2 | Workroom | 1 | 180 | 180 | | | | |
| 3 | Storage Room | 1 | 380 | 380 | | | | |
| 4 | Office | 1 | 120 | 120 | | | | |
| 5 | Interior Seating Area | 60 | 20 | 1,200 | | | | Seating for up to sixty |
| 6 | Grab and Go Cases | 1 | 100 | 100 | | | | Secured in off hours |
| | **Subtotal** | | | **2,250** | | | | |
| | **Mechanical Spaces** | | | | | | | |
| 1 | Return Air Shafts | 1 | 32 | 32 | | | | |
| 2 | Supply Air Shafts | 2 | 56 | 112 | | | | |
| 3 | Exhaust Air Shafts | 2 | 32 | 63 | | | | |
| 4 | Pipe Chases | 1 | 240 | 240 | | | | |
| | **Subtotal** | | | **447** | | | | |
| | **Electrical Spaces** | | | | | | | |
| 1 | Electrical Room | 2 | 90 | 180 | | | | |
| | **Informatics Spaces** | | | | | | | |
| 1 | Support IT Room | 1 | 1000 | 1,000 | | | | |
| 2 | Central Server Room | 1 | 1000 | 1,000 | | | | |
| 3 | Communications Rooms | 2 | 120 | 240 | | | | |
| 4 | Office | 1 | 120 | 120 | | | | IT Support Manager Office |

| Level 1 | | Phase IV New Construction | | | Renovation of Phase I | | | |
|---|---|---|---|---|---|---|---|---|
| **No.** | **Description** | **Qty** | **NSF** | **Total** | **Qty** | **NSF** | **Total** | **Comments** |
| 6 | Shared Office | 1 | 160 | 160 | | | | Support Shared Office 2 Engineers |
| 7 | Cubicles | 2 | 64 | 128 | | | | Customer Technicians Cubicles |
| | | | | | 6 | 120 | 720 | IT Existing Offices |
| | | | | | 8 | 64 | 512 | IT Existing Cubicles |
| | | | | | 1 | 160 | 160 | IT Existing Shared Office |
| | | | | | 1 | 200 | 200 | IT Tech and equipment receiving existing |
| | **Subtotal** | | | **2,828** | | | | |
| | **Common Spaces** | | | | | | | |
| 1 | Lobby Space | 1 | 2000 | 2,000 | | | | |
| 2 | Auditorium | 1 | 2085 | 2,085 | | | | Seats 110 |
| 3 | House Keeping Wet | 2 | 80 | 160 | | | | |
| 4 | House Keeping Dry | 1 | 200 | 200 | | | | |
| 5 | Fire Command Room | 1 | 200 | 200 | | | | High Rise Fire Command Room |
| 6 | Security Reception Desk | 1 | 150 | 150 | | | | |
| 7 | Bike Storage | 1 | 790 | 790 | | | | Secured room with storage for 90 bikes |
| 8 | Locker/toilet/shower rooms for employees | 2 | 577 | 1,154 | | | | Central employee use |
| 9 | Workout room | 1 | 1000 | 1,000 | | | | Workout equipment for room adjacent to locker and shower rooms |
| 10 | Breakroom | 1 | 320 | 320 | | | | |
| 11 | Toilet Rooms | 2 | 232 | 464 | | | | |
| 12 | Passenger Elevators | 4 | 80 | 320 | | | | |
| 13 | Freight Elevators | 2 | 120 | 240 | | | | |
| 14 | Stair Towers | 4 | 312 | 1,248 | | | | |
| 15 | Vestibule entry | 2 | 120 | 240 | | | | |
| | **Subtotal** | | | **10,571** | | | | |

# 4 Space Program

Space & Area Program - Option 1

| Level 1 | | Phase IV New Construction | | | Renovation of Phase I | | | |
|---|---|---|---|---|---|---|---|---|
| No. | Description | Qty | NSF | Total | Qty | NSF | Total | Comments |
| | **Dry Lab/Office Space** | | | | | | | |
| | Closed Offices | 17 | 120 | 2,040 | | | | Unassigned at this time |
| | Open Office Space Cubicles | 37 | 64 | 2,368 | | | | Unassigned at this time |
| | Storage Work room space | 1 | 944 | 944 | | | | General office supplies and records |
| | **Subtotal** | | | **5,352** | | | | |
| | | | | | | | | |
| | **SUBTOTAL LEVEL '1'** | | | **24,288** | | | **1,592** | |
| | | | | | | | | |
| | **Sub Total Net SF (NSF)** | | | **24,288** | | | **1,592** | **25,880** |
| | **Net to Gross Ratio** | | | **1.22** | | | **1.25** | **1.24** |
| | **Department Gross SF (DGSF)** | | | **29,630** | | | **1,990** | **31,960** |

| Level 2 | | Phase IV New Construction | | | Renovation of Phase I | | | |
|---|---|---|---|---|---|---|---|---|
| No. | Description | Qty | NSF | Total | Qty | NSF | Total | Comments |
| | **Office Space** | | | | | | | |
| 1 | Return Air Shafts | 1 | 103 | 103 | | | | |
| 2 | Supply Air Shafts | 1 | 175 | 175 | | | | |
| 3 | Exhaust Air Shafts | 1 | 103 | 103 | | | | |
| 4 | Pipe Chases | 2 | 60 | 120 | | | | |
| | **Subtotal** | | | **501** | | | | |
| | **Electrical Spaces** | | | | | | | |
| 1 | Electrical Panel Room | 2 | 90 | 180 | | | | |
| | **Informatics Spaces** | | | | | | | |
| 1 | Communications Rooms | 2 | 120 | 240 | | | | |
| | **Subtotal** | | | **420** | | | | |
| | **Laboratory Spaces** | | | | | | | |
| 1 | Investigators Offices | 10 | 140 | 1,400 | | | | |
| 2 | Staff Offices | 4 | 120 | 480 | | | | Additional offices, possible lab manager spaces |
| 3 | Open Office | 2 | 1531 | 3,062 | | | | Write up desks, open cubicles |
| 4 | Research Laboratory | 10 | 650 | 6,500 | | | | |
| 5 | Laboratory Entry area | 2 | 110 | 220 | | | | Cubicle/lockers for lab techs |
| 6 | Laboratory Support | 10 | 620 | 6,200 | | | | |
| | **Subtotal** | | | **17,862** | | | | |
| | **Common Spaces** | | | | | | | |
| 1 | Large Conference room | 1 | 800 | 800 | | | | Up to 30 Occupants |
| 2 | Small multi Conference Room | 2 | 600 | 600 | | | | 16-24 Occupants |
| 3 | Small Conference Rooms | 2 | 280 | 560 | | | | 8-12 Occupants |
| 4 | Toilet Rooms | 2 | 232 | 464 | | | | |
| 5 | House Keeping | 2 | 80 | 160 | | | | |
| 6 | Breakrooms | 2 | 280 | 560 | | | | |
| 7 | Passenger Elevators | 4 | 80 | 320 | | | | |
| 8 | Freight Elevators | 2 | 120 | 240 | | | | |
| 9 | Stair Tower | 4 | 312 | 1,248 | | | | |

# 4 Space Program

## Space & Area Program - Option 1

| Level 2 | | Phase IV New Construction | | | Renovation of Phase I | | | |
|---|---|---|---|---|---|---|---|---|
| **No.** | **Description** | **Qty** | **NSF** | **Total** | **Qty** | **NSF** | **Total** | **Comments** |
| 10 | Common Public Space | 1 | 2000 | 2,000 | | | | |
| | **Subtotal** | | | **6,952** | | | | |
| | **Phase I Clinic Remodel** | | | | | | Remodel in Point of Phase 1 Office to Clinic, not in Phase IV Budget | |
| 1 | Waiting | | | | 20 | 20 | 400 | 20 seats in waiting room |
| 2 | Reception | | | | 1 | 280 | 280 | remodeled space |
| 3 | Treatment Rooms | | | | 2 | 196 | 392 | remodeled space |
| 4 | Exam Rooms | | | | 11 | 170 | 1,870 | remodeled space |
| 5 | Soiled | | | | 1 | 110 | 110 | remodeled space |
| 6 | Clean | | | | 1 | 145 | 145 | remodeled space |
| 7 | Vitals | | | | 1 | 60 | 60 | remodeled space |
| 8 | Patient Toilets | | | | 3 | 60 | 180 | remodeled space |
| 9 | House Keeping | | | | 1 | 42 | 42 | remodeled space |
| 10 | Work Stations | | | | 4 | 24 | 96 | remodeled space |
| 11 | Staff Workroom | | | | 1 | 880 | 880 | Existing Space, no remodel |
| 12 | MD Workroom | | | | 1 | 600 | 600 | Existing Space, no remodel |
| 13 | Small Conference Room | | | | 1 | 230 | 230 | 8 to 10 occupants. Existing Space, no remodel |
| | **Subtotal** | | | | | | | |
| | **SUBTOTAL LEVEL '2'** | | | **25,735** | | | **5,285** | |
| | **Sub Total Net SF (NSF)** | | | **25,735** | | | **5,285** | |
| | **Net to Gross Ratio** | | | **1.18** | | | **1.20** | **-** |
| | **Department Gross SF (DGSF)** | | | **30,370** | | | **6,340** | **-** |

| Level 3 | | Phase IV New Construction | | | Renovation of Phase I | | | |
|---|---|---|---|---|---|---|---|---|
| **No.** | **Description** | **Qty** | **NSF** | **Total** | **Qty** | **NSF** | **Total** | **Comments** |
| | **Mechanical Spaces** | | | | | | | |
| 1 | Return Air Shafts | 1 | 142 | 142 | | | | |
| 2 | Supply Air Shafts | 1 | 233 | 233 | | | | |
| 3 | Exhaust Air Shafts | 1 | 142 | 142 | | | | |
| 4 | Pipe Chases | 2 | 60 | 120 | | | | |
| | **Subtotal** | | | **637** | | | | |
| | **Electrical Spaces** | | | | | | | |
| 1 | Electrical Panel Room | 2 | 90 | 180 | | | | |
| | **Informatics Spaces** | | | | | | | |
| 1 | Communications Rooms | 2 | 120 | 240 | | | | |
| | **Subtotal** | | | **420** | | | | |
| | **Laboratory Spaces** | | | | | | | |
| 1 | Investigators Offices | 10 | 140 | 1,400 | | | | |
| 2 | Staff Offices | 4 | 120 | 480 | | | | Additional offices, possible lab manager spaces and associated dry lab workers working with lab groups |
| 3 | Open Office | 2 | 1531 | 3,062 | | | | Write up desks, open cubicles |
| 4 | Research Laboratory | 10 | 650 | 6,500 | | | | |
| 5 | Laboratory Entry area | 2 | 110 | 220 | | | | Cubicle/lockers for lab techs |
| 6 | Laboratory Support | 10 | 620 | 6,200 | | | | |
| | **Subtotal** | | | **17,862** | | | | |
| | **Common Spaces** | | | | | | | |
| 1 | Large Conference room | 1 | 800 | 800 | | | | Up to 30 Occupants |
| 2 | Small multi Conference Room | 2 | 600 | 1,200 | | | | 16-24 Occupants |
| 3 | Small Conference Rooms | 2 | 280 | 560 | | | | 8-12 Occupants |
| 4 | Toilet Rooms | 2 | 232 | 464 | | | | |
| 5 | House Keeping | 2 | 80 | 160 | | | | |

# 4 Space Program

Space & Area Program - Option 1

| Level 3 | | Phase IV New Construction | | | Renovation of Phase I | | | |
|---|---|---|---|---|---|---|---|---|
| **No.** | **Description** | **Qty** | **NSF** | **Total** | **Qty** | **NSF** | **Total** | **Comments** |
| 6 | Dry Storage House Keeping | 1 | 200 | 200 | | | | |
| 7 | Breakrooms | 2 | 320 | 640 | | | | |
| 8 | Passenger Elevators | 4 | 80 | 320 | | | | |
| 9 | Freight Elevators | 2 | 120 | 240 | | | | |
| 10 | Stair Towers | 4 | 312 | 1,248 | | | | |
| 11 | Common Public Space | 1 | 2000 | 2,000 | | | | |
| 12 | Bridge Connection | 0 | 0 | - | 1 | 600 | 600 | |
| | **Subtotal** | | | **7,832** | | | **600** | |
| | | | | | | | | |
| | **SUBTOTAL LEVEL '3'** | | | **26,751** | | | **600** | |
| | | | | | | | | |
| | **Sub Total Net SF (NSF)** | | | **26,751** | | | **600** | **-** |
| | **Net to Gross Ratio** | | | **1.18** | | | **1.10** | |
| | **Department Gross SF (DGSF)** | | | **31,570** | | | **660** | **-** |

| Level 4 | | Phase IV New Construction | | | Renovation of Phase I | | | |
|---|---|---|---|---|---|---|---|---|
| **No.** | **Description** | **Qty** | **NSF** | **Total** | **Qty** | **NSF** | **Total** | **Comments** |
| | **Mechanical Spaces** | | | | | | | |
| 1 | Return Air Shafts | 1 | 181 | 181 | | | | |
| 2 | Supply Air Shafts | 1 | 295 | 295 | | | | |
| 3 | Exhaust Air Shafts | 1 | 181 | 181 | | | | |
| 4 | Pipe Chases | 2 | 60 | 120 | | | | |
| | **Subtotal** | | | **777** | | | | |
| | **Electrical Spaces** | | | | | | | |
| 1 | Electrical Panel Room | 2 | 90 | 180 | | | | |
| | **Informatics Spaces** | | | | | | | |
| 1 | Communications Rooms | 2 | 120 | 240 | | | | |
| | **Subtotal** | | | **420** | | | | |
| | **Laboratory Spaces** | | | | | | | |
| 1 | Investigators Offices | 10 | 140 | 1,400 | | | | |
| 2 | Staff Offices | 4 | 120 | 480 | | | | Additional offices, possible lab manager spaces, use for investigators working with the lab investigators |
| 3 | Open Office | 2 | 1531 | 3,062 | | | | Write up desks, open cubicles |
| 4 | Research Laboratory | 10 | 650 | 6,500 | | | | |
| 5 | Laboratory Entry area | 2 | 110 | 220 | | | | Cubicle/lockers for lab techs |
| 6 | Laboratory Support | 10 | 620 | 6,200 | | | | |
| | **Subtotal** | | | **17,862** | | | | |
| | **Common Spaces** | | | | | | | |
| 1 | Large Conference room | 1 | 800 | 800 | | | | Up to 30 Occupants |
| 2 | Small multi Conference Room | 2 | 600 | 1,200 | | | | 16-24 Occupants |
| 3 | Small Conference Rooms | 2 | 280 | 560 | | | | 8-12 Occupants |
| 4 | Toilet Rooms | 2 | 232 | 464 | | | | |
| 5 | House Keeping | 2 | 80 | 160 | | | | |

# 4 Space Program

Space & Area Program - Option 1

| Level 4 | | Phase IV New Construction | | | Renovation of Phase I | | | |
|---|---|---|---|---|---|---|---|---|
| No. | Description | Qty | NSF | Total | Qty | NSF | Total | Comments |
| 6 | Breakrooms | 2 | 320 | 640 | | | | |
| 7 | Passenger Elevators | 4 | 80 | 320 | | | | |
| 8 | Freight Elevators | 2 | 120 | 240 | | | | |
| 9 | Stair Towers | 4 | 312 | 1,248 | | | | |
| 10 | Common Public Space | 1 | 2000 | 2,000 | | | | |
| | **Subtotal** | | | **7,632** | | | | |
| | | | | | | | | |
| | **SUBTOTAL LEVEL '4'** | | | **26,691** | | | **-** | |
| | | | | | | | | |
| | **Sub Total Net SF (NSF)** | | | **26,691** | | | **-** | **26,691** |
| | **Net to Gross Ratio** | | | **1.18** | | | **1.20** | **1.19** |
| | **Department Gross SF (DGSF)** | | | **31,500** | | | **-** | **31,760** |

| Level 5 | | Phase IV New Construction | | | Renovation of Phase I | | | |
|---|---|---|---|---|---|---|---|---|
| **No.** | **Description** | **Qty** | **NSF** | **Total** | **Qty** | **NSF** | **Total** | **Comments** |
| | **Mechanical Spaces** | | | | | | | |
| 1 | Return Air Shafts | 1 | 258 | 258 | | | | |
| 2 | Supply Air Shafts | 1 | 415 | 415 | | | | |
| 3 | Exhaust Air Shafts | 1 | 258 | 258 | | | | |
| 4 | Pipe Chases | 2 | 60 | 120 | | | | |
| | **Subtotal** | | | **1,051** | | | | |
| | **Electrical Spaces** | | | | | | | |
| 1 | Electrical Panel Room | 2 | 100 | 200 | | | | |
| | **Informatics Spaces** | | | | | | | |
| 1 | Communications Room | 2 | 120 | 240 | | | | |
| | **Subtotal** | | | **440** | | | | |
| | **Dry Lab/Office Areas** | | | | | | | |
| 1 | Closed Offices | 58 | 120 | 6,960 | | | | |
| 2 | Open Offices | 172 | 64 | 11,008 | | | | |
| 3 | Storage Area | 4 | 200 | 800 | | | | |
| | **Subtotal** | | | **18,768** | | | | |
| | **Common Spaces** | | | | | | | |
| 1 | Large Conference Room | 1 | 800 | 800 | | | | |
| 2 | Small Multi Conference Room | 2 | 600 | 1,200 | | | | |
| 3 | Small Conference Rooms | 2 | 280 | 560 | | | | |
| 4 | Toilet Rooms | 2 | 196 | 392 | | | | |
| 5 | House Keeping | 1 | 80 | 80 | | | | |
| 6 | Break Rooms | 2 | 320 | 640 | | | | |
| 7 | Passenger Elevators | 4 | 80 | 320 | | | | |
| 8 | Freight Elevator | 1 | 120 | 120 | | | | |
| 9 | Stair Towers | 3 | 312 | 936 | | | | |
| 10 | Common Public Space | 1 | 1200 | 1,200 | | | | |
| | **Subtotal** | | | **6,248** | | | | |
| | **SUBTOTAL LEVEL '5'** | | | **26,507** | | | | |
| | **Sub Total Net SF (NSF)** | | | 26,507 | | | | **26,507** |
| | **Net to Gross Ratio** | | | **1.15** | | | | **1.15** |
| | **Department Gross SF (DGSF)** | | | **30,480** | | | **-** | **30,480** |

# 4 Space Program

## Space & Area Program - Option 1

| Level 6 | | Phase IV New Construction | | | Renovation of Phase I | | | |
|---|---|---|---|---|---|---|---|---|
| **No.** | **Description** | **Qty** | **NSF** | **Total** | **Qty** | **NSF** | **Total** | **Comments** |
| | **Mechanical Spaces** | | | | | | | |
| 1 | Air handling Penthouse | 1 | 20684 | 20,684 | | | | Supply & Exhaust Air |
| 2 | Return Air shafts | 1 | 0 | - | | | | |
| 3 | Supply Air Shafts | 1 | 0 | - | | | | |
| 4 | Exhaust Air Shafts | 1 | 0 | - | | | | |
| | **Subtotal** | | | **20,684** | | | | |
| | **Electrical Spaces** | | | | | | | |
| 1 | Electrical Panel Room | 1 | 100 | 100 | | | | Electrical Panel Room |
| | **Informatics Spaces** | | | | | | | |
| 2 | Communications Room | 1 | 120 | 120 | | | | Stacked |
| | **Subtotal** | | | **220** | | | | |
| | **Office Areas** | | | | | | | |
| 1 | Closed Offices | 16 | 120 | 1,920 | | | | |
| 2 | Open Office (Cubicles) | 40 | 64 | 2,560 | | | | |
| | **Subtotal** | | | **4,480** | | | | |
| | **Common Spaces** | | | | | | | Stairs in Net to Gross |
| 1 | Conference Room Small | 1 | 300 | 300 | | | | 8 to 12 Occupants |
| 2 | Toilet Rooms | 2 | 173 | 346 | | | | Male / Female Rooms |
| 3 | House Keeping Room | 1 | 80 | 80 | | | | |
| 4 | Break Room | 1 | 320 | 320 | | | | |
| 5 | Passenger elevators | 4 | 80 | 320 | | | | Connects all levels |
| 6 | Freight Elevators | 1 | 120 | 120 | | | | Connects all levels |
| 7 | Stair Towers | 3 | 312 | 936 | | | | Connects all levels |
| 8 | Bridge Connection | | | - | 1 | 600 | 600 | Bridge Connection to phase 1 |
| | **Subtotal** | | | **2,422** | | | | |
| | | | | | | | | |
| | **SUBTOTAL LEVEL '6'** | | | **27,806** | | | **600** | |
| | | | | | | | | |
| | **Sub Total Net SF (NSF)** | | | **27,806** | | | **600** | **28,406** |
| | **Net to Gross Ratio** | | | **1.10** | | | **1.10** | **1.10** |
| | **Department Gross SF (DGSF)** | | | **30,590** | | | **660** | **31,250** |

### Space Summary Option 2

| Space Summary | | Phase IV New Construction | | | Renovation of Phase I | | | |
|---|---|---|---|---|---|---|---|---|
| No. | Unit | NSF | Factor | DGSF | NSF | Factor | DGSF | Comments |
| 1 | Level A | 29,146 | 1.20 | 34,980 | 3,632 | 1.10 | 4,000 | |
| 2 | Level 01 | 23,090 | 1.22 | 28,170 | 5,592 | 1.25 | 6,990 | |
| 3 | Level 02 | 29,799 | 1.18 | 35,160 | 5,285 | 1.20 | 6,340 | |
| 4 | Level 03 | 30,735 | 1.18 | 36,270 | 600 | 1.10 | 660 | |
| 5 | Level 04 | 24,604 | 1.18 | 29,030 | - | 1.20 | - | |
| 6 | Level 05 | 26,015 | 1.12 | 29,140 | - | 1.20 | - | |
| 7 | Level 06 | 24,506 | 1.10 | 26,960 | 600 | 1.10 | 660 | |
| | | NSF | | DGSF | NSF | | DGSF | |
| | **Totals** | **187,895** | | **219,710** | **15,709** | | **18,650** | |
| | **Circulation (main Corridors only)** | | 2% | **4,394** | | 2% | **373** | |
| | | | | | | | | |
| | **Building Gross Area** | | | **224,104** | | | **19,023** | |
| | | | | 1.19 | | | 1.21 | |

# 4 Space Program

## Space & Area Program - Option 2

| Level A | | Phase IV New Construction | | | Renovation of Phase I | | | |
|---|---|---|---|---|---|---|---|---|
| **No.** | **Description** | **Qty** | **NSF** | **Total** | **Qty** | **NSF** | **Total** | **Comments** |
| | **Mechanical Spaces** | | | | | | | |
| 1 | High Temp Water Room | 1 | 800 | 800 | | | | 2 exits from room |
| 2 | Mechanical room(pumps, heat exchangers, plate and frame exchangers and pure water systems | 1 | 8,000 | 8,000 | | | | Mech pumps, Heat exchangers, plate and frame exchangers and pure water systems |
| | **Electrical Spaces** | | | | | | | |
| 1 | Main Electrical Room | 1 | 1,200 | 1,200 | | | | 2 exits |
| 2 | Remote electrical panel room | 1 | 110 | 110 | | | | |
| | **Informatics Spaces** | | | | | | | |
| 1 | Level A IT Room | 2 | 120 | 240 | | | | |
| | | 1 | 110 | 110 | | | | |
| | **Subtotal** | | | **10,460** | | | | |
| | **Doc Spaces (Interior)** | | | | | | | |
| 1 | Exterior upper dock and ramp | 1 | 800 | 800 | | | | |
| 2 | Dock Office | 1 | 130 | 130 | | | | |
| 3 | Mail Room | 1 | 64 | 64 | | | | |
| 4 | Receiving area | 1 | 1,300 | 1,300 | | | | |
| 5 | Cryo Storage (Freezer Room) | 1 | 800 | 800 | | | | |
| 6 | Stock Room | 1 | 600 | 600 | | | | |
| 7 | Furniture Storage | 0 | 600 | - | | | | |
| 8 | Delivery cart storage space | 1 | 100 | 100 | | | | |
| 9 | Toilet Room | 1 | 56 | 56 | | | | |
| 10 | Secure mechanics work area, tool storage | 1 | 700 | 700 | | | | |
| 11 | Gas Cylinder Storage Out Going | 1 | 120 | 120 | | | | |
| 13 | Hazardous Material Storage | 1 | 200 | 200 | | | | |
| 12 | Gas Cylinder Room | 1 | 200 | 200 | | | | |

| Level A | | Phase IV New Construction | | | Renovation of Phase I | | | |
|---|---|---|---|---|---|---|---|---|
| **No.** | **Description** | **Qty** | **NSF** | **Total** | **Qty** | **NSF** | **Total** | **Comments** |
| 13 | Equipment Area | 1 | 400 | 400 | | | | |
| 14 | Rebuild Cooling Towers PH 1 | | | | 2 | 816 | 1632 | Built at east side of dock |
| | **Subtotal** | | | **5,470** | | | | |
| | **Doc Spaces (Exterior)** | | | | | | | |
| 1 | Truck Area | | | | | | | 6000 SF exterior space |
| 2 | Generator Space | | | | | | | 400 SF (Possible 2000KW Generator) Exterior space |
| | **Vivarium Spaces** | | | | | | | |
| 1 | Vivarium Zebra Fish holding and injection area | 1 | 1,540 | 1,540 | | | | |
| 2 | Zebra Fish Procedure Rooms | 2 | 120 | 240 | | | | |
| 3 | Zebra Fish Equipment Room | 1 | 410 | 410 | | | | |
| 4 | Zebra Fish Kitchen | 1 | 320 | 320 | | | | |
| 5 | Zebra Fish Storage | 1 | 170 | 170 | | | | |
| 6 | Imaging MRI | 1 | 400 | 400 | | | | |
| 7 | Imaging MRI Observation Console | 1 | 100 | 100 | | | | |
| 8 | Imagining MRI Equipment Room | 1 | 150 | 150 | | | | |
| 9 | Imaging MRI Prep | 1 | 150 | 150 | | | | |
| 10 | Imaging Micro CT | 1 | 120 | 120 | | | | |
| 11 | Imaging Imcro Spec | 1 | 120 | 120 | | | | |
| 12 | Imaging Intravital Microscopy | 1 | 200 | 200 | | | | |
| 13 | Imaging Ultrasound | 1 | 120 | 120 | | | | |
| 14 | Imaging Computer Room | 1 | 200 | 200 | | | | |
| 15 | Imaging PET | 1 | 330 | 330 | | | | |
| 16 | Imaging Hot Holding | 1 | 70 | 70 | | | | |
| 17 | Imaging Hot Procedure | 1 | 120 | 120 | | | | |
| 18 | Imaging General Lab | 1 | 500 | 500 | | | | |

# 4 Space Program

## Space & Area Program - Option 2

| Level A | | Phase IV New Construction | | | Renovation of Phase I | | | |
|---|---|---|---|---|---|---|---|---|
| No. | Description | Qty | NSF | Total | Qty | NSF | Total | Comments |
| 19 | Imaging Office | 1 | 120 | 120 | | | | |
| 20 | Imaging Mice Holding | 3 | 150 | 450 | | | | |
| 21 | Imaging Internal Circulation | 1 | 600 | 600 | | | | |
| 22 | Imaging Gas Cylinder Closet | 1 | 50 | 50 | | | | |
| 23 | Break Room | 1 | 300 | 300 | | | | |
| 24 | House Keeping | 1 | 80 | 80 | | | | |
| 25 | Toilet Rooms/Locker Room | 2 | 189 | 378 | | | | Male and Female includes lockers and one shower each |
| 26 | Vivarium Tunnel Connection | | | | 1 | 2000 | 2,000 | Connecting tunnel for Phase 1 Vivarium |
| 27 | Imaging Gas Cylinder Circulation | 1 | 50 | 50 | | | | |
| | **Subtotal** | | | **7,288** | | | | |
| | **Cyclotron Space** | | | | | | | |
| 1 | Cyclotron Room | 1 | 820 | 820 | | | | |
| 2 | Hot Cell / Lab Room | 1 | 560 | 560 | | | | |
| 3 | Clean Room Ante Room | 1 | 80 | 80 | | | | |
| 4 | Clean Room | 1 | 190 | 190 | | | | |
| 5 | Shipping Room | 1 | 240 | 240 | | | | |
| 6 | Ante Room to Cell Lab and Clean Room | 1 | 80 | 80 | | | | |
| 7 | Lab | 1 | 200 | 200 | | | | |
| 8 | Tank Room | 1 | 150 | 150 | | | | |
| 9 | Electronics Room | 1 | 290 | 290 | | | | |
| 10 | QC Lab | 2 | 330 | 660 | | | | |
| 11 | Clean Storage | 1 | 260 | 260 | | | | |
| 12 | Entry Area to Unit | 1 | 150 | 150 | | | | |
| 13 | Offices | 1 | 140 | 140 | | | | |
| 14 | Toilet Room | 2 | 80 | 160 | | | | |
| 15 | House Keeping | 1 | 60 | 60 | | | | |
| 16 | Radioactive Decay Storage Room | 1 | 80 | 80 | | | | Vented to Roof |
| | **Subtotal** | | | **4,120** | | | | |

| Level A | | Phase IV New Construction | | | Renovation of Phase I | | | |
|---|---|---|---|---|---|---|---|---|
| **No.** | **Description** | **Qty** | **NSF** | **Total** | **Qty** | **NSF** | **Total** | **Comments** |
| | **Common Spaces** | | | | | | | |
| 1 | Passenger Elevators | 4 | 80 | 320 | | | | Full Height |
| 2 | Freight Elevators | 2 | 120 | 240 | | | | One full height and one to level four |
| 3 | Stair Towers | 4 | 312 | 1,248 | | | | Two full height and two to level four |
| | **Subtotal** | | | **4,120** | | | | |
| | **SUBTOTAL LEVEL 'A'** | | | **29,146** | | | **3,632** | |
| | **Sub Total Net SF (NSF)** | | | **29,146** | | | **3,632** | **32,778** |
| | **Net to Gross Ratio** | | | **1.20** | | | **1.10** | **1.23** |
| | **Department Gross SF (DGSF)** | | | **34,980** | | | **4,000** | **40,860** |

# 4 Space Program

## Space & Area Program - Option 2

| Level 1 | | Phase IV New Construction | | | Renovation of Phase I | | | |
|---|---|---|---|---|---|---|---|---|
| No. | Description | Qty | NSF | Total | Qty | NSF | Total | Comments |
| | **Lab Support Spaces** | | | | | | | |
| 1 | Glass Washing | 1 | 2400 | 2,400 | | | | Central Glass Wash for Phase IV |
| 2 | General Storage | 1 | 500 | 500 | | | | General laboratory supplies |
| 3 | Micro Array | 1 | 440 | 440 | | | | |
| 4 | Chemical Storage | 1 | 300 | 300 | | | | Central for Phase IV, vented flamable cabinets and corrosive storage cabinets |
| | **Subtotal** | | | **3,640** | | | | |
| | **Coffee Shop/Grab and Go Station** | | | | | | | |
| 1 | Backbar Counter Area/Cashier Stand | 1 | 270 | 270 | | | | Secured in off hours |
| 2 | Workroom | 1 | 180 | 180 | | | | |
| 3 | Storage Room | 1 | 380 | 380 | | | | |
| 4 | Office | 1 | 120 | 120 | | | | |
| 5 | Interior Seating Area | 60 | 20 | 1,200 | | | | Seating for up to sixty |
| 6 | Grab and Go Cases | 1 | 100 | 100 | | | | Secured in off hours |
| | **Subtotal** | | | **2,250** | | | | |
| | **Mechanical Spaces** | | | | | | | |
| 1 | Return Air Shafts | 1 | 32 | 32 | | | | |
| 2 | Supply Air Shafts | 2 | 56 | 112 | | | | |
| 3 | Exhaust Air Shafts | 2 | 32 | 63 | | | | |
| 4 | Pipe Chases | 1 | 240 | 240 | | | | |
| | **Subtotal** | | | **447** | | | | |
| | **Electrical Spaces** | | | | | | | |
| 1 | Electrical Room | 2 | 90 | 180 | | | | |
| | **Informatics Spaces** | | | | | | | |
| 2 | Support IT Room | 1 | 250 | 250 | | | | |
| 3 | Central Server Room | 1 | 1000 | 1,000 | | | | |
| 4 | Communications Rooms | 2 | 120 | 240 | | | | |
| 5 | Office | 1 | 120 | 120 | | | | IT Support Manager Office |

| Level 1 | | Phase IV New Construction | | | Renovation of Phase I | | | |
|---|---|---|---|---|---|---|---|---|
| **No.** | **Description** | **Qty** | **NSF** | **Total** | **Qty** | **NSF** | **Total** | **Comments** |
| 6 | Shared Office | 1 | 160 | 160 | | | | Suport Shared Office 2 Engineers |
| 7 | Cubicles | 2 | 64 | 128 | | | | Customer Technicians Cubicles |
| | | | | | 6 | 120 | 720 | IT Exisiting Offices |
| | | | | | 8 | 64 | 512 | IT Existing Cubicels |
| | | | | | 1 | 160 | 160 | IT Exisiting Shared Office |
| | | | | | 1 | 200 | 200 | IT Tech and equipment receiving existing |
| | **Subtotal** | | | **2,078** | | | | |
| | **Common Spaces** | | | | | | | |
| 1 | Lobby Space | 1 | 2000 | 2,000 | | | | |
| 2 | Auditorium | 1 | 2085 | 2,085 | | | | Seats 110 |
| 3 | Toilet Rooms | 2 | | - | | | | |
| 4 | House Keeping Wet | 2 | 80 | 160 | | | | |
| 5 | Fire Command Room | 1 | 200 | 200 | | | | |
| 6 | House Keeping Dry | 1 | 200 | 200 | | | | |
| 7 | Security Reception Desk | 1 | 150 | 150 | | | | |
| 8 | Bike Storage | 1 | 790 | 790 | | | | Secured room with storage for 90 bikes |
| 9 | Locker/toilet/shower rooms for employees | 2 | 577 | 1,154 | | | | Central employee use |
| 10 | Workout room | 1 | 1000 | 1,000 | | | | Workout equipment for room adjacent to locker and shower rooms |
| 11 | Breakroom | 1 | 320 | 320 | | | | |
| 12 | Toilet Rooms | 2 | 232 | 464 | | | | |
| 13 | Passenger Elevators | 4 | 80 | 320 | | | | |
| 14 | Freight Elevators | 2 | 120 | 240 | | | | |
| 15 | Vestibule entry | 2 | 120 | 240 | | | | |
| | **Subtotal** | | | **9,323** | | | | |

# 4 Space Program

## Space & Area Program - Option 2

| Level 1 | | Phase IV New Construction | | | Renovation of Phase I | | | |
|---|---|---|---|---|---|---|---|---|
| No. | Description | Qty | NSF | Total | Qty | NSF | Total | Comments |
| | **Office Space** | | | | | | | |
| | Closed Offices | 17 | 120 | 2,040 | | | | Unassigned at this time |
| | Open Office Space Cubicles | 37 | 64 | 2,368 | | | | Unassigned at this time |
| | Storage Work room space | 1 | 944 | 944 | | | | General office supplies and records |
| | **Subtotal** | | | **5,352** | | | | |
| | Fire Access Lane at Level 1 | | | | 1 | 4000 | 4,000 | Outside space under level two |
| | **Subtotal** | | | **5,352** | | | **5,592** | |
| | **SUBTOTAL LEVEL '1'** | | | **23,090** | | | **3,632** | |
| | **Sub Total Net SF (NSF)** | | | **23,090** | | | **5,592** | **28,682** |
| | **Net to Gross Ratio** | | | **1.22** | | | **1.25** | **1.24** |
| | **Department Gross SF (DGSF)** | | | **28,170** | | | **6,990** | **35,420** |

| Level 2 | | Phase IV New Construction | | | Renovation of Phase I | | | |
|---|---|---|---|---|---|---|---|---|
| No. | Description | Qty | NSF | Total | Qty | NSF | Total | Comments |
| | **Mechanical Spaces** | | | | | | | |
| 1 | Return Air Shafts | 1 | 103 | 103 | | | | |
| 2 | Supply Air Shafts | 1 | 175 | 175 | | | | |
| 3 | Exhaust Air Shafts | 1 | 103 | 103 | | | | |
| 4 | Pipe Chases | 2 | 60 | 120 | | | | |
| | **Subtotal** | | | **501** | | | | |
| | **Electrical Spaces** | | | | | | | |
| 1 | Electrical Panel Room | 2 | 90 | 180 | | | | |
| | **Informatics Spaces** | | | | | | | |
| 1 | Communications Rooms | 2 | 120 | 240 | | | | |
| | **Subtotal** | | | **420** | | | | |
| | **Laboratory Spaces** | | | | | | | |
| 1 | Investigators Offices | 12 | 140 | 1,680 | | | | |
| 2 | Staff Offices | 8 | 120 | 960 | | | | Additional offices, possible lab manager spaces |
| 3 | Open Office | 2 | 1838 | 3,676 | | | | Write up desks, open cubicles |
| 4 | Research Laboratory | 12 | 650 | 7,800 | | | | |
| 5 | Laboratory Entry area | 2 | 125 | 250 | | | | Cubicle/lockers for lab techs |
| 6 | Laboratory Support | 12 | 620 | 7,440 | | | | |
| | **Subtotal** | | | **21,806** | | | | |
| | **Common Spaces** | | | | | | | |
| 1 | Large Conference room | 1 | 800 | 800 | | | | Up to 30 Occupants |
| 2 | Small multi Conference Room | 2 | 600 | 600 | | | | 16-24 Occupants |
| 3 | Small Conference Rooms | 2 | 300 | 600 | | | | 8-12 Occupants |
| 4 | Toilet Rooms | 2 | 232 | 464 | | | | |
| 5 | House Keeping | 2 | 80 | 160 | | | | |
| 6 | Breakrooms | 2 | 320 | 640 | | | | |
| 7 | Passenger Elevators | 4 | 80 | 320 | | | | |
| 8 | Freight Elevators | 2 | 120 | 240 | | | | |

# 4 Space Program

## Space & Area Program - Option 2

| Level 2 | | Phase IV New Construction | | | Renovation of Phase I | | | |
|---|---|---|---|---|---|---|---|---|
| **No.** | **Description** | **Qty** | **NSF** | **Total** | **Qty** | **NSF** | **Total** | **Comments** |
| 9 | Stair Tower | 4 | 312 | 1,248 | | | | |
| 10 | Common Public Space | 1 | 2000 | 2,000 | | | | |
| | **Subtotal** | | | **7,072** | | | | |
| | **Phase 1 Clinic Remodel** | | | | Remodel in Point of Phase 1 Office to Clinic, not in Phase IV Budget | | | |
| 1 | Waiting | | | | 20 | 20 | 400 | 20 seats in waiting room |
| 2 | Reception | | | | 1 | 280 | 280 | remodeled space |
| 3 | Treatment Rooms | | | | 2 | 196 | 392 | remodeled space |
| 4 | Exam Rooms | | | | 11 | 170 | 1,870 | remodeled space |
| 5 | Soiled | | | | 1 | 110 | 110 | remodeled space |
| 6 | Clean | | | | 1 | 145 | 145 | remodeled space |
| 7 | Vitals | | | | 1 | 60 | 60 | remodeled space |
| 8 | Patient Toilets | | | | 3 | 60 | 180 | remodeled space |
| 9 | House Keeping | | | | 1 | 42 | 42 | remodeled space |
| 10 | Work Stations | | | | 4 | 24 | 96 | remodeled space |
| 11 | Staff Workroom | | | | 1 | 880 | 880 | Existing Space, no remodel |
| 12 | MD Workroom | | | | 1 | 600 | 600 | Existing Space, no remodel |
| 13 | Small Conference Room | | | | 1 | 230 | 230 | 8 to 10 occupants. Existing Space, no remodel |
| | **Subtotal** | | | | | | | |
| | **SUBTOTAL LEVEL '2'** | | | **29,799** | | | **5,285** | |
| | **Sub Total Net SF (NSF)** | | | **29,799** | | | **5,285** | |
| | **Net to Gross Ratio** | | | **1.18** | | | **1.20** | |
| | **Department Gross SF (DGSF)** | | | **35,160** | | | **6,340** | |

| Level 3 | | Phase IV New Construction | | | Renovation of Phase I | | | |
|---|---|---|---|---|---|---|---|---|
| No. | Description | Qty | NSF | Total | Qty | NSF | Total | Comments |
| | **Mechanical Spaces** | | | | | | | |
| 1 | Return Air Shafts | 1 | 142 | 142 | | | | |
| 2 | Supply Air Shafts | 1 | 233 | 233 | | | | |
| 3 | Exhaust Air Shafts | 1 | 142 | 142 | | | | |
| 4 | Pipe Chases | 2 | 60 | 120 | | | | |
| | **Subtotal** | | | **637** | | | | |
| | **Electrical Spaces** | | | | | | | |
| 1 | Electrical Panel Room | 2 | 90 | 180 | | | | |
| | **Informatics Spaces** | | | | | | | |
| 1 | Communications Rooms | 2 | 120 | 240 | | | | |
| | **Subtotal** | | | **420** | | | | |
| | **Laboratory Spaces** | | | | | | | |
| 1 | Investigators Offices | 12 | 140 | 1,680 | | | | |
| 2 | Staff Offices | 8 | 120 | 960 | | | | Additional offices, possible lab manager spaces |
| 3 | Open Office | 2 | 1838 | 3,676 | | | | Write up desks, open cubicles |
| 4 | Research Laboratory | 12 | 650 | 7,800 | | | | |
| 5 | Laboratory Entry area | 2 | 125 | 250 | | | | Cubicle/lockers for lab techs |
| 6 | Laboratory Support | 12 | 620 | 7,440 | | | | |
| | **Subtotal** | | | **21,806** | | | | |
| | **Common Spaces** | | | | | | | |
| 1 | Large Conference room | 1 | 800 | 800 | | | | Up to 30 Occupants |
| 2 | Small multi Conference Room | 2 | 600 | 1,200 | | | | 16-24 Occupants |
| 3 | Small Conference Rooms | 2 | 300 | 600 | | | | 8-12 Occupants |
| 4 | Toilet Rooms | 2 | 232 | 464 | | | | |
| 5 | House Keeping | 2 | 80 | 160 | | | | |
| 6 | Dry Storage House Keeping | 1 | 200 | 200 | | | | |
| 6 | Breakrooms | 2 | 320 | 640 | | | | |

# 4 Space Program

Space & Area Program - Option 2

| Level 3 | | Phase IV New Construction | | | Renovation of Phase I | | | |
|---|---|---|---|---|---|---|---|---|
| No. | Description | Qty | NSF | Total | Qty | NSF | Total | Comments |
| 7 | Passenger Elevators | 4 | 80 | 320 | | | | |
| 8 | Freight Elevators | 2 | 120 | 240 | | | | |
| 9 | Stair Towers | 4 | 312 | 1,248 | | | | |
| 10 | Common Public Space | 1 | 2000 | 2,000 | | | | |
| 11 | Bridge Connection | 0 | 0 | - | 1 | 600 | 600 | |
| | **Subtotal** | | | **30,735** | | | **600** | |
| | | | | | | | | |
| | **SUBTOTAL LEVEL '3'** | | | **29,799** | | | **5,285** | |
| | | | | | | | | |
| | **Sub Total Net SF (NSF)** | | | **30,735** | | | **600** | |
| | **Net to Gross Ratio** | | | **1.18** | | | **1.10** | |
| | **Department Gross SF (DGSF)** | | | **36,270** | | | **660** | |

| Level 4 | | Phase IV New Construction | | | Renovation of Phase I | | | |
|---|---|---|---|---|---|---|---|---|
| No. | Description | Qty | NSF | Total | Qty | NSF | Total | Comments |
| | **Mechanical Spaces** | | | | | | | |
| 1 | Return Air Shafts | 1 | 181 | 181 | | | | |
| 2 | Supply Air Shafts | 1 | 295 | 295 | | | | |
| 3 | Exhaust Air Shafts | 1 | 181 | 181 | | | | |
| 4 | Pipe Chases | 2 | 60 | 120 | | | | |
| | **Subtotal** | | | **777** | | | | |
| | **Electrical Spaces** | | | | | | | |
| 1 | Electrical Panel Room | 2 | 90 | 180 | | | | |
| | **Informatics Spaces** | | | | | | | |
| 1 | Communications Rooms | 2 | 120 | 240 | | | | |
| | **Subtotal** | | | **420** | | | | |
| | **Laboratory Spaces** | | | | | | | |
| 1 | Investigators Offices | 6 | 140 | 840 | | | | |
| 2 | Staff Offices | 4 | 120 | 480 | | | | Additional offices, possible lab manager spaces |
| 3 | Open Office | 1 | 1838 | 1,838 | | | | Write up desks, open cubicles |
| 4 | Research Laboratory | 6 | 650 | 3,900 | | | | |
| 5 | Laboratory Entry area | 1 | 125 | 125 | | | | Cubicle/lockers for lab techs |
| 6 | Laboratory Support | 6 | 620 | 3,720 | | | | |
| | **Subtotal** | | | **10,903** | | | | |
| | **Common Spaces** | | | | | | | |
| 1 | Dry Lab/ Closed Offices | 20 | 120 | 2,400 | | | | |
| 2 | Open Cubicles | 38 | 64 | 2,432 | | | | |
| 1 | Large Conference room | 1 | 800 | 800 | | | | Up to 30 Occupants |
| 2 | Small multi Conference Room | 2 | 600 | 1,200 | | | | 16-24 Occupants |
| 3 | Small Conference Rooms | 2 | 300 | 600 | | | | 8-12 Occupants |
| 4 | Toilet Rooms | 2 | 232 | 464 | | | | |
| 5 | House Keeping | 2 | 80 | 160 | | | | |

# 4 Space Program

Space & Area Program - Option 2

| Level 3 | | Phase IV New Construction | | | Renovation of Phase I | | | |
|---|---|---|---|---|---|---|---|---|
| **No.** | **Description** | **Qty** | **NSF** | **Total** | **Qty** | **NSF** | **Total** | **Comments** |
| 6 | Breakrooms | 2 | 320 | 640 | | | | |
| 7 | Passenger Elevators | 4 | 80 | 320 | | | | |
| 8 | Freight Elevators | 2 | 120 | 240 | | | | |
| 9 | Stair Towers | 4 | 312 | 1,248 | | | | |
| 26 | Common Public Space | 1 | 2000 | 2,000 | | | | |
| | **Subtotal** | | | **12,504** | | | | |
| | **SUBTOTAL LEVEL '4'** | | | **24,604** | | | | |
| | | | | | | | | |
| | **Sub Total Net SF (NSF)** | | | **24,604** | | | **600** | |
| | **Net to Gross Ratio** | | | **1.18** | | | **1.10** | |
| | **Department Gross SF (DGSF)** | | | **29,030** | | | **660** | |

| Level 4 | | Phase IV New Construction | | | Renovation of Phase I | | | |
|---|---|---|---|---|---|---|---|---|
| No. | Description | Qty | NSF | Total | Qty | NSF | Total | Comments |
| | **Mechanical Spaces** | | | | | | | |
| 1 | Return Air Shafts | 1 | 181 | 181 | | | | |
| 2 | Supply Air Shafts | 1 | 295 | 295 | | | | |
| 3 | Exhaust Air Shafts | 1 | 181 | 181 | | | | |
| 4 | Pipe Chases | 2 | 60 | 120 | | | | |
| | **Subtotal** | | | **777** | | | | |
| | **Electrical Spaces** | | | | | | | |
| 1 | Electrical Panel Room | 2 | 90 | 180 | | | | |
| | **Informatics Spaces** | | | | | | | |
| 1 | Communications Rooms | 2 | 120 | 240 | | | | |
| | **Subtotal** | | | **420** | | | | |
| | **Laboratory Spaces** | | | | | | | |
| 1 | Investigators Offices | 6 | 140 | 840 | | | | |
| 2 | Staff Offices | 4 | 120 | 480 | | | | Additional offices, possible lab manager spaces |
| 3 | Open Office | 1 | 1838 | 1,838 | | | | Write up desks, open cubicles |
| 4 | Research Laboratory | 6 | 650 | 3,900 | | | | |
| 5 | Laboratory Entry area | 1 | 125 | 125 | | | | Cubicle/lockers for lab techs |
| 6 | Laboratory Support | 6 | 620 | 3,720 | | | | |
| | **Subtotal** | | | **10,903** | | | | |
| | **Common Spaces** | | | | | | | |
| 1 | Dry Lab/ Closed Offices | 20 | 120 | 2,400 | | | | |
| 2 | Open Cubicles | 38 | 64 | 2,432 | | | | |
| 1 | Large Conference room | 1 | 800 | 800 | | | | Up to 30 Occupants |
| 2 | Small multi Conference Room | 2 | 600 | 1,200 | | | | 16-24 Occupants |
| 3 | Small Conference Rooms | 2 | 300 | 600 | | | | 8-12 Occupants |
| 4 | Toilet Rooms | 2 | 232 | 464 | | | | |
| 5 | House Keeping | 2 | 80 | 160 | | | | |

# 4 Space Program

Space & Area Program - Option 2

| Level 4 | | Phase IV New Construction | | | Renovation of Phase I | | | |
|---|---|---|---|---|---|---|---|---|
| No. | Description | Qty | NSF | Total | Qty | NSF | Total | Comments |
| 6 | Breakrooms | 2 | 320 | 640 | | | | |
| 7 | Passenger Elevators | 4 | 80 | 320 | | | | |
| 8 | Freight Elevators | 2 | 120 | 240 | | | | |
| 9 | Stair Towers | 4 | 312 | 1,248 | | | | |
| 26 | Common Public Space | 1 | 2000 | 2,000 | | | | |
| | **Subtotal** | | | **12,504** | | | | |
| | **SUBTOTAL LEVEL '4'** | | | **24,604** | | | **-** | |
| | | | | | | | | |
| | **Sub Total Net SF (NSF)** | | | **24,604** | | | **-** | **24,604** |
| | **Net to Gross Ratio** | | | **1.18** | | | **1.20** | **1.19** |
| | **Department Gross SF (DGSF)** | | | **29,030** | | | **-** | **29,280** |

| Level 5 | | Phase IV New Construction | | | Renovation of Phase I | | | |
|---|---|---|---|---|---|---|---|---|
| **No.** | **Description** | **Qty** | **NSF** | **Total** | **Qty** | **NSF** | **Total** | **Comments** |
| | **Mechanical Spaces** | | | | | | | |
| 1 | Mechanical Room | 1 | 4800 | 4,800 | | | | |
| 2 | Return Air Shafts | 1 | 258 | 258 | | | | |
| 3 | Supply Air Shafts | 1 | 415 | 415 | | | | |
| 4 | Exhaust Air Shafts | 1 | 258 | 258 | | | | |
| 5 | Pipe Chases | 2 | 60 | 120 | | | | |
| | **Subtotal** | | | **5,851** | | | | |
| | **Electrical Spaces** | | | | | | | |
| 1 | Electrical Panel Room | 2 | 100 | 200 | | | | |
| | **Informatics Spaces** | | | | | | | |
| 1 | Communications Room | 2 | 120 | 240 | | | | |
| | **Subtotal** | | | **440** | | | | |
| | **Office Areas** | | | | | | | |
| 1 | Closed Offices | 38 | 120 | 4,560 | | | | |
| 2 | Open Offices | 134 | 64 | 8,576 | | | | |
| 3 | Storage Area | 2 | 200 | 400 | | | | |
| | **Subtotal** | | | **13,536** | | | | |
| | **Common Spaces** | | | | | | | |
| 1 | Large Conference Room | 1 | 800 | 800 | | | | |
| 2 | Small Multi Conference Room | 1 | 600 | 600 | | | | |
| 3 | Small Conference Rooms | 1 | 300 | 300 | | | | |
| 4 | Toilet Rooms | 2 | 196 | 392 | | | | |
| 5 | House Keeping | 1 | 80 | 80 | | | | |
| 6 | Break Rooms | 2 | 320 | 640 | | | | |
| 7 | Passenger Elevators | 4 | 80 | 320 | | | | |
| 8 | Freight Elevator | 1 | 120 | 120 | | | | |
| 9 | Stair Towers | 3 | 312 | 936 | | | | |
| 10 | Common Public Space | 1 | 2000 | 2,000 | | | | |
| | **Subtotal** | | | **6,188** | | | | |

# 4 Space Program

Space & Area Program - Option 2

| Level 5 | | Phase IV New Construction | | | Renovation of Phase I | | | |
|---|---|---|---|---|---|---|---|---|
| No. | Description | Qty | NSF | Total | Qty | NSF | Total | Comments |
| | SUBTOTAL LEVEL '5' | | | 26,015 | | | | |
| | | | | | | | | |
| | Sub Total Net SF (NSF) | | | 26,015 | | | | 26,015 |
| | Net to Gross Ratio | | | 1.12 | | | | 1.15 |
| | Department Gross SF (DGSF) | | | 29,140 | | | - | 29,920 |

| Level 6 | | Phase IV New Construction | | | Renovation of Phase I | | | |
|---|---|---|---|---|---|---|---|---|
| **No.** | **Description** | **Qty** | **NSF** | **Total** | **Qty** | **NSF** | **Total** | **Comments** |
| | **Mechanical Spaces** | | | | | | | |
| 1 | Air handling Penthouse | 1 | 16884 | 16,884 | | | | Supply & Exhaust Air |
| 2 | Return Air shafts | 1 | 0 | - | | | | |
| 3 | Supply Air Shafts | 1 | 0 | - | | | | |
| 4 | Exhaust Air Shafts | 1 | 0 | - | | | | |
| | **Subtotal** | | | **16,884** | | | | |
| | **Electrical Spaces** | | | | | | | |
| 1 | Electrical Panel Room | 1 | 100 | 100 | | | | Electrical Panel Room |
| | **Informatics Spaces** | | | | | | | |
| 2 | Communications Room | 1 | 120 | 120 | | | | Stacked |
| | **Subtotal** | | | **220** | | | | |
| | **Office Areas** | | | | | | | |
| 1 | Closed Offices | 16 | 120 | 1,920 | | | | |
| 2 | Open Office (Cubicles) | 40 | 64 | 2,560 | | | | |
| | **Subtotal** | | | **4,480** | | | | |
| | **Common Spaces** | | | | | | | Stairs in Net to Gross |
| 1 | Conference Room Small | 1 | 300 | 300 | | | | 8 to 12 Occupants |
| 2 | Toilet Rooms | 2 | 173 | 346 | | | | Male / Female Rooms |
| 3 | House Keeping Room | 1 | 80 | 80 | | | | |
| 4 | Break Room | 1 | 320 | 320 | | | | |
| 5 | Passenger elevators | 4 | 80 | 320 | | | | Connects all levels |
| 6 | Freight Elevators | 1 | 120 | 120 | | | | Connects all levels |
| 7 | Stair Towers | 3 | 312 | 936 | | | | Connects all levels |
| 8 | Common Public Space | 1 | 500 | 500 | | | | |
| 9 | Bridge Connection | | | - | 1 | 600 | 600 | Bridge Connection to phase 1 |
| | **Subtotal** | | | **2,922** | | | | |
| | | | | | | | | |
| | **SUBTOTAL LEVEL '6'** | | | **24,506** | | | **600** | |
| | | | | | | | | |
| | **Sub Total Net SF (NSF)** | | | **24,506** | | | **600** | **25,106** |
| | **Net to Gross Ratio** | | | **1.10** | | | **1.10** | **1.10** |
| | **Department Gross SF (DGSF)** | | | **26,960** | | | **660** | **27,620** |

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## 4.2 BUILDING ORGANIZATION / ADJACENCIES AND RELATIONSHIPS DIAGRAMS

The following space diagrams and sections illustrate several key relationships that are important to the programmatic needs of the users of the facility.

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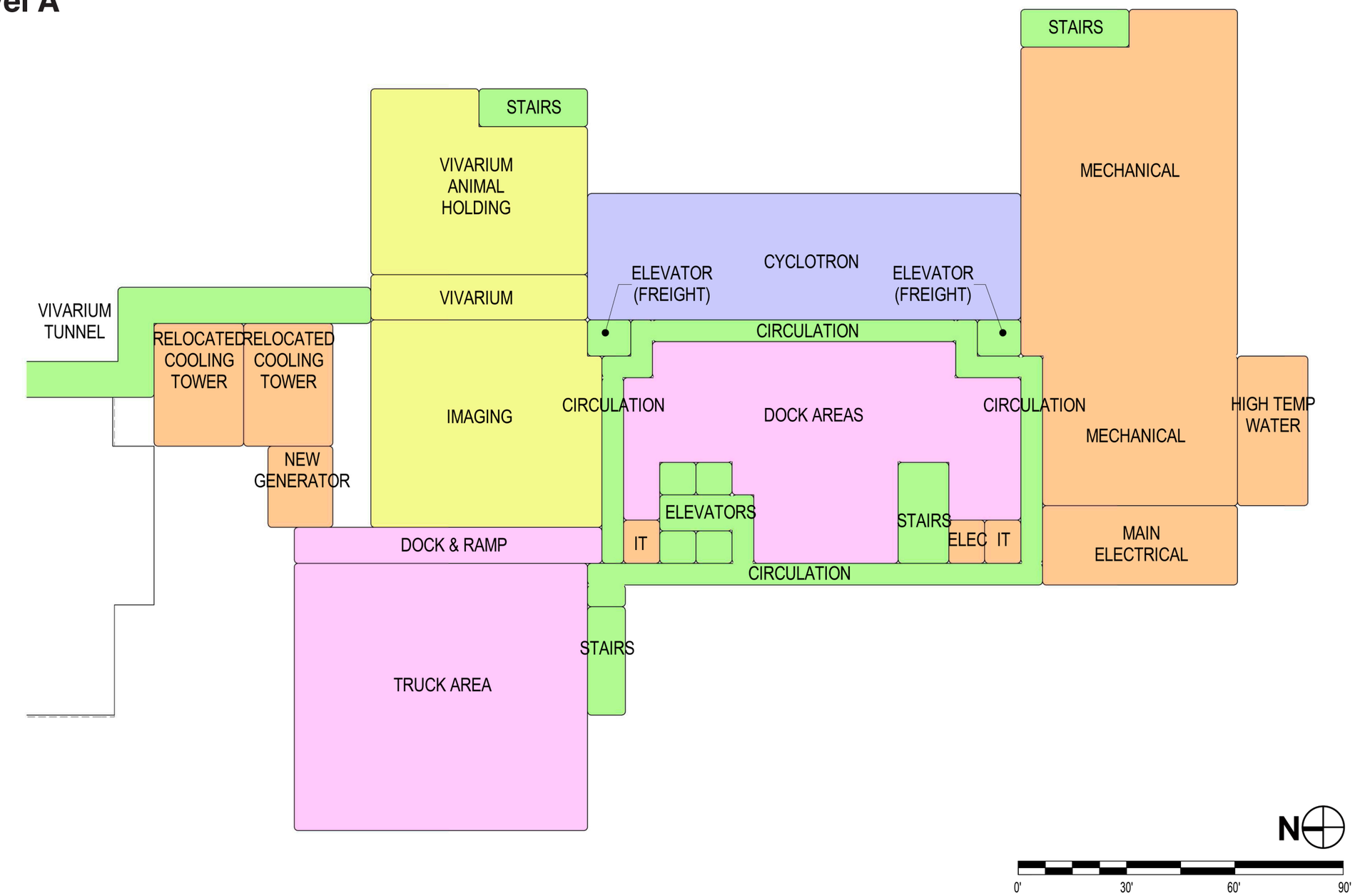
## Option 01 - Level A



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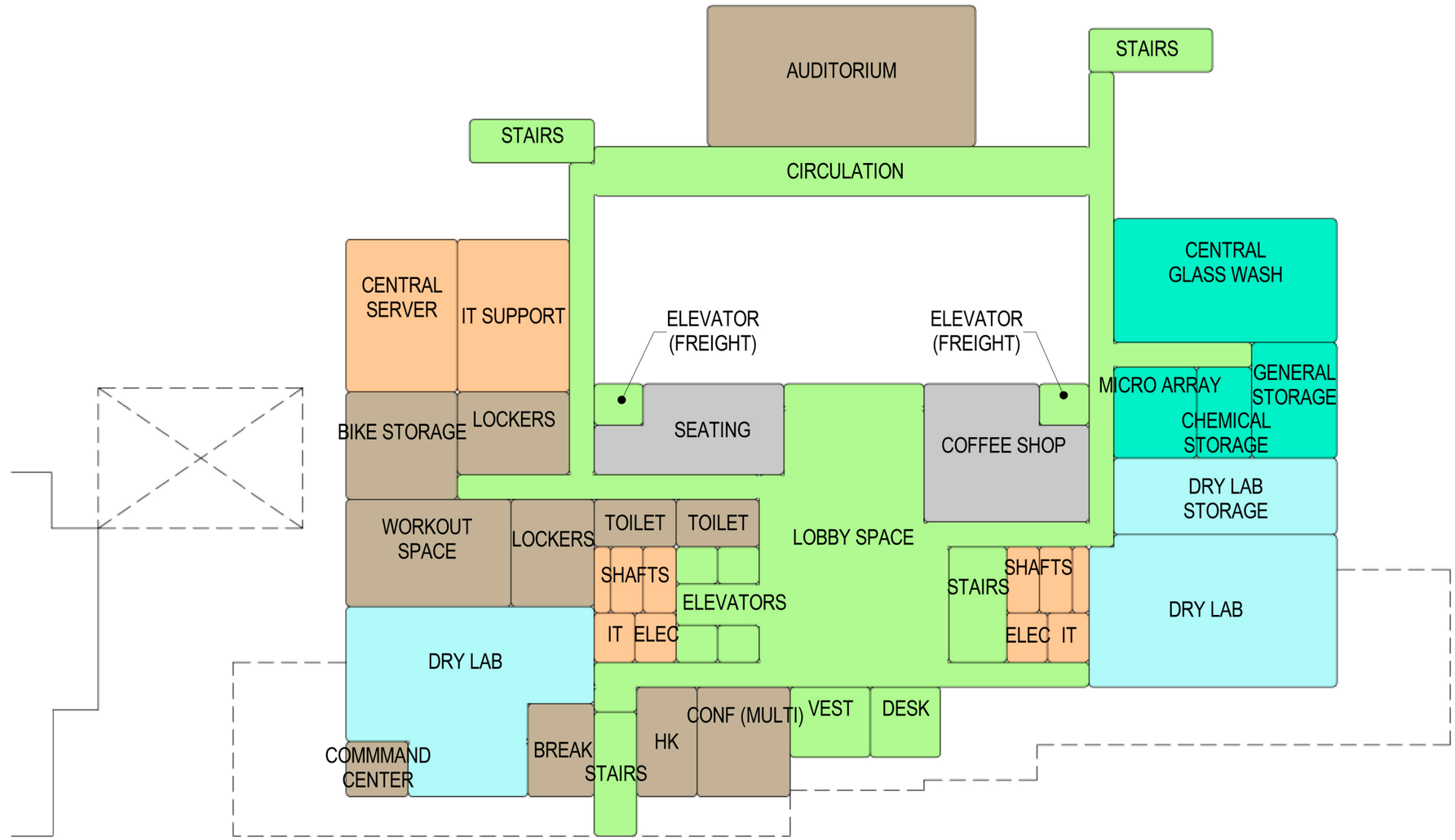
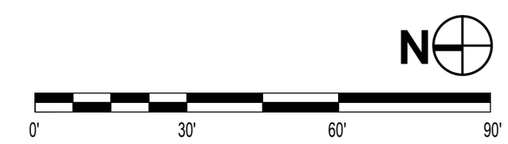
## Option 01 - Level 1



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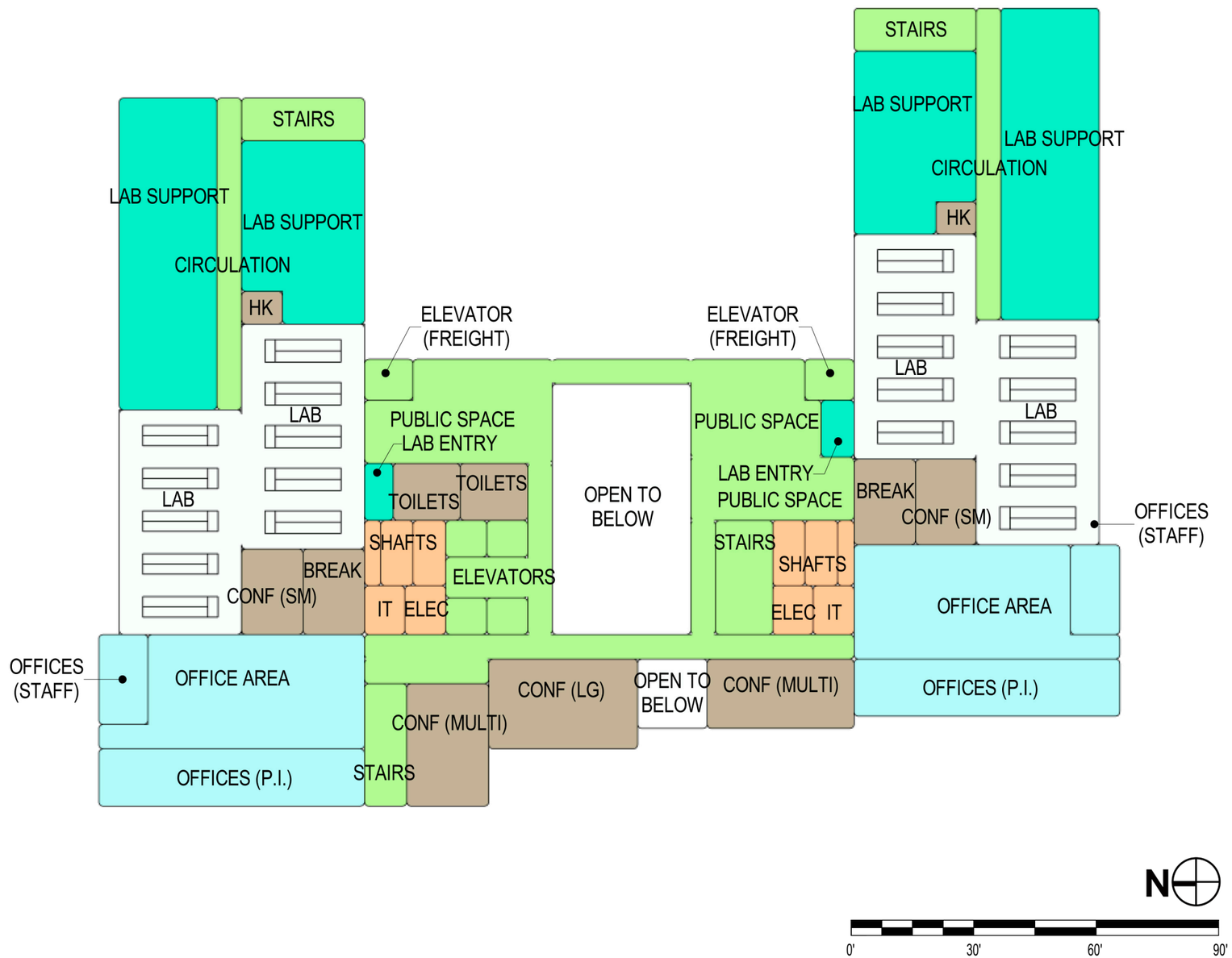
## Option 01 - Level 2



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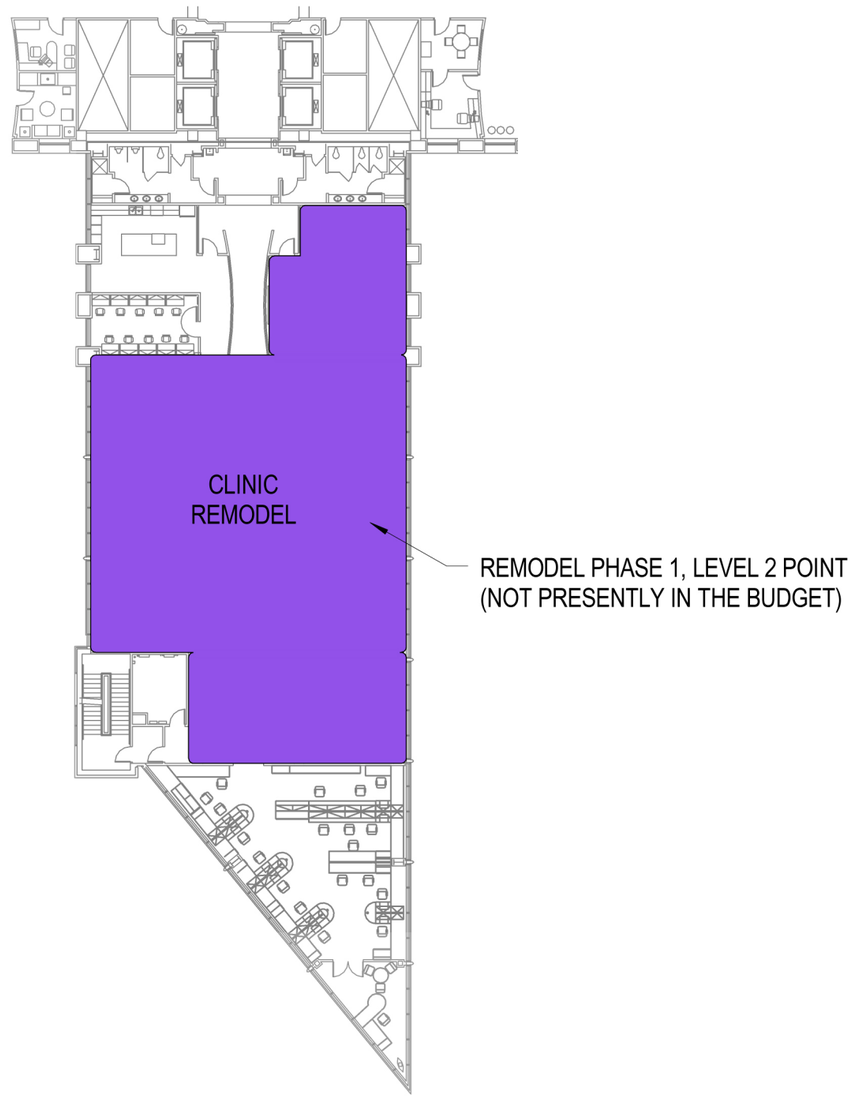
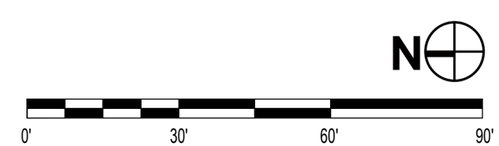
# Option 01 - Level 2 - Clinic Remodel



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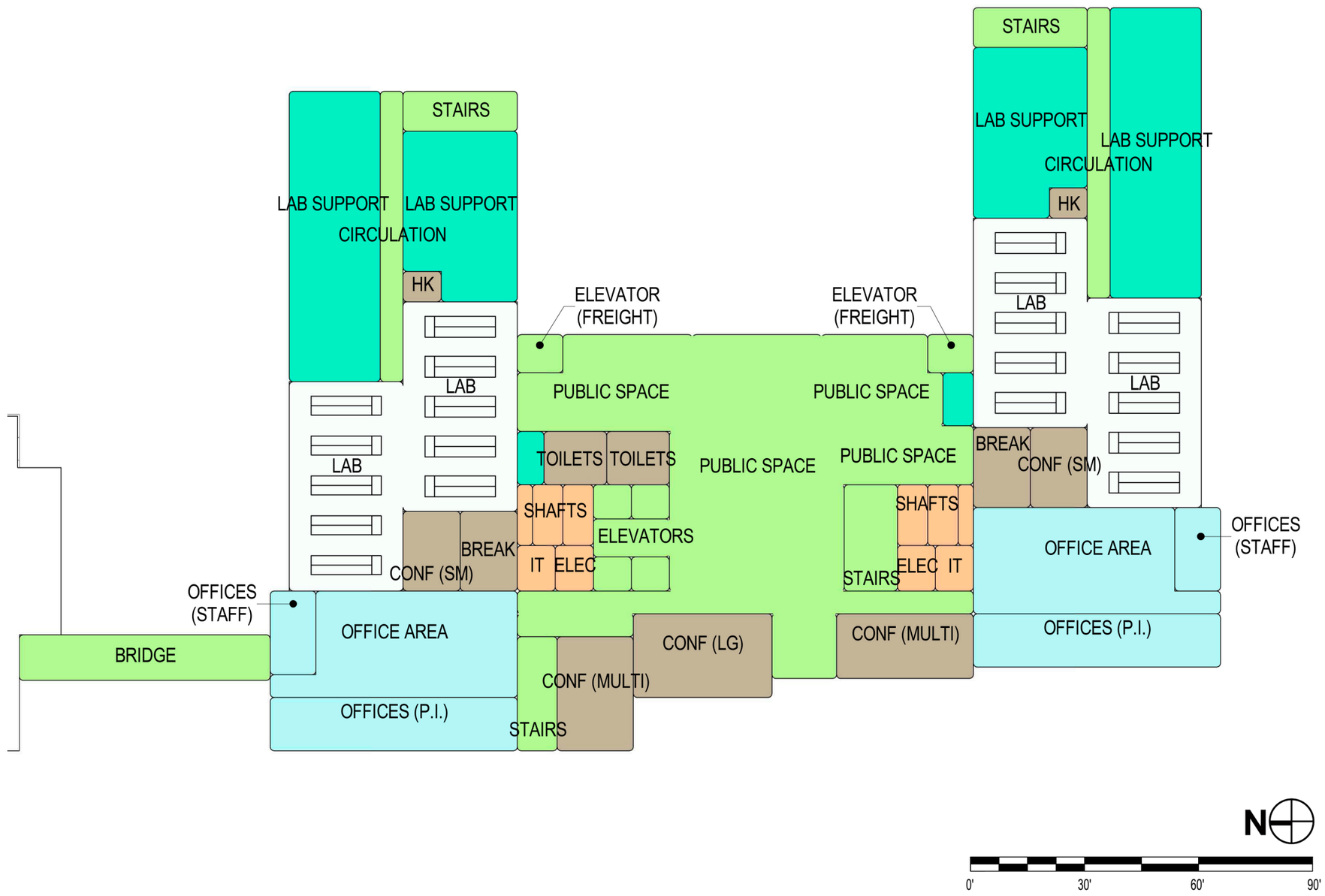
## Option 01 - Level 3



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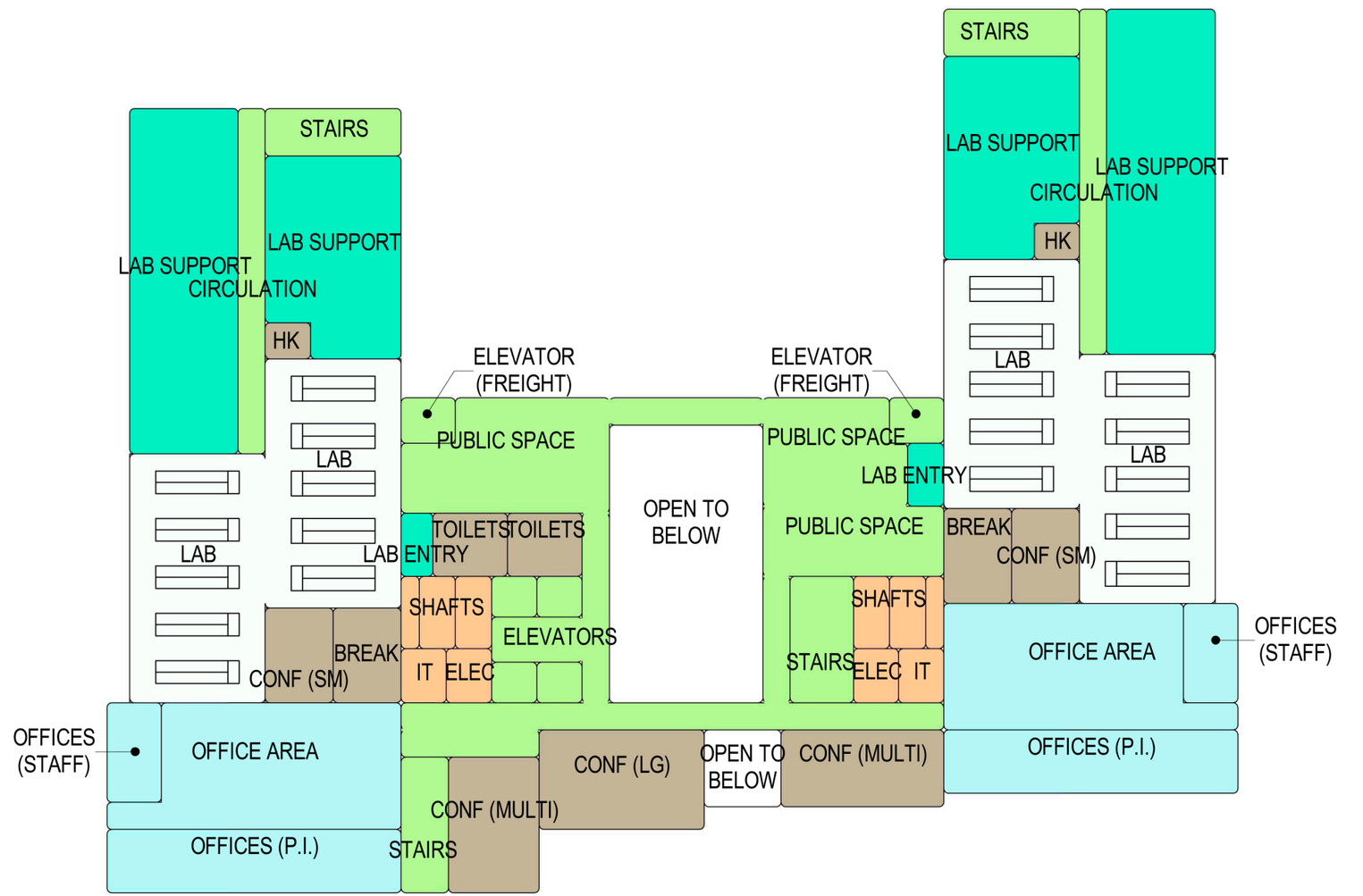
## Option 01 - Level 4



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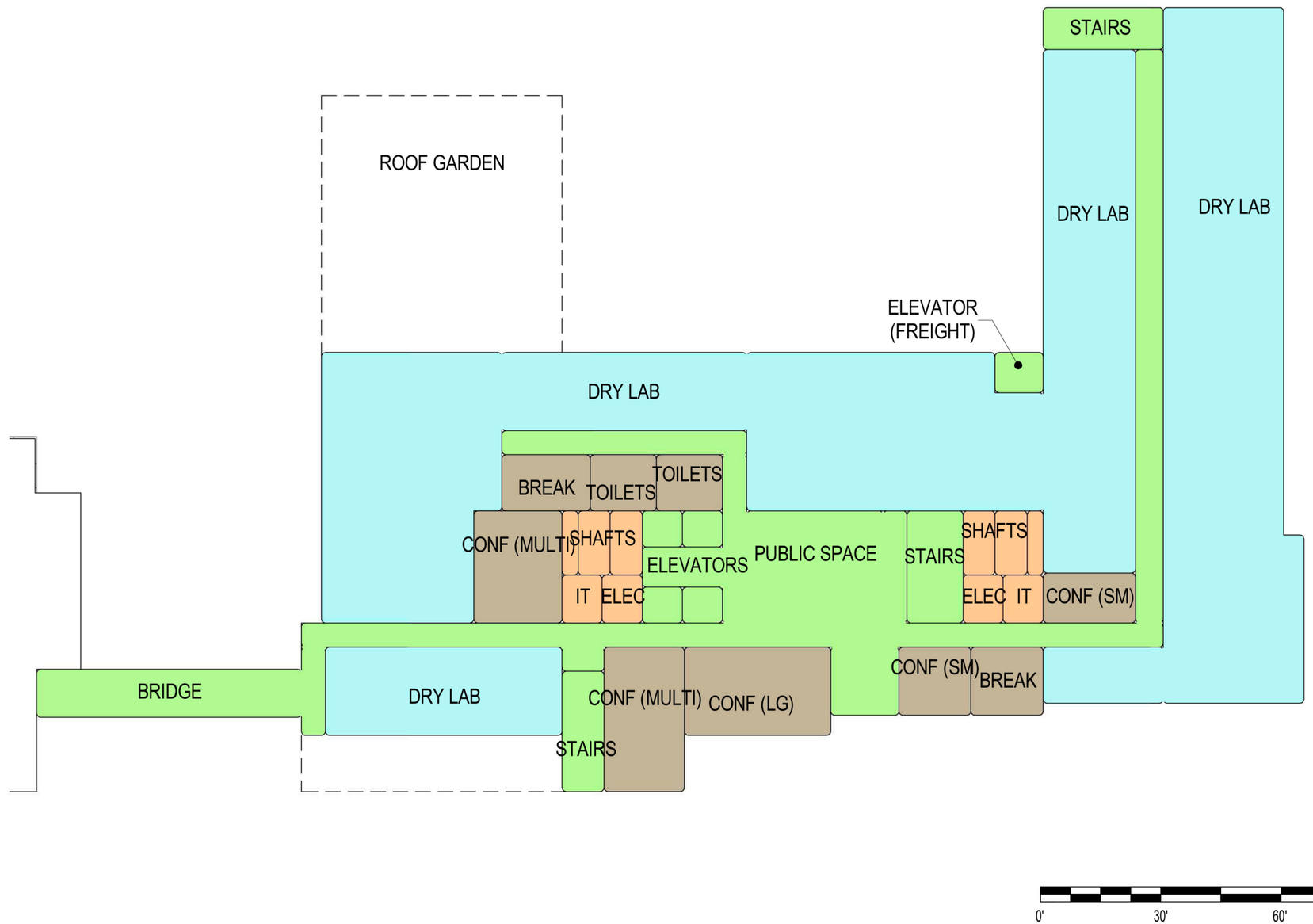
# Option 01 - Level 5



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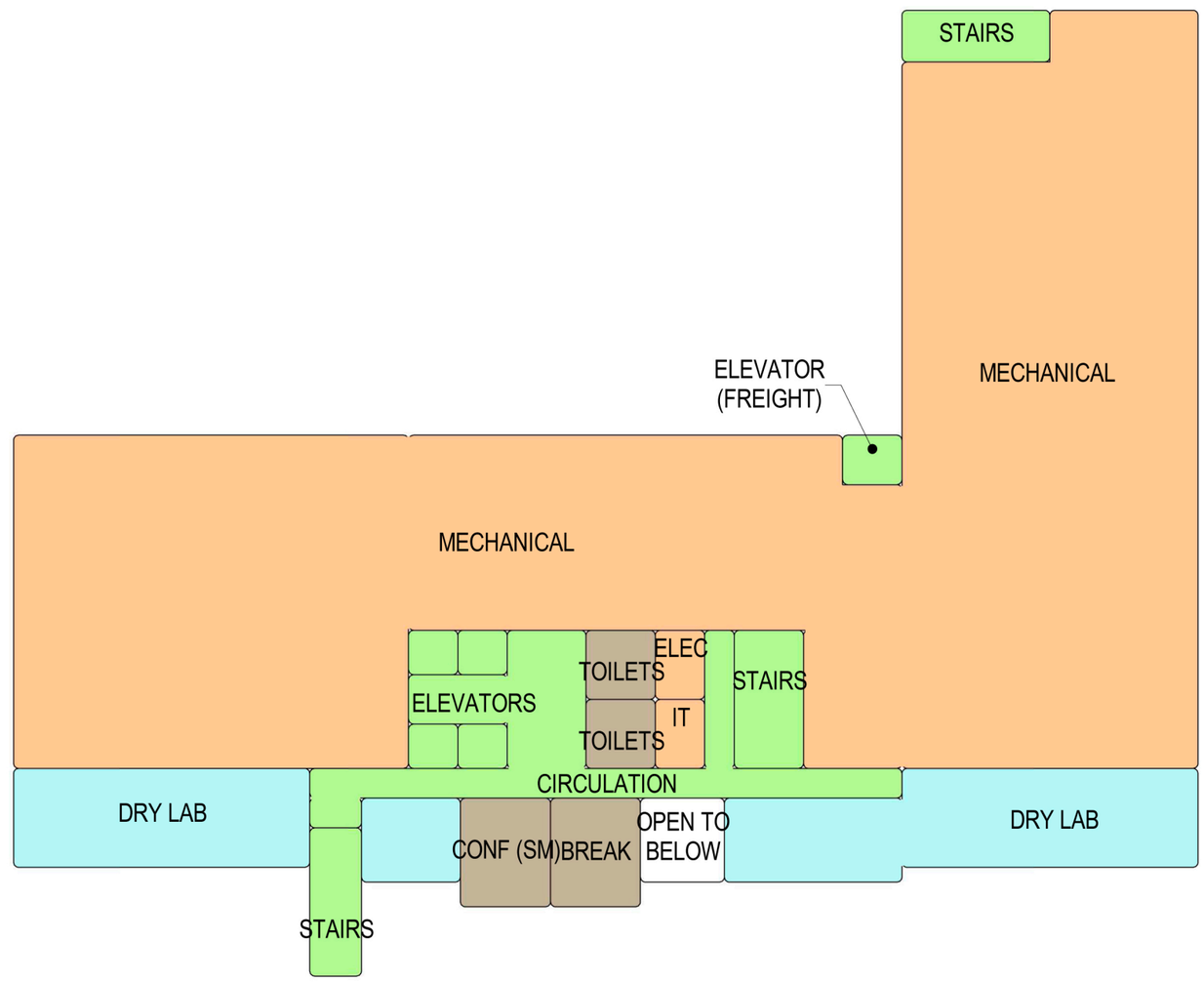
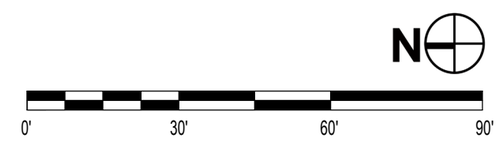
# Option 01 - Level 6



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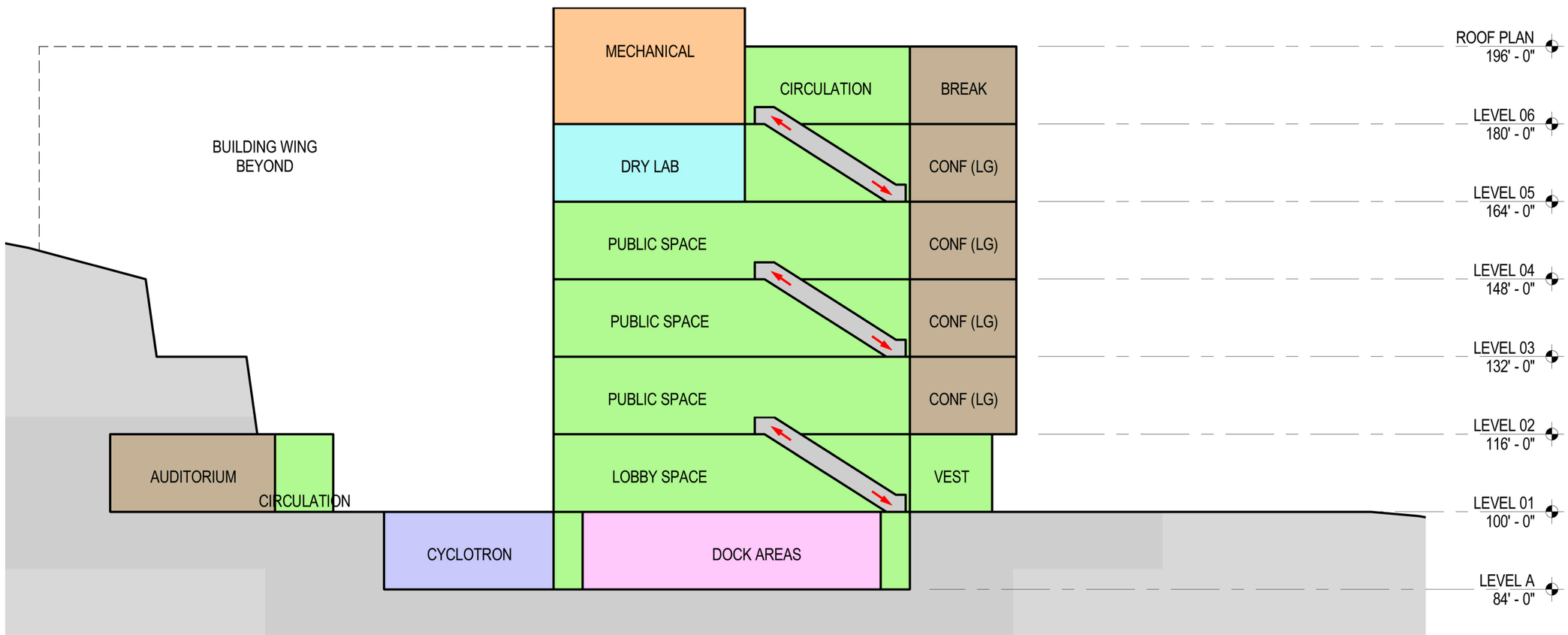
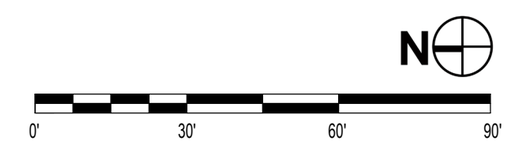
# Option 01 - Center Section



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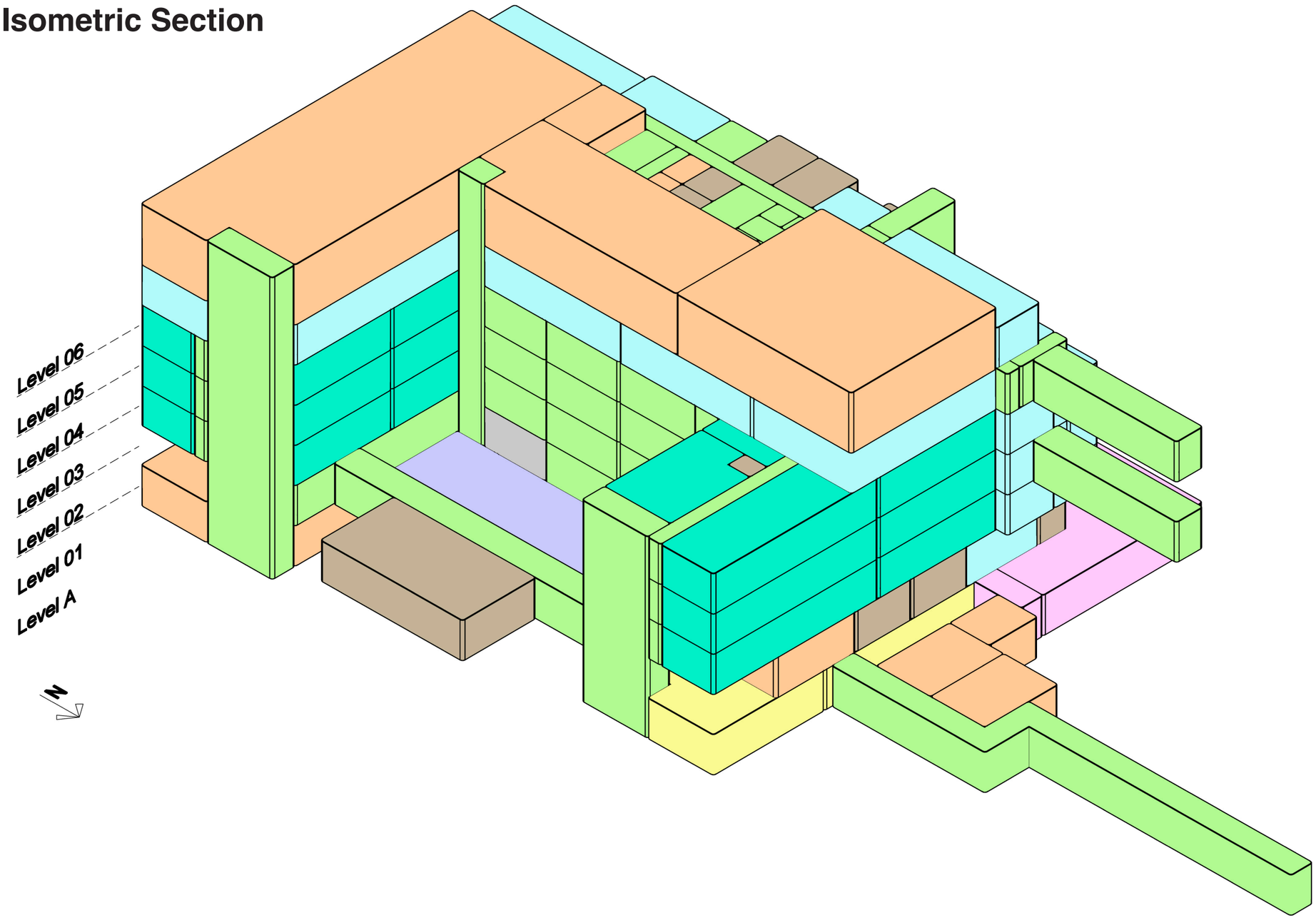
## Option 01 - NE Isometric Section



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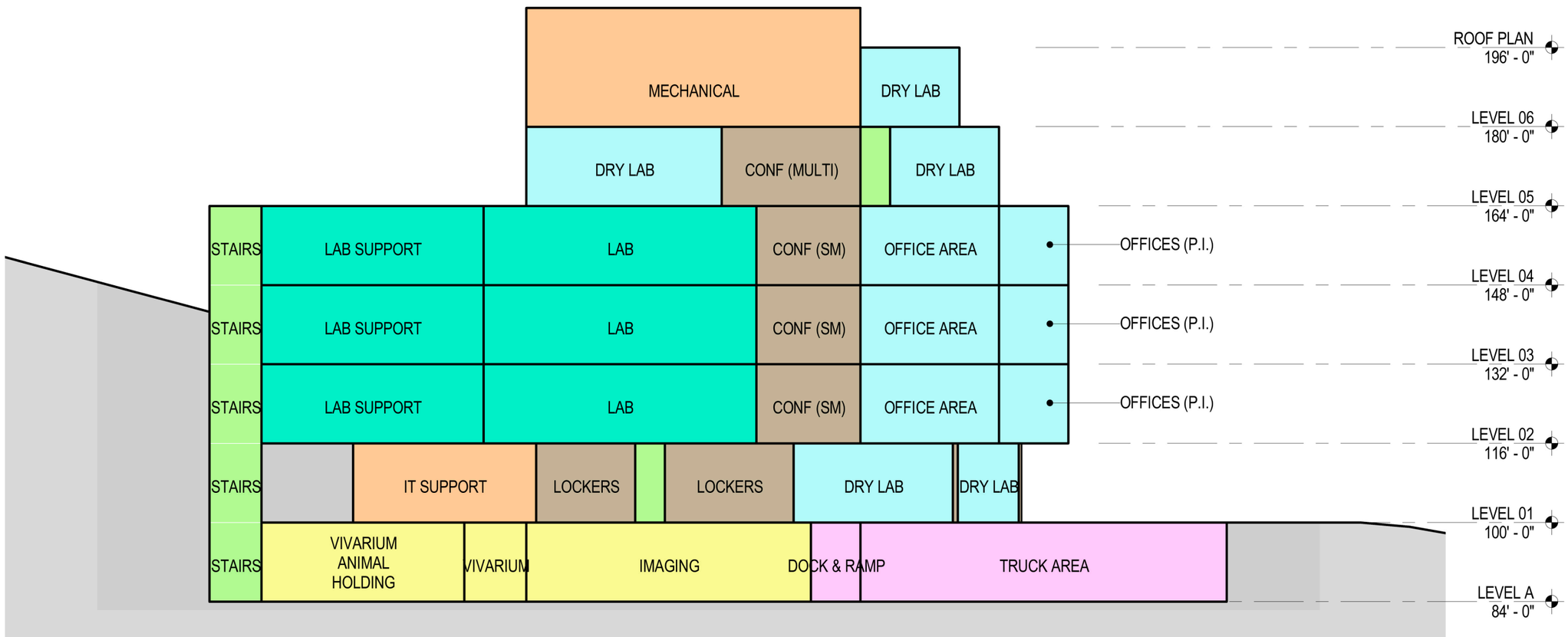
# Option 01 - North Wing Section



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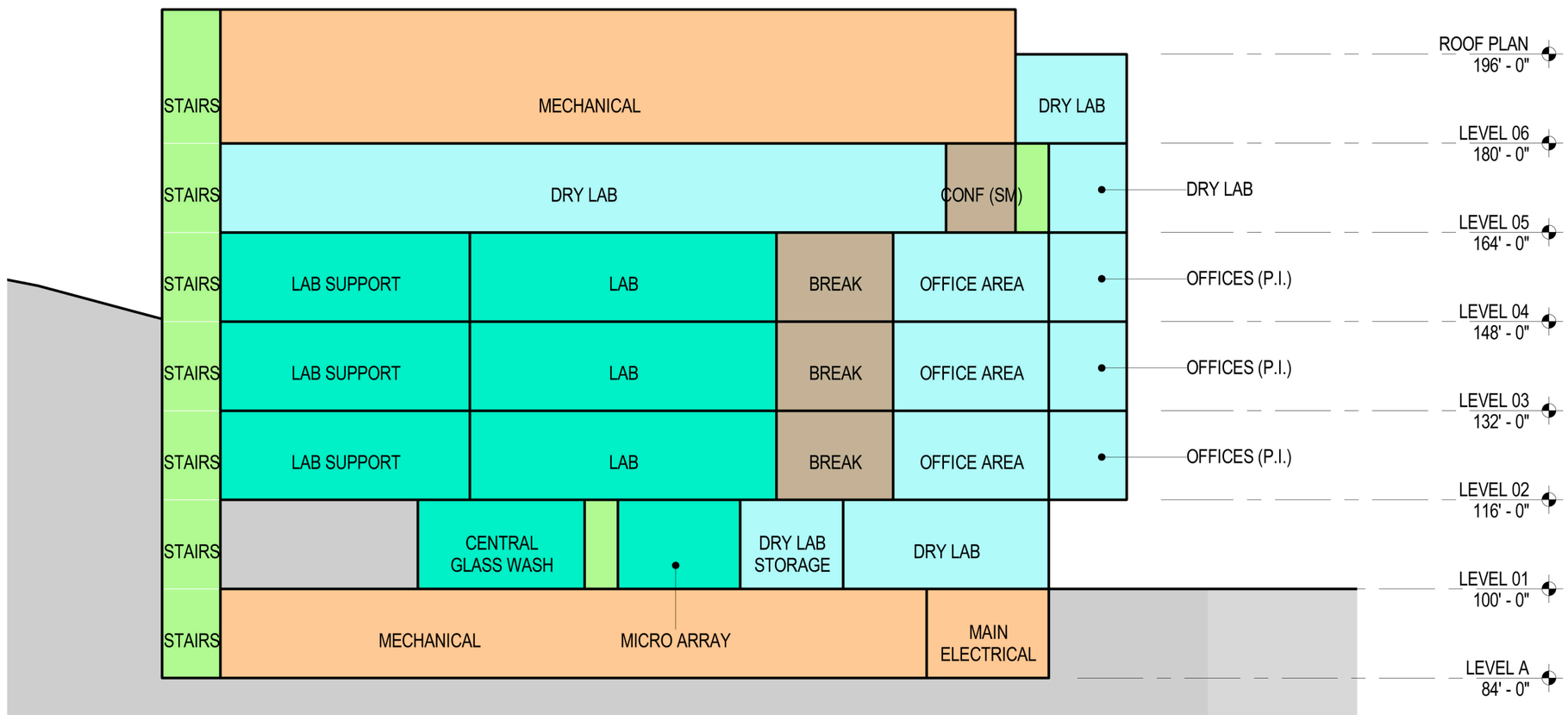
# Option 01 - South Wing Section



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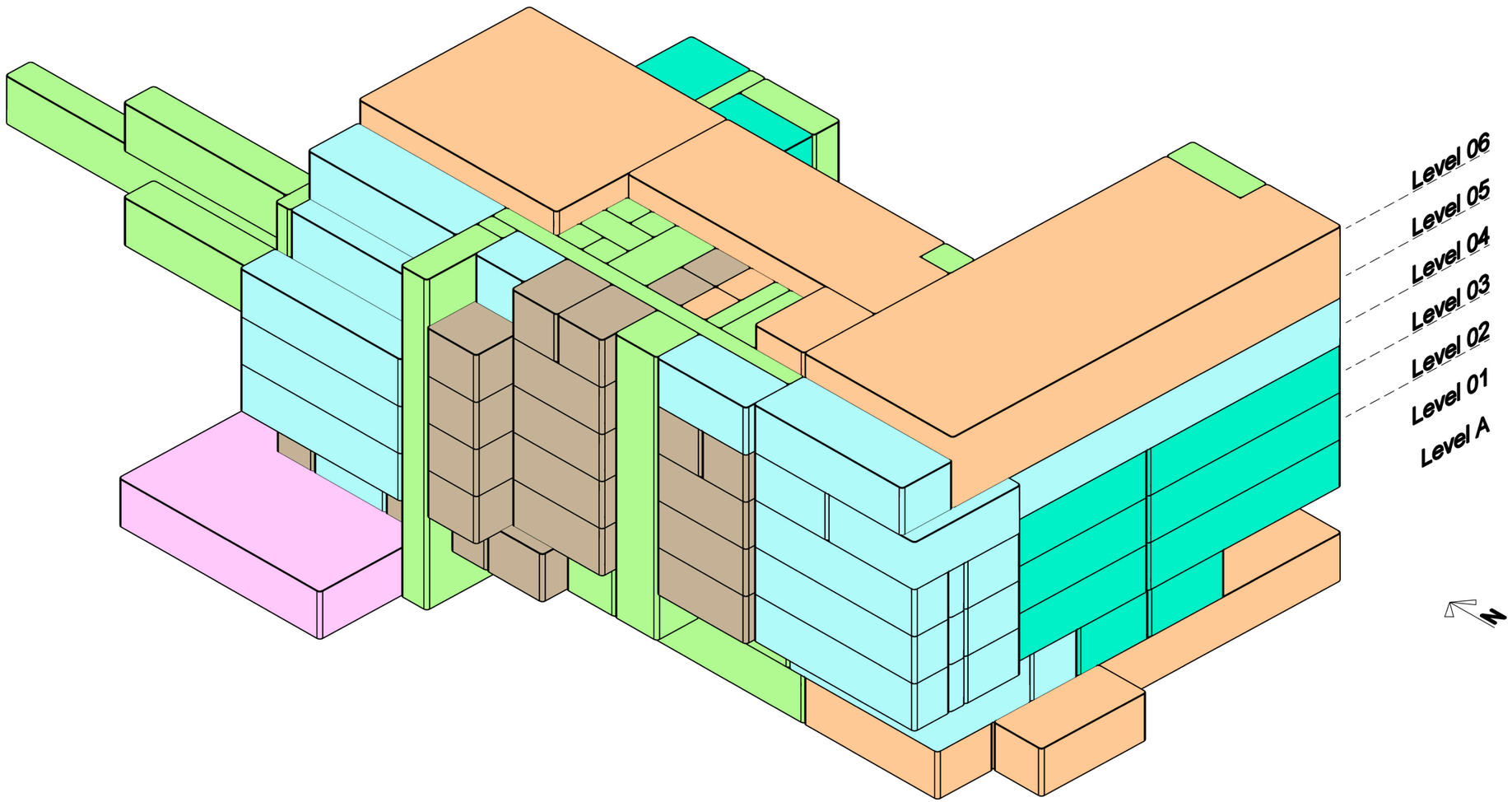
# Option 01 - SW Isometric Section



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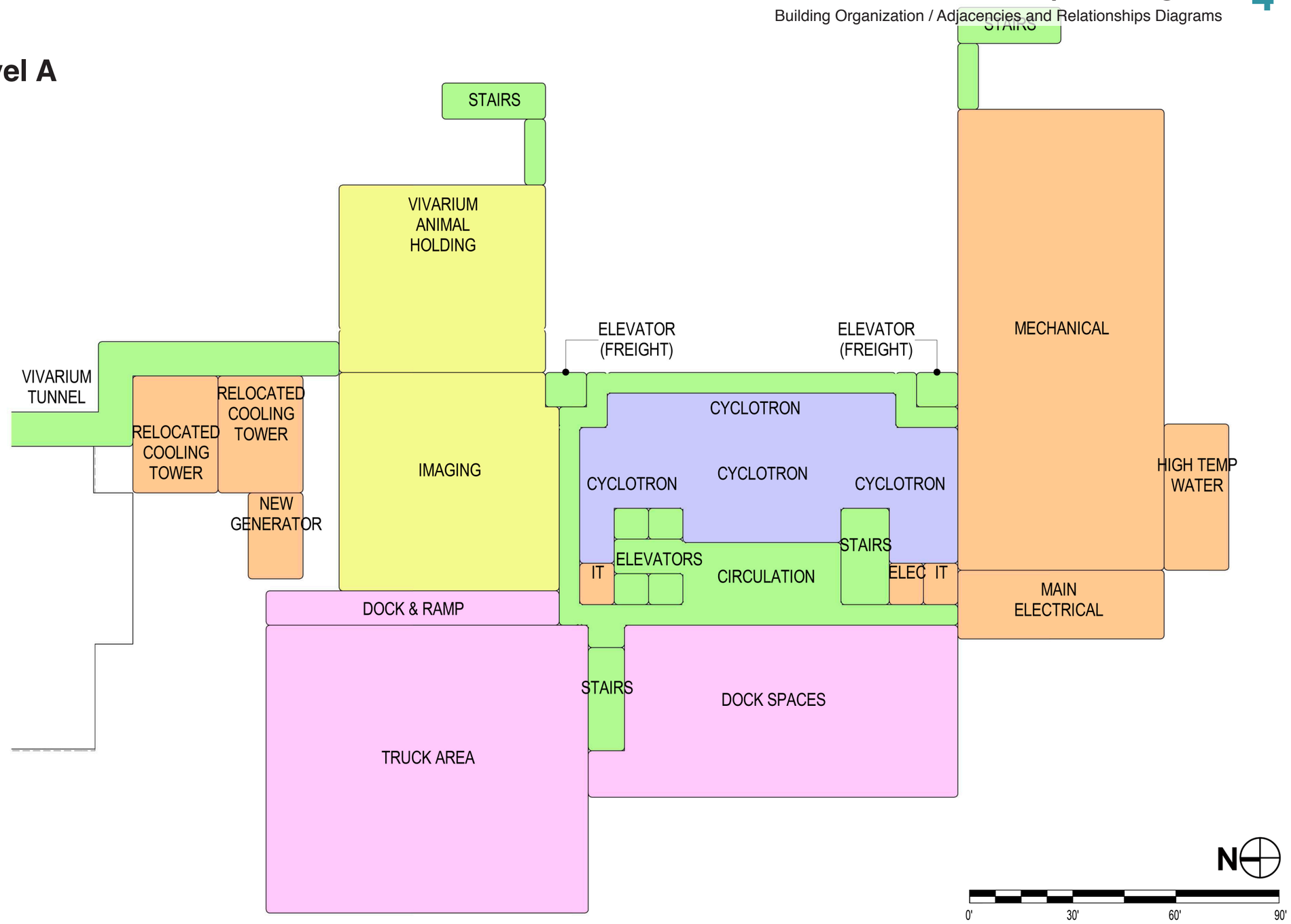
## Option 02 - Level A



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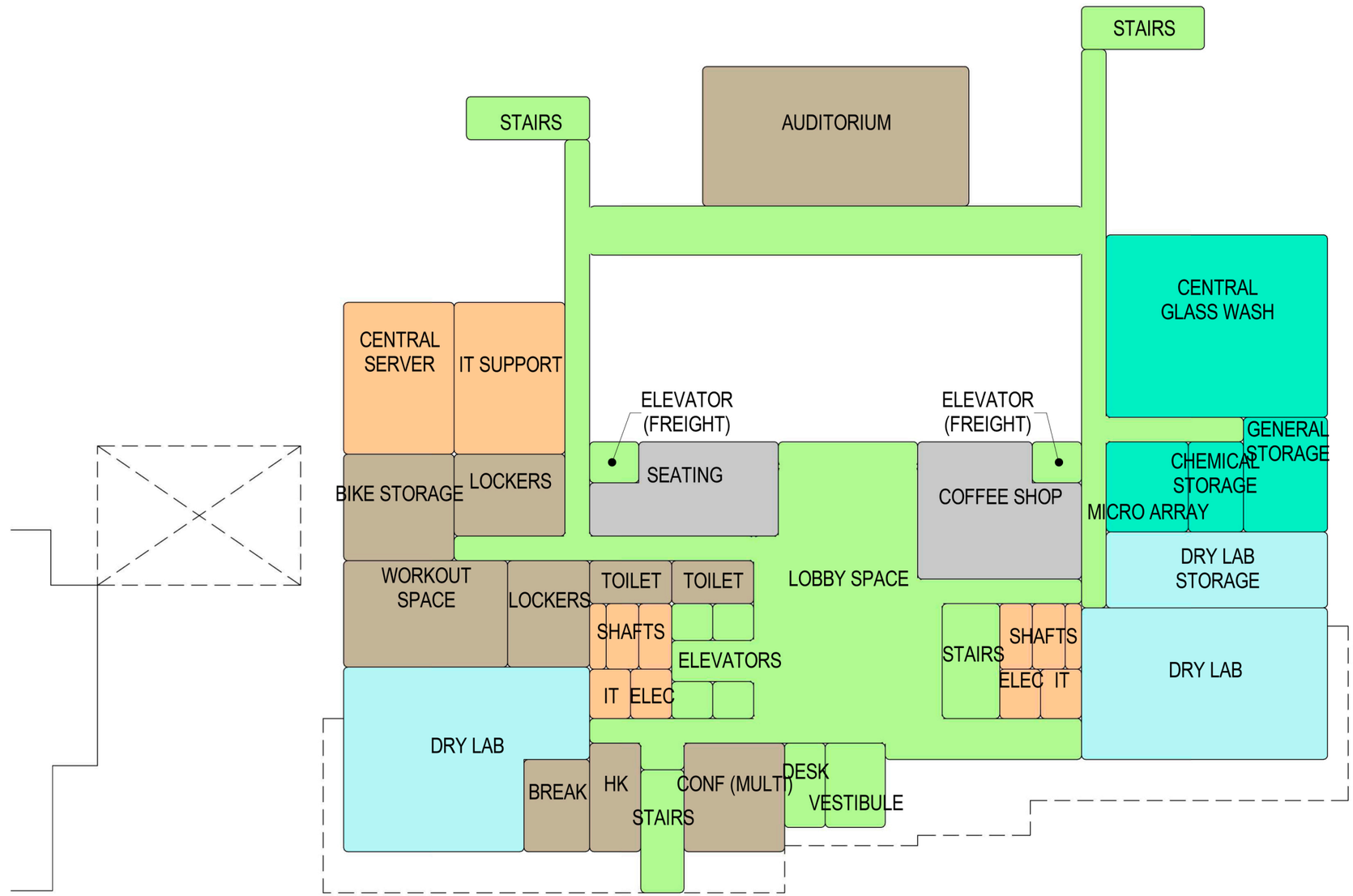
## Option 02 - Level 1



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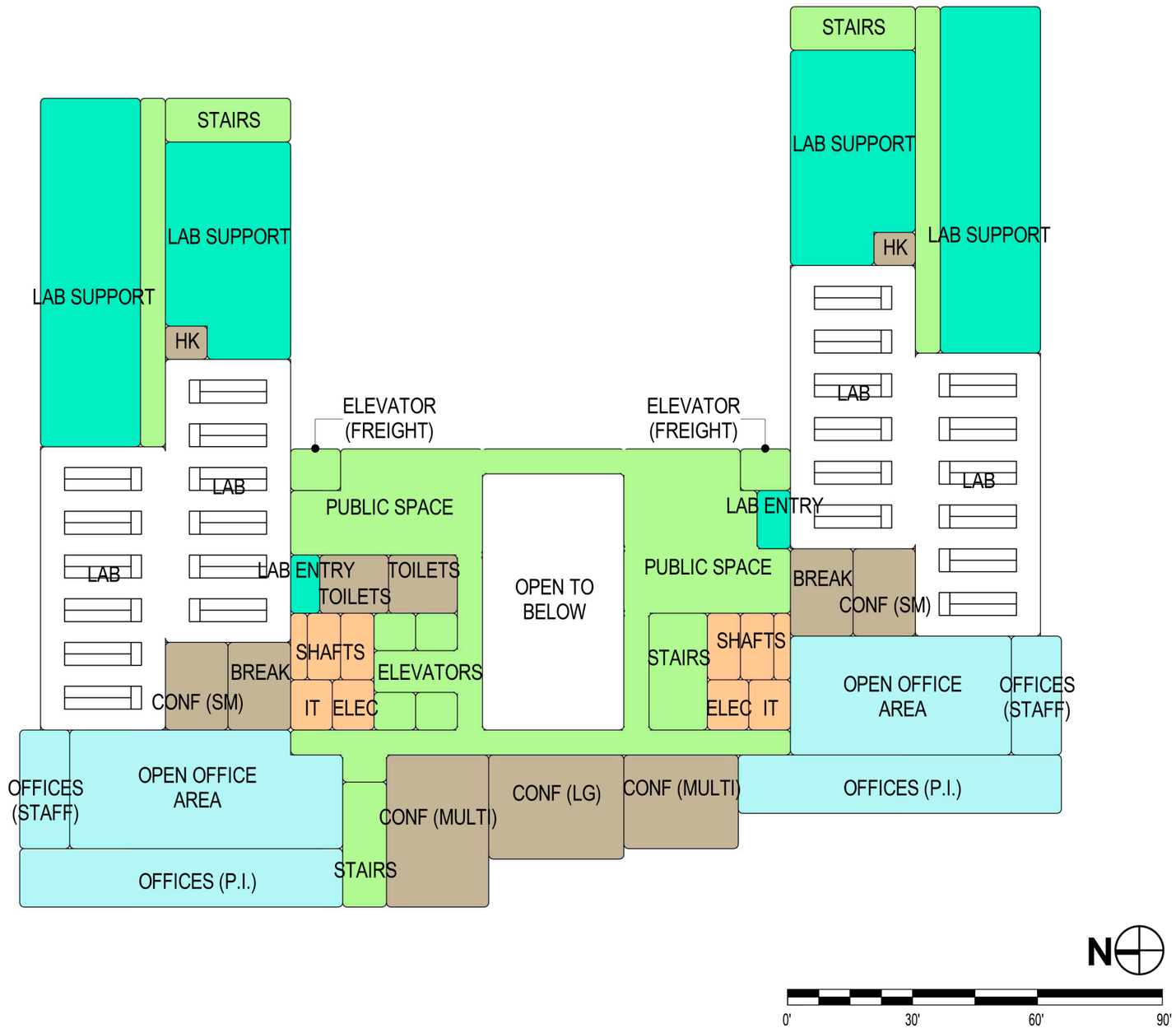
## Option 02 - Level 2



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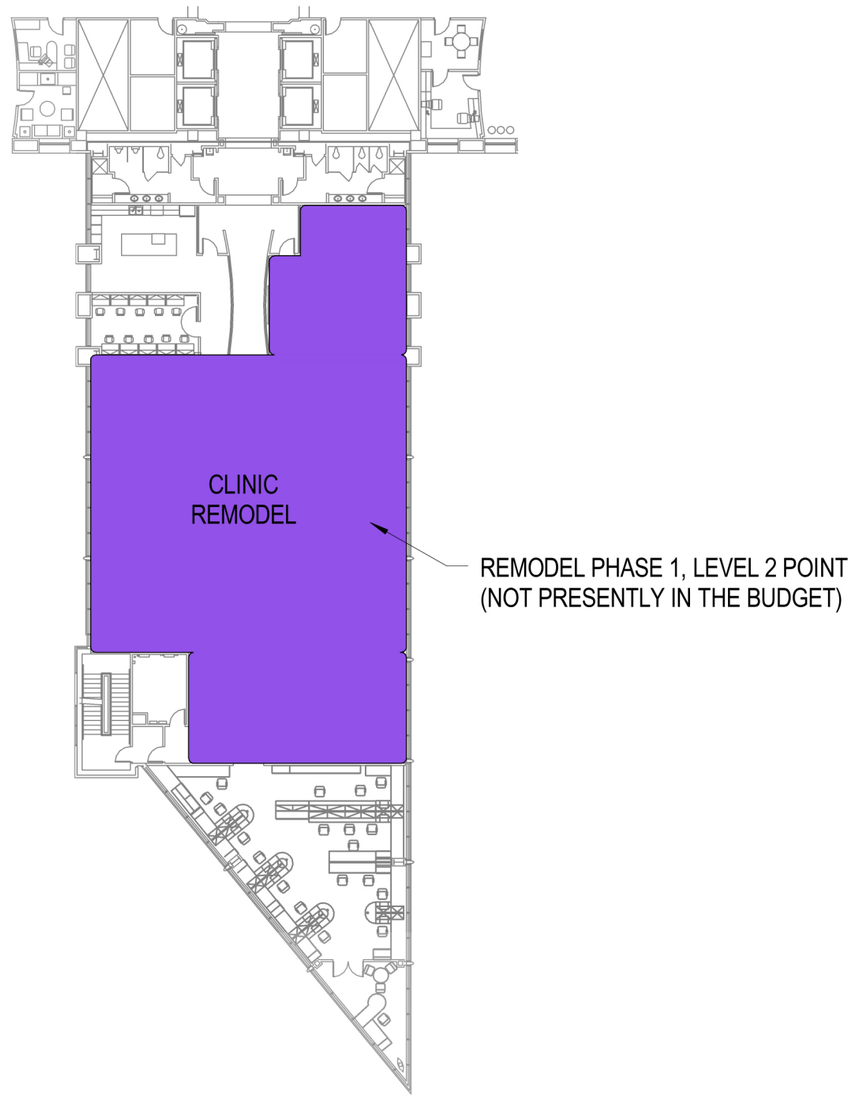
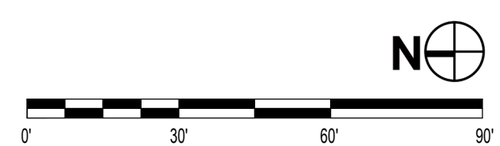
# Option 02 - Level 2 - Clinic Remodel



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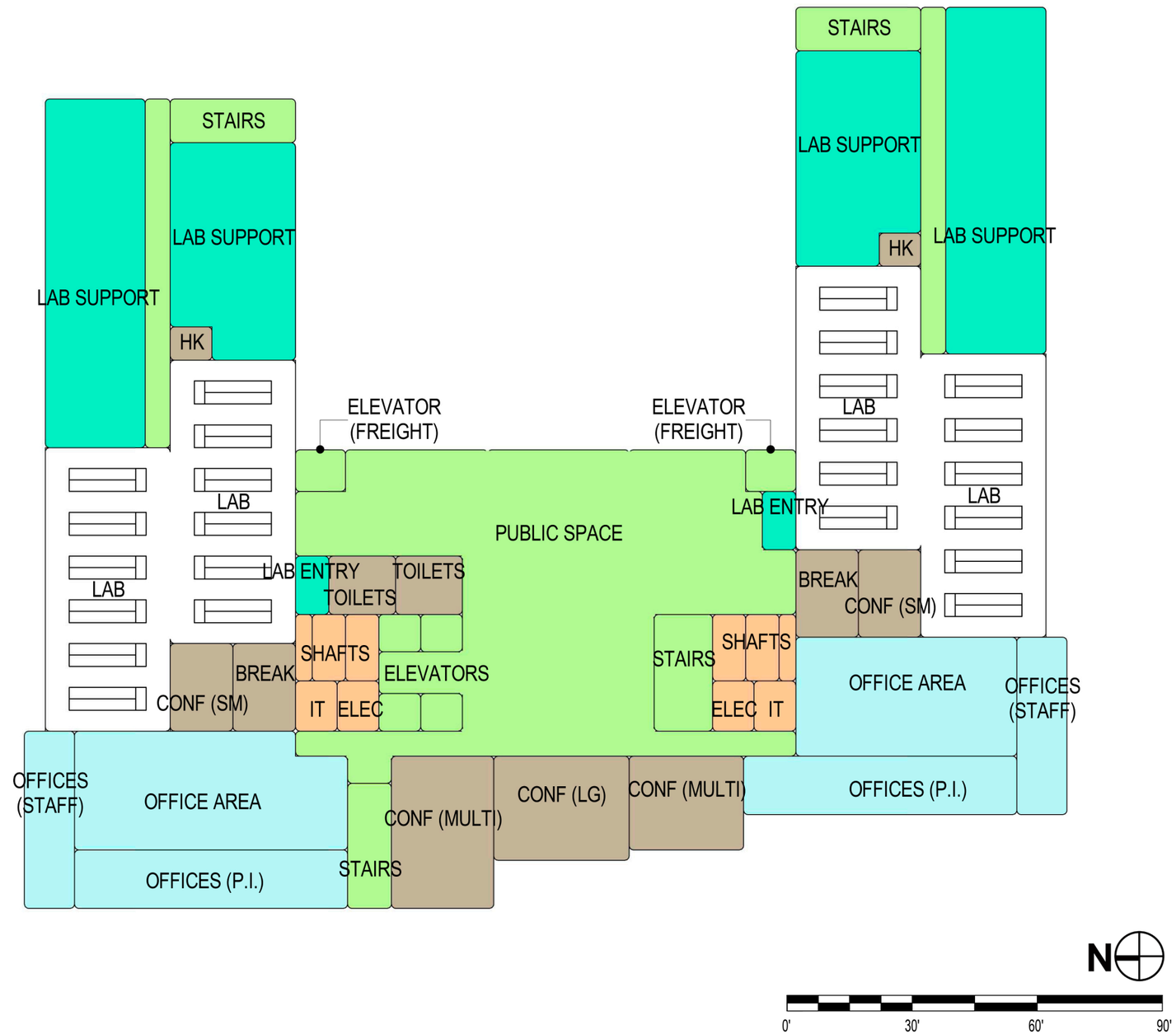
## Option 02 - Level 3



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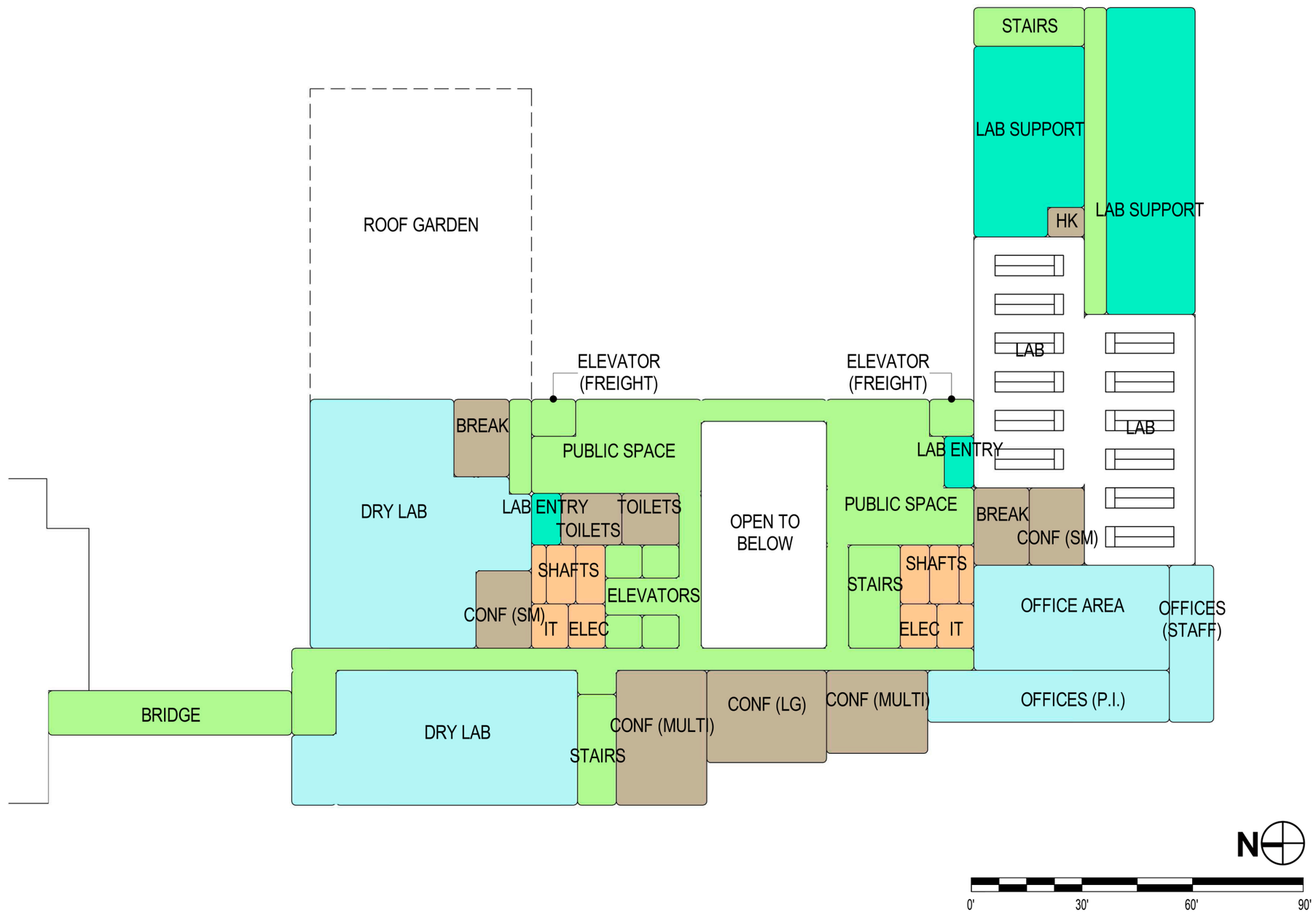
# Option 02 - Level 4



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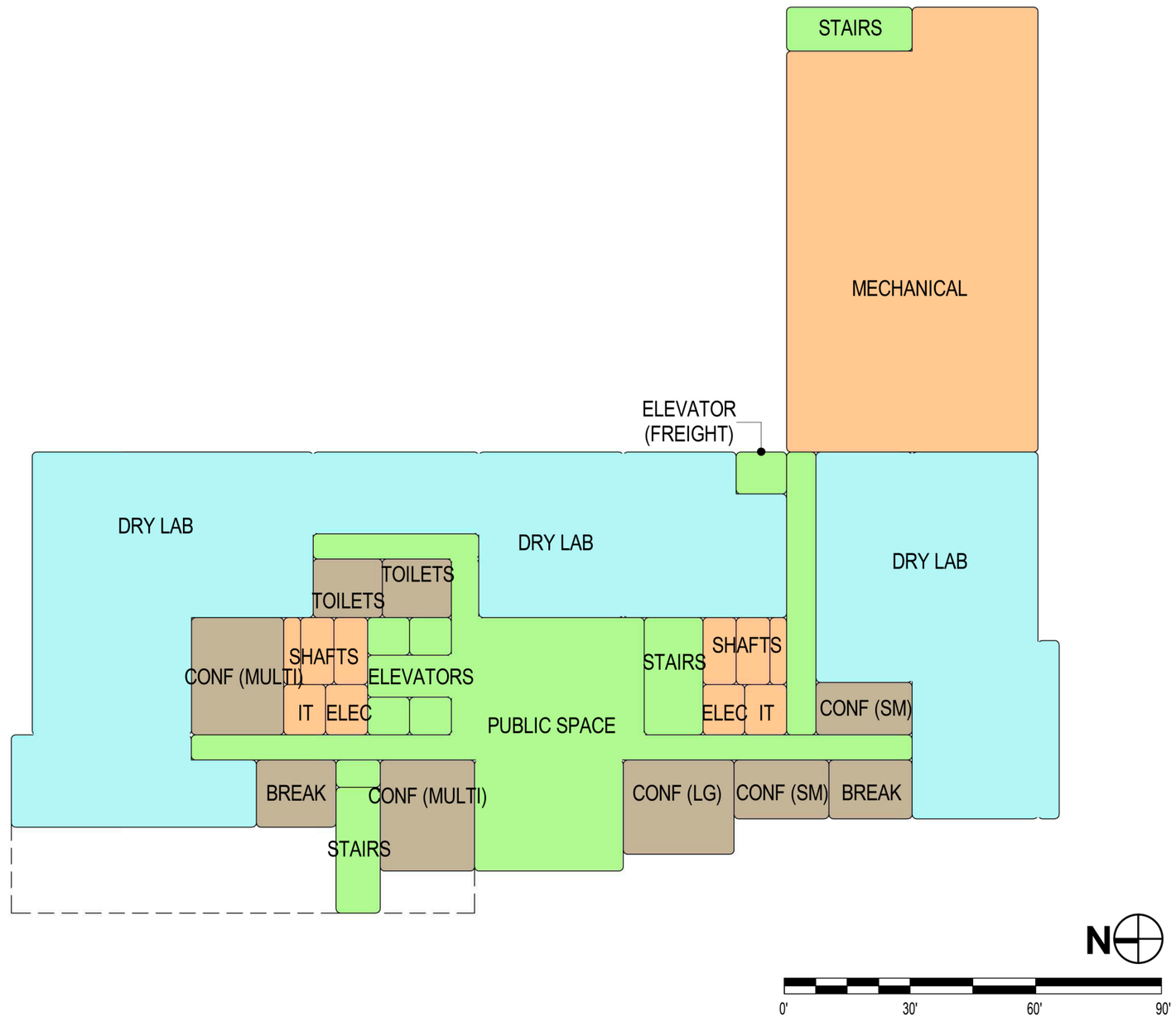
# Option 02 - Level 5



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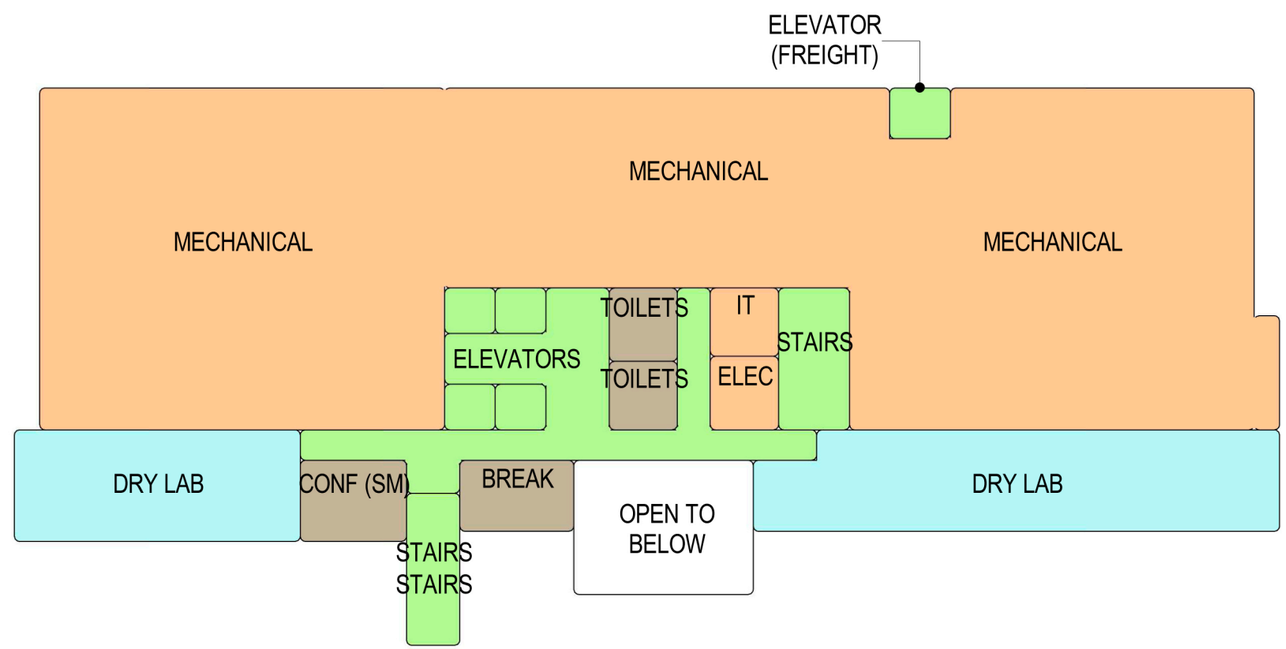
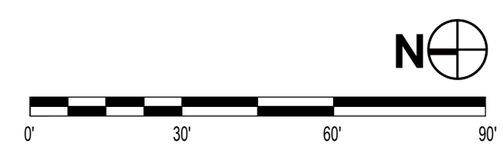
# Option 02 - Level 6



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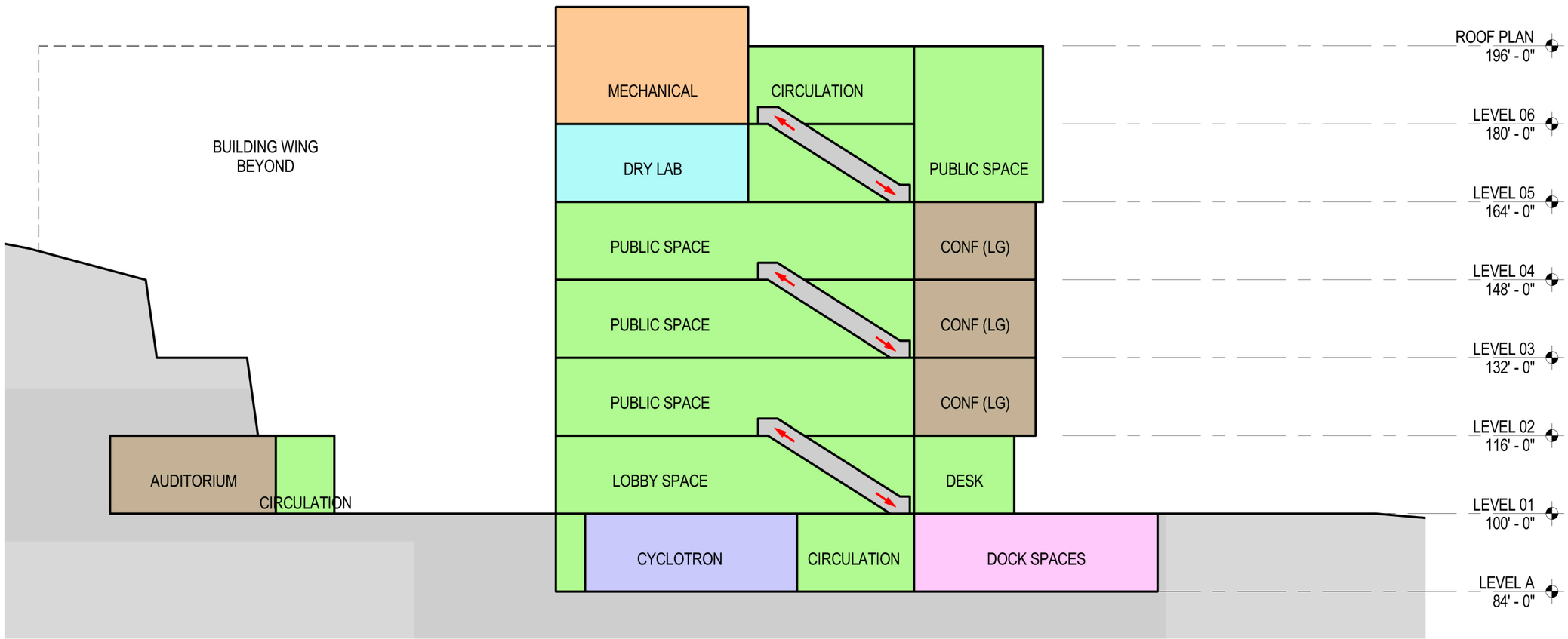
# Option 02 - Center Section



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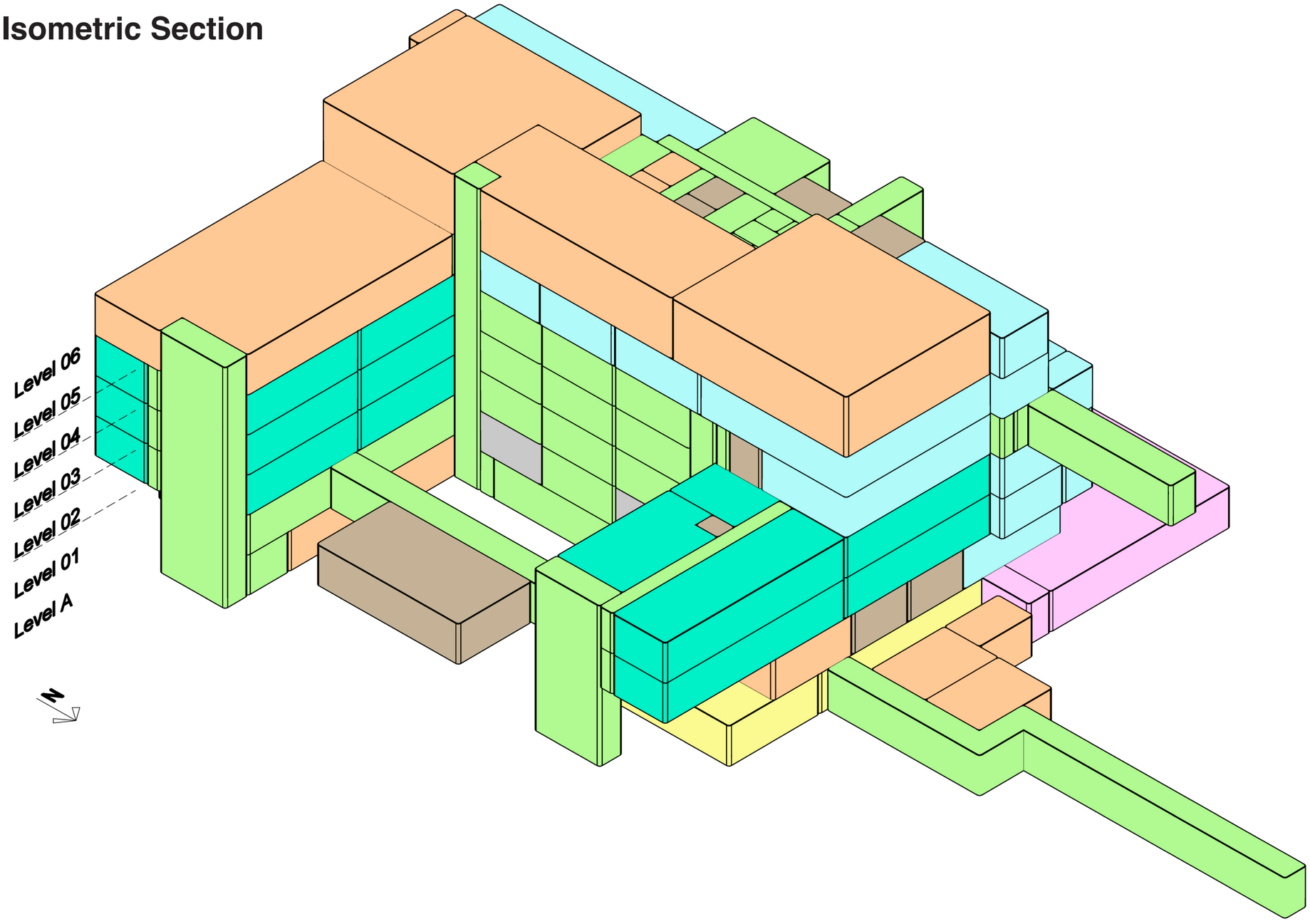
## Option 02 - NE Isometric Section



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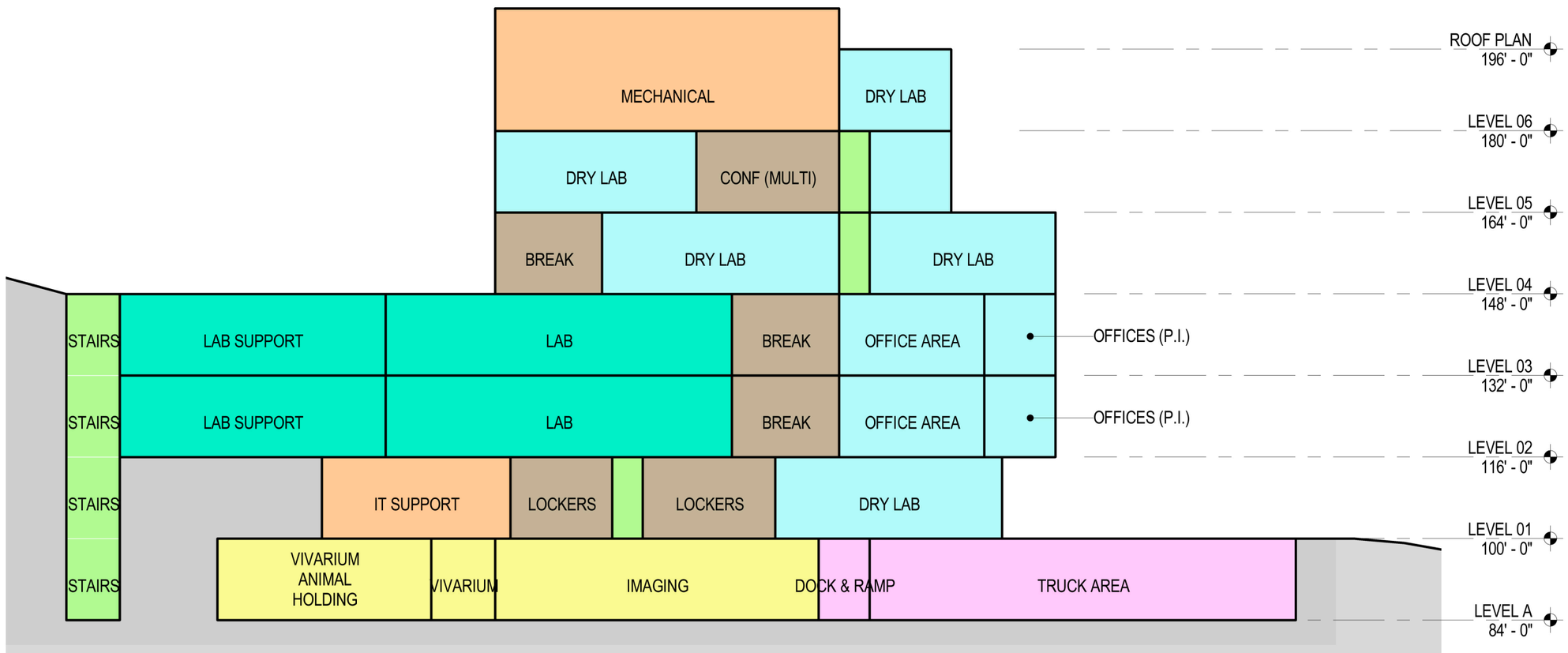
# Option 02 - North Wing Section



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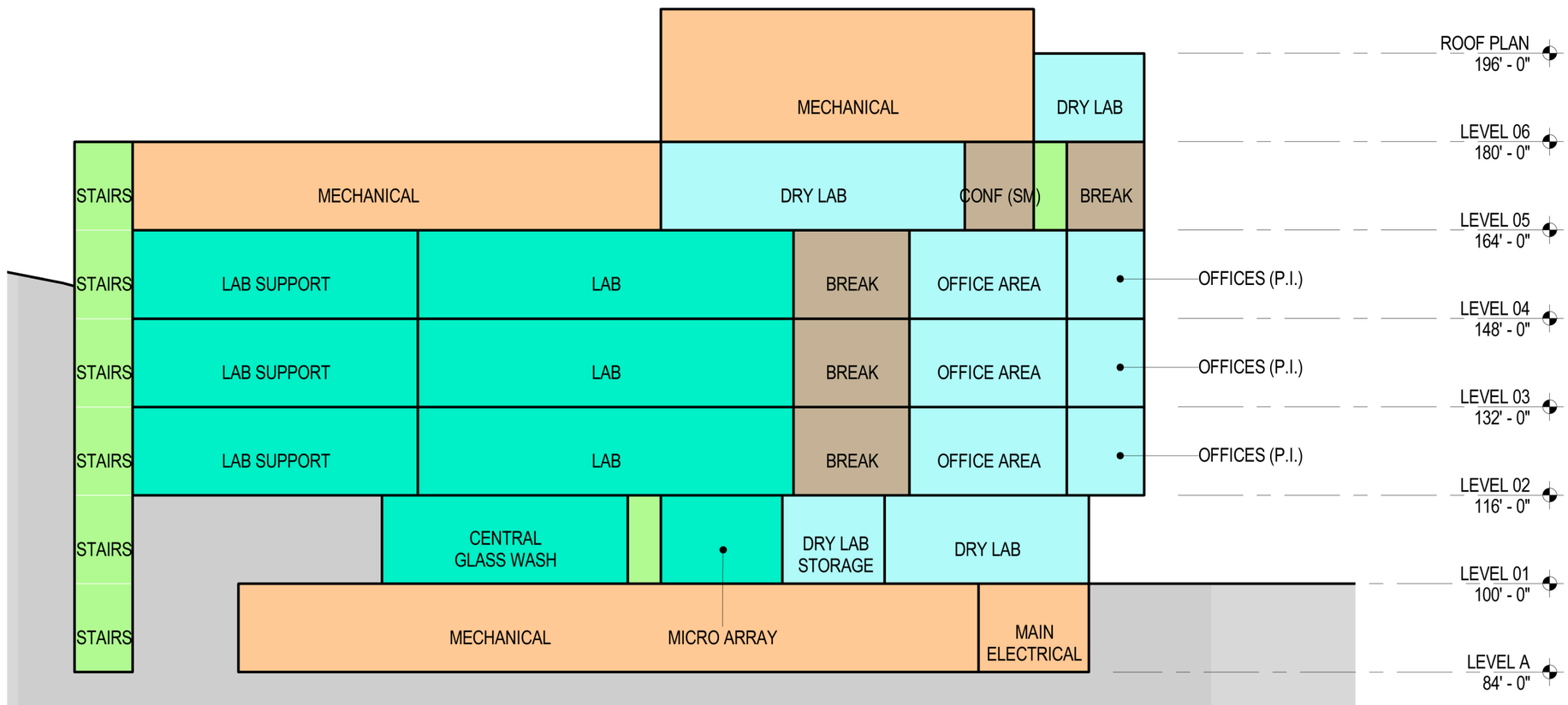
# Option 02 - South Wing Section



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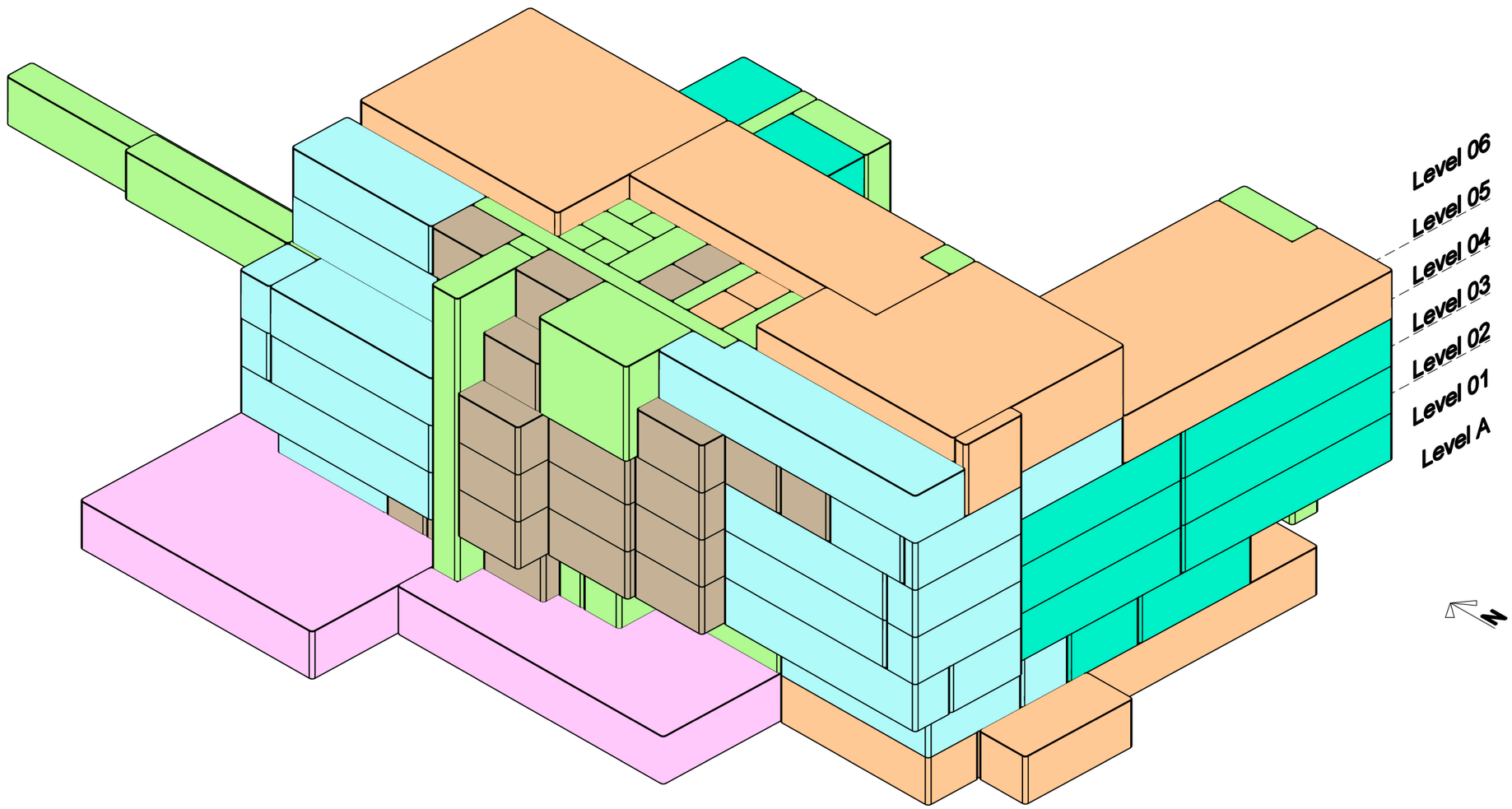
# Option 02 - SW Isometric Section



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## 4.3 INDIVIDUAL ROOM DATA SHEETS / PRE-SCHEMATIC FINISH SCHEDULE

The room data sheet section consists of a one write up sheet containing physical space requirements, interior finishes, ceiling heights, proximity location to other spaces, door and window information. The data also contains the general requirements for security, mechanical, plumbing and electrical requirements for the space. Specific equipment, furniture and special issues are also listed. After the room data sheet a plan diagram showing a typical layout for the room is shown.

# 4 Space Program

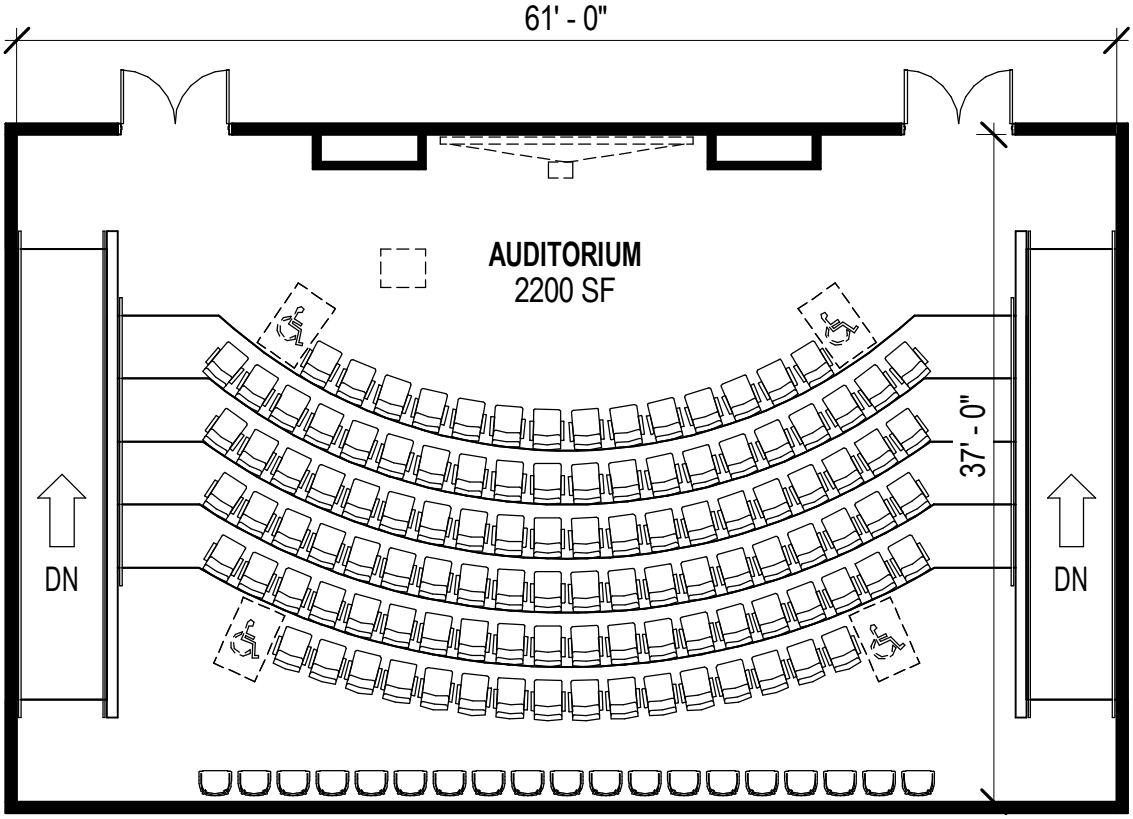
Individual Room Data Sheets / Pre-Schematic Finish Schedule

| DEPARTMENT UNIT | Common Rooms |
|---|---|
| Space Name | Auditorium |
| Space Number | N/A |

| 1. SPACE PROGRAM | |
|---|---|
| General Space Description: | Auditorium |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 2,200 SF |
| (Quantity) & Location: | (1) at Level 01 |
| Purpose of Space: | Auditorium |
| Number of Occupants: | 110 |
| Hours and Days Used: | 8am - 5pm, M-F |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | N/A |
| Must Be Near To: | Main Lobby |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | None |
| Doors: | (2) 6'-0" Wide Minimum (Pairs) |
| Floor: | Carpet |
| Wall: | Painted Gypsum Board, Wall Acoustical Treatments |
| Ceiling: | Painted Gypsum Board |
| Ceiling Height: | 10'-0" to 14'-0" |
| Acoustics: | STC 50 |
| General Character of Room: | Auditorium |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | N/A |
| HVAC: | 72 degrees F +/- 4 |
| Plumbing: | N/A |
| Electrical: | 120 V Outlets |
| Lighting: | Theater Lighting |
| Phone / Data: | Cat-6 Data & Voice, Wifi, AV System |
| Vibration Criteria: | N/A |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Fixed Tablet Arm Seating, Tech Podium, Projector, Projection Screen, Video Conferencing |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

## ROOM DATA SHEET

### Auditorium / 2,200 SF

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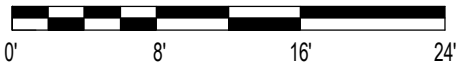
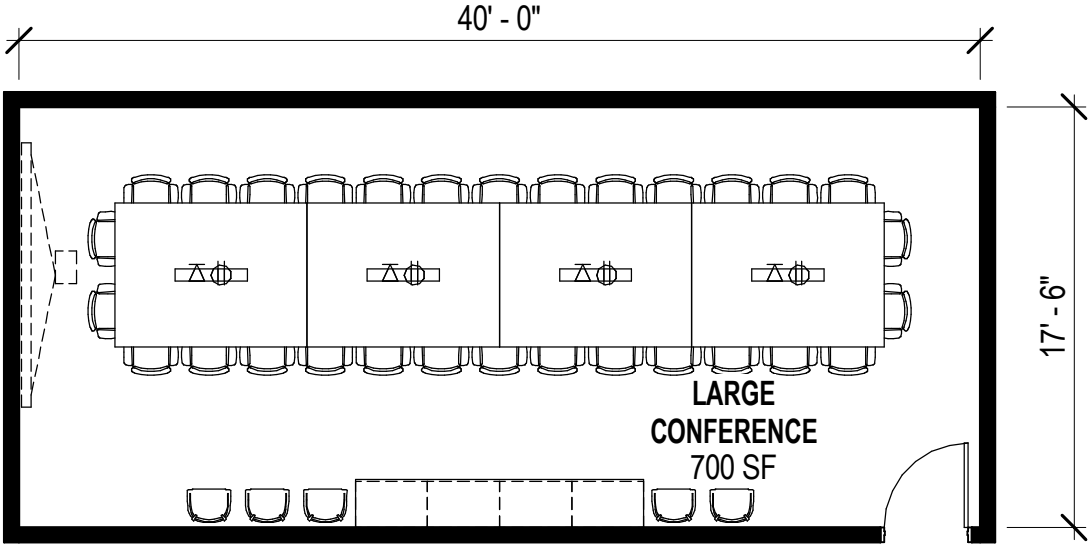


| DEPARTMENT UNIT | Conference Rooms |
|---|---|
| Space Name | Large Conference |
| Space Number | N/A |

| 1. SPACE PROGRAM | |
|---|---|
| General Space Description: | Large Conference Room |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 700 SF |
| (Quantity) & Location: | (1) at Levels 02, 03, 04, 05 |
| Purpose of Space: | Conference |
| Number of Occupants: | 30 |
| Hours and Days Used: | 8am - 5pm, M-F |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | N/A |
| Must Be Near To: | N/A |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | Desirable |
| Doors: | 3'-6" Wide Minimum |
| Floor: | Carpet |
| Wall: | Painted Gypsum Board |
| Ceiling: | Acoustical Tile |
| Ceiling Height: | 9'-0" Minimum |
| Acoustics: | STC 45 |
| General Character of Room: | Conference Room |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | N/A |
| HVAC: | 72 Degrees F +/- 4 |
| Plumbing: | N/A |
| Electrical: | 120 V Outlets |
| Lighting: | Fluorescent/LED |
| Phone / Data: | Cat-6 Data & Voice, Wifi, AV System |
| Vibration Criteria: | N/A |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Multi-Unit Conference Table, Task Chairs, Casework, Countertop, Projector, Projection Screen, Video Conferencing Screen |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

## ROOM DATA SHEET

### Large Conference Room / 700 SF




SCALE: 1/8" = 1'-0"

# 4 Space Program

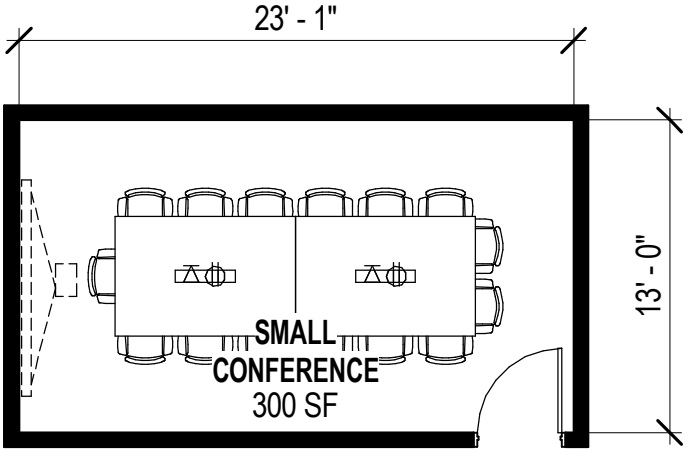
Individual Room Data Sheets / Pre-Schematic Finish Schedule

| DEPARTMENT UNIT | Common Rooms |
|---|---|
| Space Name | Small Conference |
| Space Number | N/A |

| | |
|---|---|
| **1. SPACE PROGRAM** | |
| General Space Description: | Small Conference Room |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 300 SF |
| (Quantity) & Location: | (2) at Levels 02, 03, 04 |
| Purpose of Space: | Conference |
| Number of Occupants: | 15 |
| Hours and Days Used: | 8am - 5pm, M-F |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | N/A |
| Must Be Near To: | N/A |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | Desirable |
| Doors: | 3'-6" Wide Minimum |
| Floor: | Carpet |
| Wall: | Painted Gypsum Board |
| Ceiling: | Acoustical Tile |
| Ceiling Height: | 9'-0" Minimum |
| Acoustics: | STC 45 |
| General Character of Room: | Conference Room |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | N/A |
| HVAC: | 72 Degrees F +/- 4 |
| Plumbing: | N/A |
| Electrical: | 120 V Outlets |
| Lighting: | Fluorescent/LED |
| Phone / Data: | Cat-6 Data & Voice, Wifi, AV System |
| Vibration Criteria: | N/A |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Multi-Unit Conference Table, Task Chairs, Casework, Countertop, Projector, Projection Screen, Video Conferencing Screen and Controls |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

## ROOM DATA SHEET

### Small Conference Room / 300 SF




SCALE: 1/8" = 1'-0"

# 4 Space Program

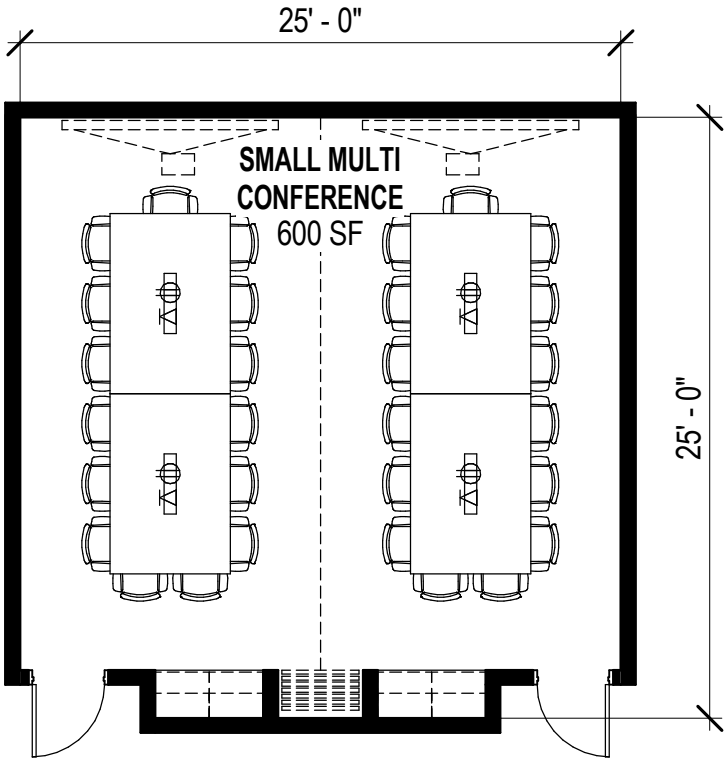
Individual Room Data Sheets / Pre-Schematic Finish Schedule

| DEPARTMENT UNIT | Common Rooms |
|---|---|
| Space Name | Small Multi-Conference |
| Space Number | N/A |

| | |
|---|---|
| **1. SPACE PROGRAM** | |
| General Space Description: | Partitionable Conference Space |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 600 SF |
| (Quantity) & Location: | (1) at Level 01; (2) at Levels 02, 03, 04 |
| Purpose of Space: | Conference |
| Number of Occupants: | 30 |
| Hours and Days Used: | 8am - 5pm, M-F |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | N/A |
| Must Be Near To: | N/A |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | Desirable |
| Doors: | 3'-6" Wide Minimum |
| Floor: | Carpet |
| Wall: | Painted Gypsum Board |
| Ceiling: | Acoustical Tile |
| Ceiling Height: | 9'-0" Minimum |
| Acoustics: | STC 45 |
| General Character of Room: | Conference Room |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | N/A |
| HVAC: | 72 Degrees F +/- 4 |
| Plumbing: | N/A |
| Electrical: | 120 V Outlets |
| Lighting: | Fluorescent/LED |
| Phone / Data: | Cat-6 Data & Voice, Wifi, AV System |
| Vibration Criteria: | N/A |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Multi-Unit Conference Table, Task Chairs, Casework, Countertop, Projector, Projection Screen, Video Conference Screens. Each room to work independent or together when partition is open. |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | N/A |

## ROOM DATA SHEET

### Small Multi-Conference / 600 SF




SCALE: 1/8" = 1'-0"

# 4 Space Program

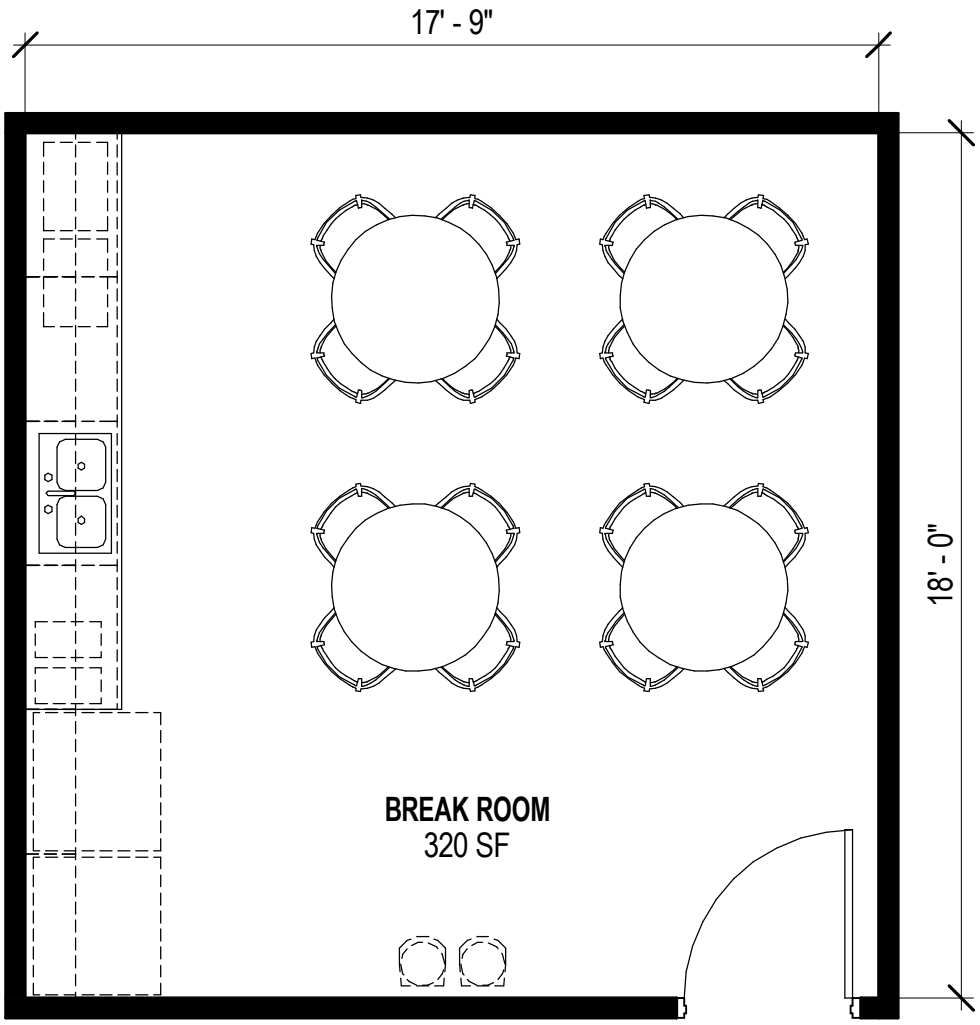
Individual Room Data Sheets / Pre-Schematic Finish Schedule

| DEPARTMENT UNIT | Common Areas |
|---|---|
| Space Name | Break Room |
| Space Number | N/A |

| 1. SPACE PROGRAM | |
|---|---|
| General Space Description: | Break Room |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 320 SF |
| (Quantity) & Location: | (2) at Levels 02, 03, 04, 05; (1) at Levels 01, 06 |
| Purpose of Space: | Food Storage, Prep & Consumption |
| Number of Occupants: | 16 |
| Hours and Days Used: | 8am - 5pm, M-F |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | Labs, Lab Offices |
| Must Be Near To: | N/A |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | Desirable |
| Doors: | 3'-6" Wide Minimum |
| Floor: | Vinyl Composition Tile or Sheet Vinyl |
| Wall: | Painted Gypsum Board |
| Ceiling: | Acoustical Tile |
| Ceiling Height: | 9'-0" Minimum |
| Acoustics: | N/A |
| General Character of Room: | Break Room |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | N/A |
| HVAC: | 72 Degrees F +/- 4 |
| Plumbing: | Kitchen Sink |
| Electrical: | 120 V Outlets, 220 V Outlets |
| Lighting: | Fluorescent/LED |
| Phone / Data: | Cat-6 Data & Voice, Wifi |
| Vibration Criteria: | N/A |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Refrigerator, Water Cooler, Coffee Machines, Microwaves, Water Coolers, Tables & Chairs |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

## ROOM DATA SHEET

### Break Room / 320 SF

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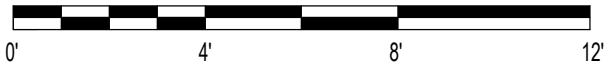
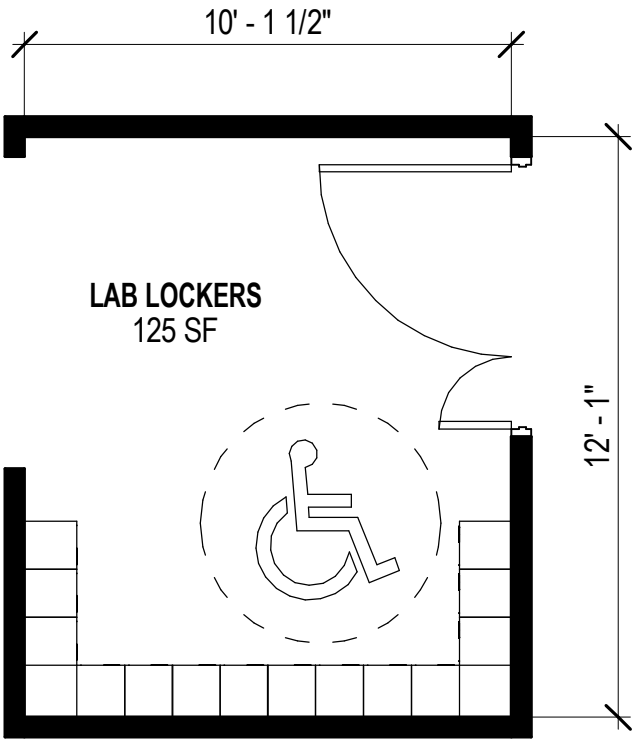


| DEPARTMENT UNIT | Common Rooms |
|---|---|
| Space Name | Lab Lockers |
| Space Number | N/A |

| 1. SPACE PROGRAM | |
|---|---|
| General Space Description: | Lab Lockers |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 125 SF |
| (Quantity) & Location: | (2) at Levels 02, 03, 04 |
| Purpose of Space: | Personal Storage Space Outside Lab Areas |
| Number of Occupants: | 3 |
| Hours and Days Used: | 8am - 5pm, M-F |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | Labs |
| Must Be Near To: | N/A |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | None |
| Doors: | 6'-0" Wide Opening, 4'-6" + 1'-6" Uneven Doors |
| Floor: | Resilient Flooring |
| Wall: | Painted Gypsum Board |
| Ceiling: | Acoustical Tile |
| Ceiling Height: | 9'-0" Minimum |
| Acoustics: | N/A |
| General Character of Room: | Lab Lockers |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | N/A |
| HVAC: | 72 Degrees F +/- 4 |
| Plumbing: | N/A |
| Electrical: | 120 V Outlets |
| Lighting: | Fluorescent/LED |
| Phone / Data: | N/A |
| Vibration Criteria: | N/A |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | (48) 3-Tier Lockers |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

## ROOM DATA SHEET

### Lab Lockers / 125 SF



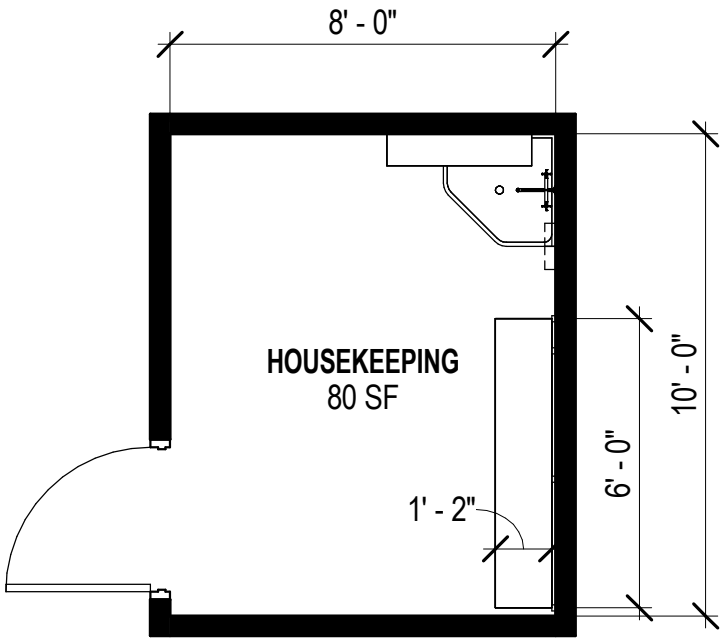

SCALE: 1/4" = 1'-0"

| DEPARTMENT UNIT | Common Rooms |
|---|---|
| Space Name | Housekeeping (Wet) |
| Space Number | N/A |

| 1. SPACE PROGRAM | |
|---|---|
| General Space Description: | Housekeeping |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 80 SF |
| (Quantity) & Location: | (2) at Levels 01, 02, 03, 04; (1) at Levels 05, 06 |
| Purpose of Space: | Housekeeping |
| Number of Occupants: | 1 |
| Hours and Days Used: | 12am - 12pm, Su-Sa |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | N/A |
| Must Be Near To: | N/A |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | None |
| Doors: | 3'-0" Minimum Wide, Outswinging, Hold Open Closer |
| Floor: | Ceramic Tile |
| Wall: | Painted Moisture Resistant Gypsum Board, Rubber Base |
| Ceiling: | Painted Gypsum Board |
| Ceiling Height: | 9'-0" Minimum |
| Acoustics: | N/A |
| General Character of Room: | Housekeeping |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | Card Access |
| HVAC: | 72 Degrees F +/- 4, Exhaust |
| Plumbing: | Mop Sink, Floor Drain |
| Electrical: | 120 V GFCI Outlets |
| Lighting: | Fluorescent/LED |
| Phone / Data: | N/A |
| Vibration Criteria: | N/A |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Mop Rack, Shelving, Cleaning Solution Dispenser |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

## ROOM DATA SHEET

### Housekeeping (Wet) / 80 SF



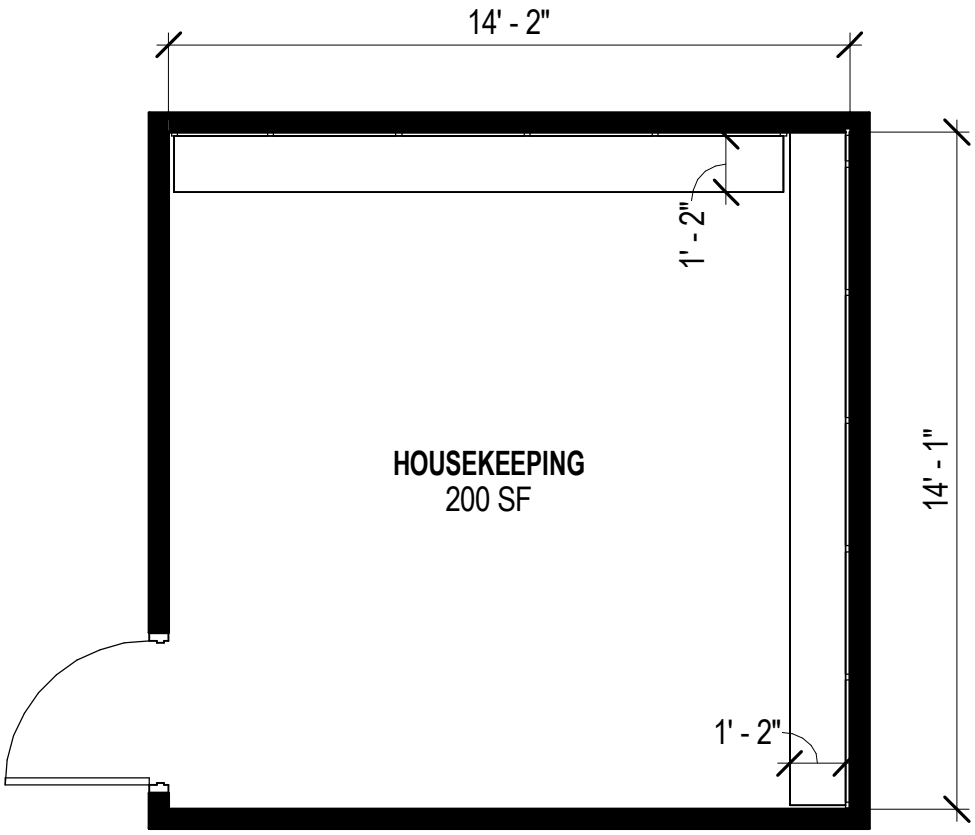

SCALE: 1/4" = 1'-0"

| DEPARTMENT UNIT | Common Rooms |
|---|---|
| Space Name | Housekeeping (Dry) |
| Space Number | N/A |

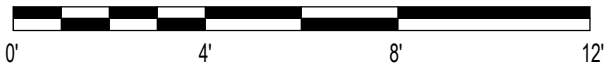
| 1. SPACE PROGRAM | |
|---|---|
| General Space Description: | Housekeeping |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 200 SF |
| (Quantity) & Location: | (1) at Levels 01, 03 |
| Purpose of Space: | Housekeeping |
| Number of Occupants: | 1 |
| Hours and Days Used: | 12am - 12pm, Su-Sa |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | N/A |
| Must Be Near To: | N/A |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | None |
| Doors: | 3'-0" Minimum Wide, Outswinging, Hold Open Closer |
| Floor: | Ceramic Tile |
| Wall: | Painted Gypsum Board |
| Ceiling: | Painted Gypsum Board |
| Ceiling Height: | 9'-0" Minimum |
| Acoustics: | N/A |
| General Character of Room: | Housekeeping |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | Card Access |
| HVAC: | 72 Degrees F +/- 4 |
| Plumbing: | N/A |
| Electrical: | 120 V Outlets |
| Lighting: | Fluorescent/LED |
| Phone / Data: | N/A |
| Vibration Criteria: | N/A |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Shelving |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

## ROOM DATA SHEET

### Housekeeping (Dry) / 200 SF




SCALE: 1/4" = 1'-0"

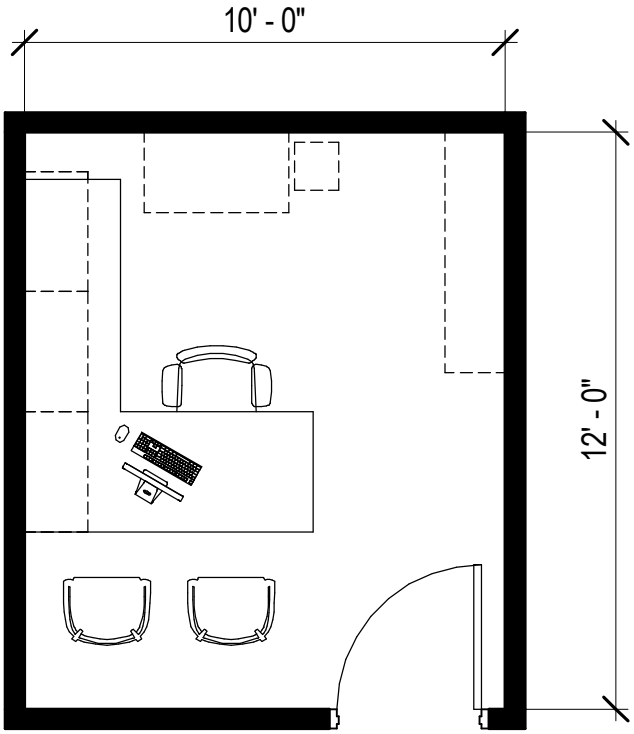


| DEPARTMENT UNIT | Common Rooms |
|---|---|
| Space Name | Housekeeping Office |
| Space Number | N/A |

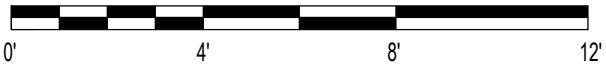
| 1. SPACE PROGRAM | |
|---|---|
| General Space Description: | Office |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 120 SF |
| (Quantity) & Location: | (1) at Level 01 |
| Purpose of Space: | Staff Office |
| Number of Occupants: | 2 |
| Hours and Days Used: | 8am - 5pm, M-F |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | N/A |
| Must Be Near To: | N/A |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | None |
| Doors: | 3'-0" Wide Minimum |
| Floor: | Carpet |
| Wall: | Painted Gypsum Board |
| Ceiling: | Acoustical Tile |
| Ceiling Height: | 9'-0" Minimum |
| Acoustics: | STC 45 |
| General Character of Room: | N/A |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | N/A |
| HVAC: | 72 Degrees F +/- 4 |
| Plumbing: | N/A |
| Electrical: | 120 V Outlets |
| Lighting: | Fluorescent/LED |
| Phone / Data: | Cat-6 Data & Voice |
| Vibration Criteria: | N/A |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Office Desk, Task Chair, Shelving, Guest Chairs |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

## ROOM DATA SHEET

### Housekeeping Office / 120 SF




SCALE: 1/4" = 1'-0"

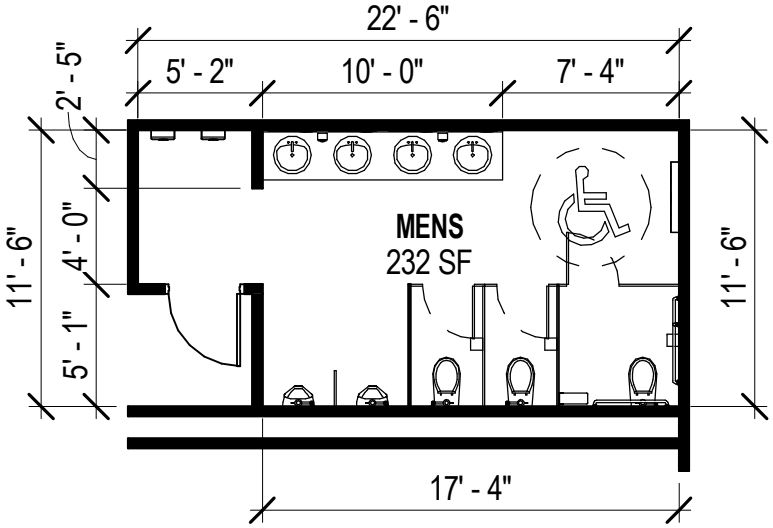


| DEPARTMENT UNIT | Common Rooms |
|---|---|
| Space Name | Men's Restroom |
| Space Number | N/A |

| 1. SPACE PROGRAM | |
|---|---|
| General Space Description: | Multiple Water Closet Toilet Room |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 232 SF |
| (Quantity) & Location: | (1) at Levels A, 01, 02, 03, 04 |
| Purpose of Space: | Toilet Room |
| Number of Occupants: | 0 |
| Hours and Days Used: | 12am - 12am, Su-Sa |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | N/A |
| Must Be Near To: | N/A |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | None |
| Doors: | 3'-0" Wide Minimum |
| Floor: | Ceramic Tile |
| Wall: | Painted Moisture Resistant Gypsum Board, Tile Base |
| Ceiling: | Painted Gypsum Board |
| Ceiling Height: | 9'-0" Minimum |
| Acoustics: | STC 45 |
| General Character of Room: | Toilet Room |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | N/A |
| HVAC: | 72 Degrees F +/- 4, Exhaust |
| Plumbing: | Wall-Hung Water Closets, Integral Handwash Sinks, Floor Drains, Wall-Hung Urinals |
| Electrical: | 120 V GFCI Outlets |
| Lighting: | Fluorescent/LED |
| Phone / Data: | N/A |
| Vibration Criteria: | N/A |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Mirror, Soap Dispenser, Toilet Paper Dispenser, Seat Cover Dispenser, Paper Towel Dispenser, Grab Bars, Trash Receptacle, Countertop, Baby Changing Station, ADA Folding Shelf, Toilet Partitions / Privacy Option |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

## ROOM DATA SHEET

### Men's Restroom / 232 SF



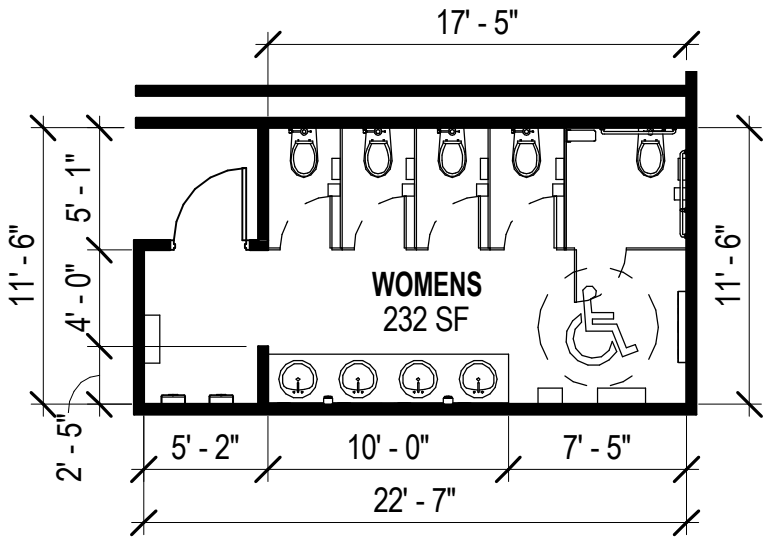

SCALE: 1/8" = 1'-0"

| DEPARTMENT UNIT | Common Rooms |
|---|---|
| Space Name | Women's Restroom |
| Space Number | N/A |

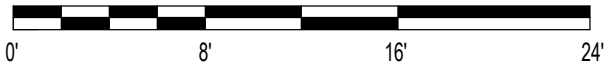
| 1. SPACE PROGRAM | |
|---|---|
| General Space Description: | Multiple Water Closet Toilet Room |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 232 SF |
| (Quantity) & Location: | (1) at Levels A, 01, 02, 03, 04 |
| Purpose of Space: | Toilet Room |
| Number of Occupants: | 0 |
| Hours and Days Used: | 12am - 12am, Su-Sa |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | N/A |
| Must Be Near To: | N/A |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | None |
| Doors: | 3'-0" Wide Minimum |
| Floor: | Ceramic Tile |
| Wall: | Painted Moisture Resistant Gypsum Board, Tile Base |
| Ceiling: | Painted Gypsum Board |
| Ceiling Height: | 9'-0" Minimum |
| Acoustics: | STC 45 |
| General Character of Room: | Toilet Room |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | N/A |
| HVAC: | 72 Degrees F +/- 4, Exhaust |
| Plumbing: | Wall-Hung Water Closets, Integral Handwash Sinks, Floor Drains |
| Electrical: | 120 V GFCI Outlets |
| Lighting: | Fluorescent/LED |
| Phone / Data: | N/A |
| Vibration Criteria: | N/A |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Mirror, Soap Dispenser, Toilet Paper Dispenser, Seat Cover Dispenser, Paper Towel Dispenser, Grab Bars, Trash Receptacle, Countertop, Baby Changing Station, ADA Folding Shelf, Sanitary Napkin Dispenser, Sanitary Napkin Disposal, SS Shelf, Toilet Partitions / Privacy Option |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | Note |

## ROOM DATA SHEET

### Women's Restroom / 232 SF




SCALE: 1/8" = 1'-0"

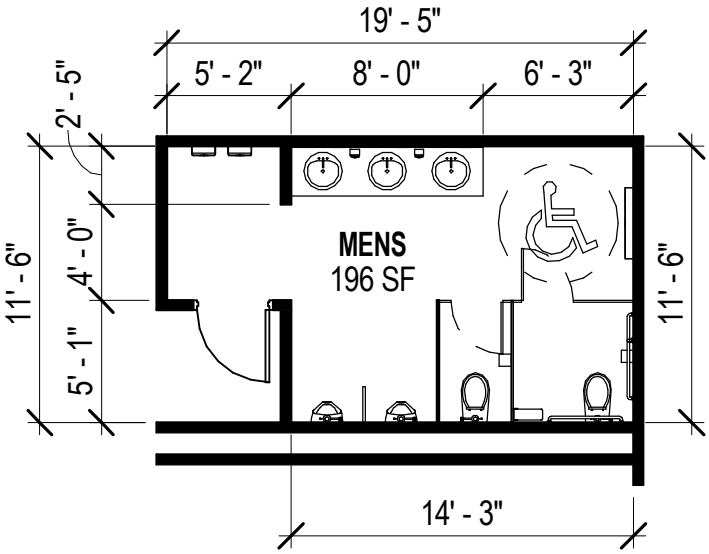


| DEPARTMENT UNIT | Common Rooms |
|---|---|
| Space Name | Men's Restroom |
| Space Number | N/A |

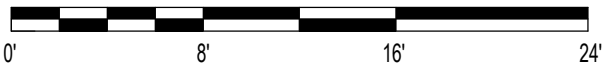
| 1. SPACE PROGRAM | |
|---|---|
| General Space Description: | Multiple Water Closet Toilet Room |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 196 SF |
| (Quantity) & Location: | (1) at Level 05 |
| Purpose of Space: | Toilet Room |
| Number of Occupants: | 0 |
| Hours and Days Used: | 12am - 12am, Su-Sa |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | N/A |
| Must Be Near To: | N/A |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | None |
| Doors: | 3'-0" Wide Minimum |
| Floor: | Ceramic Tile |
| Wall: | Painted Moisture Resistant Gypsum Board, Tile Base |
| Ceiling: | Painted Gypsum Board |
| Ceiling Height: | 9'-0" Minimum |
| Acoustics: | STC 45 |
| General Character of Room: | Toilet Room |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | N/A |
| HVAC: | 72 Degrees F +/- 4, Exhaust |
| Plumbing: | Wall-Hung Water Closets, Integral Handwash Sinks, Floor Drains, Wall-Hung Urinals |
| Electrical: | 120 V GFCI Outlets |
| Lighting: | Fluorescent/LED |
| Phone / Data: | N/A |
| Vibration Criteria: | N/A |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Mirror, Soap Dispenser, Toilet Paper Dispenser, Seat Cover Dispenser, Paper Towel Dispenser, Grab Bars, Trash Receptacle, Countertop, Baby Changing Station, ADA Folding Shelf, Toilet Partitions / Privacy Option |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

## ROOM DATA SHEET

### Men's Restroom / 196 SF




SCALE: 1/8" = 1'-0"

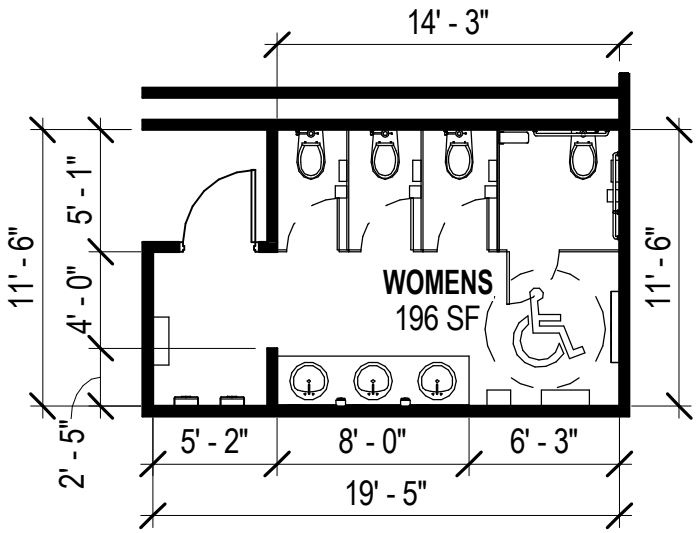


| DEPARTMENT UNIT | Common Rooms |
|---|---|
| Space Name | Women's Restroom |
| Space Number | N/A |

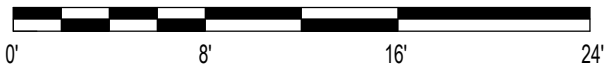
| 1. SPACE PROGRAM | |
|---|---|
| General Space Description: | Multiple Water Closet Toilet Room |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 196 SF |
| (Quantity) & Location: | (1) at Level 05 |
| Purpose of Space: | Toilet Room |
| Number of Occupants: | 0 |
| Hours and Days Used: | 12am - 12am, Su-Sa |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | N/A |
| Must Be Near To: | N/A |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | None |
| Doors: | 3'-0" Wide Minimum |
| Floor: | Ceramic Tile |
| Wall: | Painted Moisture Resistant Gypsum Board, Tile Base |
| Ceiling: | Painted Gypsum Board |
| Ceiling Height: | 9'-0" Minimum |
| Acoustics: | STC 45 |
| General Character of Room: | Toilet Room |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | N/A |
| HVAC: | 72 Degrees F +/- 4, Exhaust |
| Plumbing: | Wall-Hung Water Closets, Integral Handwash Sinks, Floor Drains |
| Electrical: | 120 V GFCI Outlets |
| Lighting: | Fluorescent/LED |
| Phone / Data: | N/A |
| Vibration Criteria: | N/A |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Mirror, Soap Dispenser, Toilet Paper Dispenser, Seat Cover Dispenser, Paper Towel Dispenser, Grab Bars, Trash Receptacle, Countertop, Baby Changing Station, ADA Folding Shelf, Sanitary Napkin Dispenser, Sanitary Napkin Disposal, SS Shelf, Toilet Partitions / Privacy Option |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

## ROOM DATA SHEET

### Women's Restroom / 196 SF




SCALE: 1/8" = 1'-0"

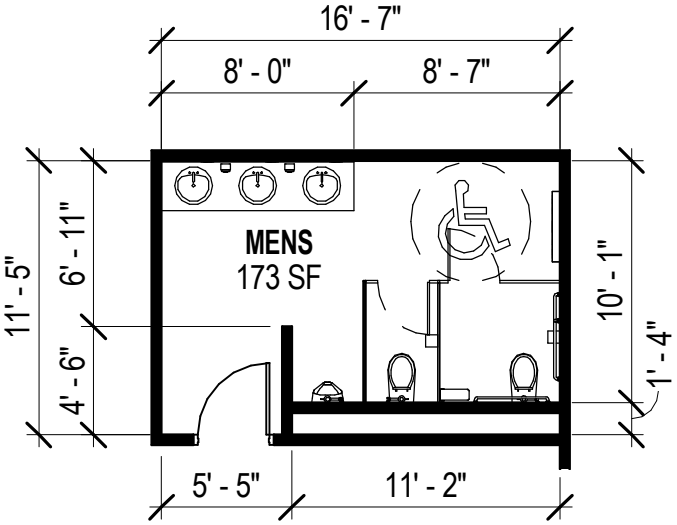


| DEPARTMENT UNIT | Common Rooms |
|---|---|
| Space Name | Men's Restroom |
| Space Number | N/A |

| 1. SPACE PROGRAM | |
|---|---|
| General Space Description: | Multiple Water Closet Toilet Room |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 173 SF |
| (Quantity) & Location: | (1) at Level 06 |
| Purpose of Space: | Toilet Room |
| Number of Occupants: | 0 |
| Hours and Days Used: | 12am - 12am, Su-Sa |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | N/A |
| Must Be Near To: | N/A |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | None |
| Doors: | 3'-0" Wide Minimum |
| Floor: | Ceramic Tile |
| Wall: | Painted Moisture Resistant Gypsum Board, Tile Base |
| Ceiling: | Painted Gypsum Board |
| Ceiling Height: | 9'-0" Minimum |
| Acoustics: | STC 45 |
| General Character of Room: | Toilet Room |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | N/A |
| HVAC: | 72 Degrees F +/- 4, Exhaust |
| Plumbing: | Wall-Hung Water Closets, Integral Handwash Sinks, Floor Drains, Wall-Hung Urinals |
| Electrical: | 120 V GFCI Outlets |
| Lighting: | Fluorescent/LED |
| Phone / Data: | N/A |
| Vibration Criteria: | N/A |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Mirror, Soap Dispenser, Toilet Paper Dispenser, Seat Cover Dispenser, Paper Towel Dispenser, Grab Bars, Trash Receptacle, Countertop, Baby Changing Station, ADA Folding Shelf, Toilet Partitions / Privacy Option |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | N/A |

## ROOM DATA SHEET

### Men's Restroom / 173 SF



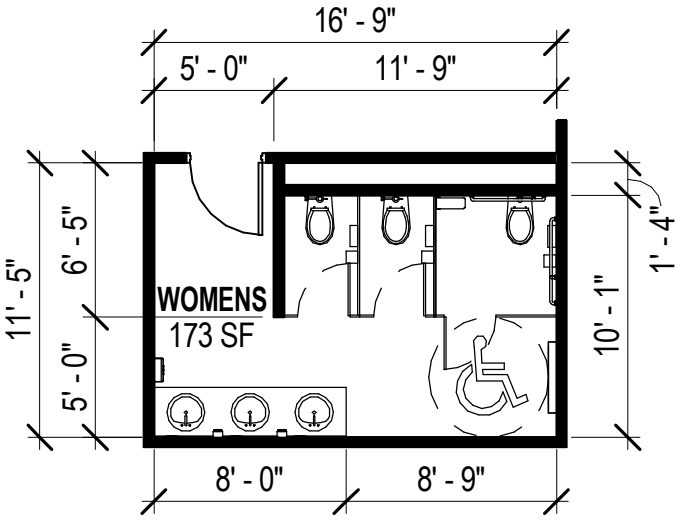

SCALE: 1/8" = 1'-0"

| DEPARTMENT UNIT | Common Rooms |
|---|---|
| Space Name | Women's Restroom |
| Space Number | N/A |

| 1. SPACE PROGRAM | |
|---|---|
| General Space Description: | Multiple Water Closet Toilet Room |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 173 SF |
| (Quantity) & Location: | (1) at Level 06 |
| Purpose of Space: | Toilet Room |
| Number of Occupants: | 0 |
| Hours and Days Used: | 12am - 12am, Su-Sa |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | N/A |
| Must Be Near To: | N/A |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | None |
| Doors: | 3'-0" Wide Minimum |
| Floor: | Ceramic Tile |
| Wall: | Painted Moisture Resistant Gypsum Board, Tile Base |
| Ceiling: | Painted Gypsum Board |
| Ceiling Height: | 9'-0" Minimum |
| Acoustics: | STC 45 |
| General Character of Room: | Toilet Room |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | N/A |
| HVAC: | 72 Degrees F +/- 4, Exhaust |
| Plumbing: | Wall-Hung Water Closets, Integral Handwash Sinks, Floor Drains |
| Electrical: | 120 V GFCI Outlets |
| Lighting: | Fluorescent/LED |
| Phone / Data: | N/A |
| Vibration Criteria: | N/A |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Mirror, Soap Dispenser, Toilet Paper Dispenser, Seat Cover Dispenser, Paper Towel Dispenser, Grab Bars, Trash Receptacle, Countertop, Baby Changing Station, ADA Folding Shelf, Sanitary Napkin Dispenser, Sanitary Napkin Disposal, SS Shelf, Toilet Partitions / Privacy Option |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

## ROOM DATA SHEET

### Women's Restroom / 173 SF



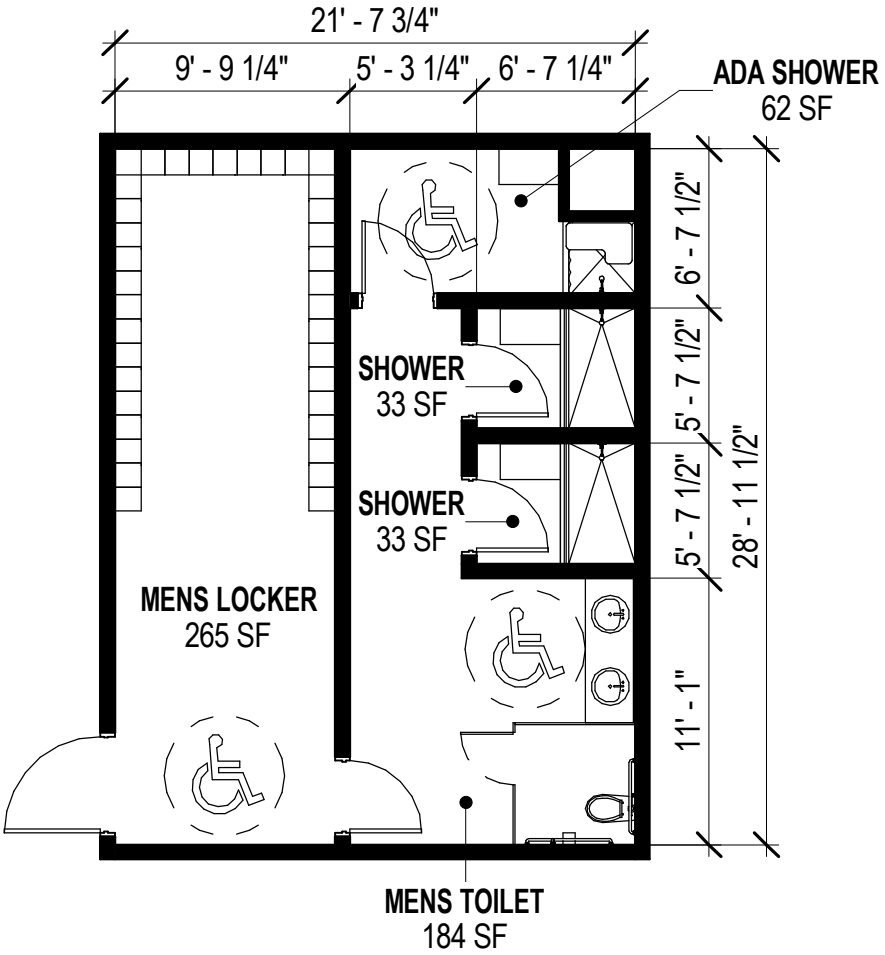

SCALE: 1/8" = 1'-0"

| DEPARTMENT UNIT | Common Rooms |
|---|---|
| Space Name | Men's Locker Room |
| Space Number | N/A |

| 1. SPACE PROGRAM | |
|---|---|
| General Space Description: | Locker Room |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 577 SF |
| (Quantity) & Location: | (1) at Level 01 |
| Purpose of Space: | Locker, Shower, Changing & Toilet Room |
| Number of Occupants: | 0 |
| Hours and Days Used: | 12am - 12am, Su-Sa |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | N/A |
| Must Be Near To: | N/A |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | None |
| Doors: | 3'-0" Wide Minimum |
| Floor: | Ceramic Tile |
| Wall: | Painted Moisture Resistant Gypsum Board, Tile Base |
| Ceiling: | Painted Gypsum Board |
| Ceiling Height: | 9'-0" Minimum |
| Acoustics: | STC 45 |
| General Character of Room: | Locker Room |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | N/A |
| HVAC: | 72 Degrees F +/- 4, Exhaust |
| Plumbing: | Wall-Hung Water Closets, Integral Handwash Sinks, Floor Drains, Shower Faucets |
| Electrical: | 120 V GFCI Outlets |
| Lighting: | Fluorescent/LED |
| Phone / Data: | N/A |
| Vibration Criteria: | N/A |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Mirror, Soap Dispenser, Toilet Paper Dispenser, Seat Cover Dispenser, Paper Towel Dispenser, Grab Bars, Trash Receptacle, Countertop, Baby Changing Station, ADA Folding Shelf, Shower Bench, Robe Hooks, 2-Tier Lockers, Toilet Partitions / Privacy Option, Shower Curtains |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

## ROOM DATA SHEET

### Men's Locker Room / 577 SF



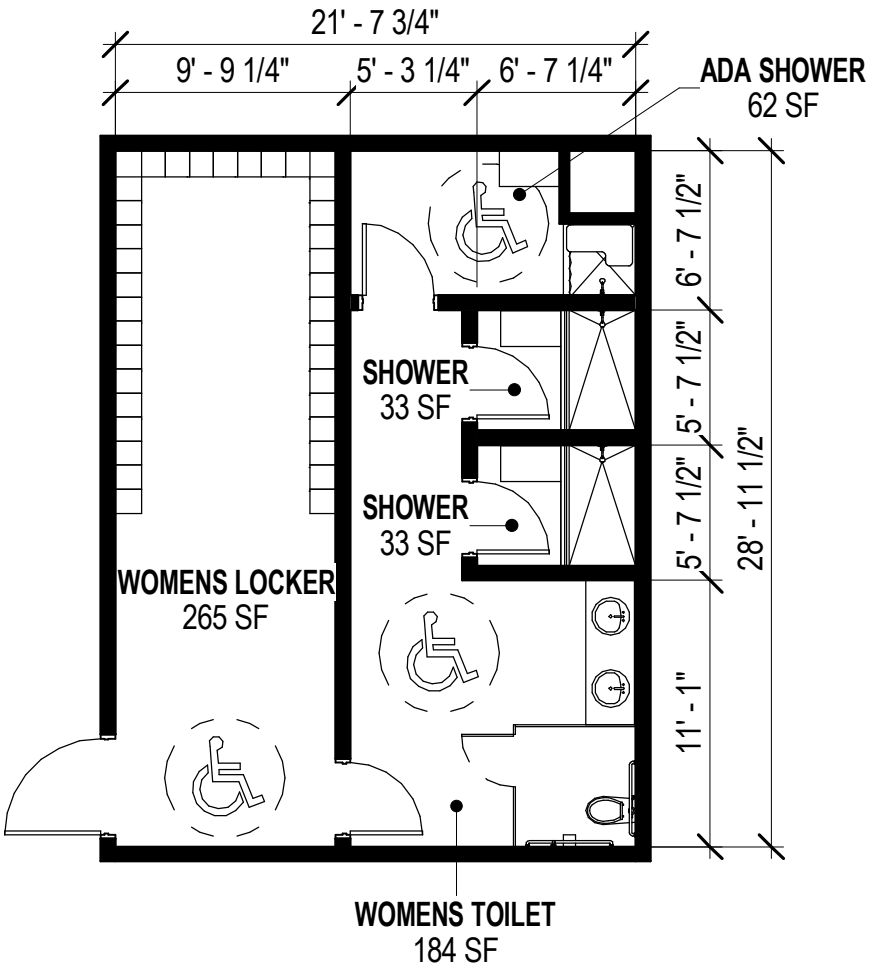

SCALE: 1/8" = 1'-0"

| DEPARTMENT UNIT | Common Rooms |
|---|---|
| Space Name | Women's Locker Room |
| Space Number | N/A |

| 1. SPACE PROGRAM | |
|---|---|
| General Space Description: | Locker Room |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 577 SF |
| (Quantity) & Location: | (1) at Level 01 |
| Purpose of Space: | Locker, Shower, Changing & Toilet Room |
| Number of Occupants: | 0 |
| Hours and Days Used: | 12am - 12am, Su-Sa |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | N/A |
| Must Be Near To: | N/A |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | None |
| Doors: | 3'-0" Wide Minimum |
| Floor: | Ceramic Tile |
| Wall: | Painted Moisture Resistant Gypsum Board, Tile Base |
| Ceiling: | Painted Gypsum Board |
| Ceiling Height: | 9'-0" Minimum |
| Acoustics: | STC 45 |
| General Character of Room: | Locker Room |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | N/A |
| HVAC: | 72 Degrees F +/- 4, Exhaust |
| Plumbing: | Wall-Hung Water Closets, Integral Handwash Sinks, Floor Drains, Shower Faucets |
| Electrical: | 120 V GFCI Outlets |
| Lighting: | Fluorescent/LED |
| Phone / Data: | N/A |
| Vibration Criteria: | N/A |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Mirror, Soap Dispenser, Toilet Paper Dispenser, Seat Cover Dispenser, Paper Towel Dispenser, Grab Bars, Trash Receptacle, Countertop, Baby Changing Station, ADA Folding Shelf, Sanitary Napkin Dispenser, Sanitary Napkin Disposal, SS Shelf, Shower Bench, Robe Hooks, 2-Tier Lockers, Toilet Partitions / Privacy Option, Shower Curtains |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

## ROOM DATA SHEET

### Women's Locker Room / 577 SF




SCALE: 1/8" = 1'-0"

# 4 Space Program

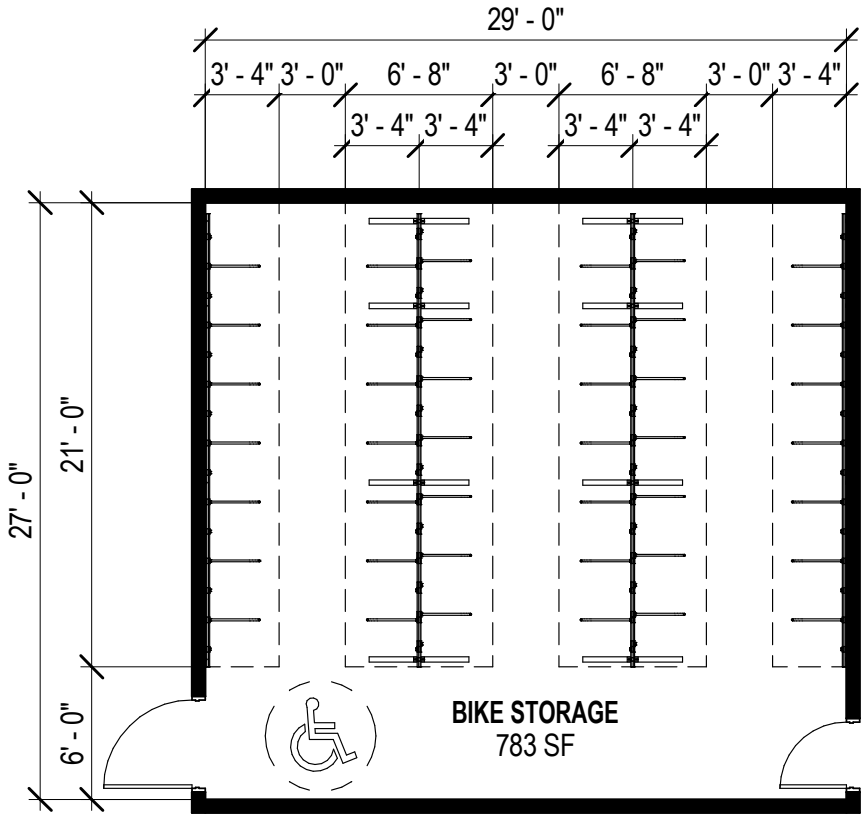
Individual Room Data Sheets / Pre-Schematic Finish Schedule

| DEPARTMENT UNIT | Common Rooms |
|---|---|
| Space Name | Bike Storage Room |
| Space Number | N/A |

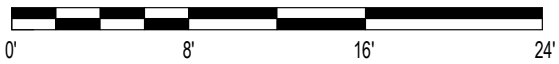
| 1. SPACE PROGRAM | |
|---|---|
| General Space Description: | Bike Storage for (32) Bikes |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 790 SF |
| (Quantity) & Location: | (1) at Level 01 |
| Purpose of Space: | Bike Storage Room |
| Number of Occupants: | 0 |
| Hours and Days Used: | 24/7 |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | N/A |
| Must Be Near To: | N/A |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | None |
| Doors: | 4'-0" Wide Minimum Exterior, 3'-0" Wide Minimum Interior |
| Floor: | Sealed Concrete |
| Wall: | Painted Gypsum Board, Fire Treated Plywood to 7'-0" A.F.F. |
| Ceiling: | Open to Structure |
| Ceiling Height: | N/A |
| Acoustics: | N/A |
| General Character of Room: | Bike Storage Room |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | Card Access |
| HVAC: | 72 Degrees F +/- 4 |
| Plumbing: | Floor Drains |
| Electrical: | 120 V Outlets |
| Lighting: | Fluorescent/LED |
| Phone / Data: | N/A |
| Vibration Criteria: | N/A |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Bike Storage (Dero - Ultra Space Saver), Bike Fixing Station (Dero - Fixit) |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

## ROOM DATA SHEET

### Bike Storage Room / 790 SF




SCALE: 1/8" = 1'-0"



# 4 Space Program

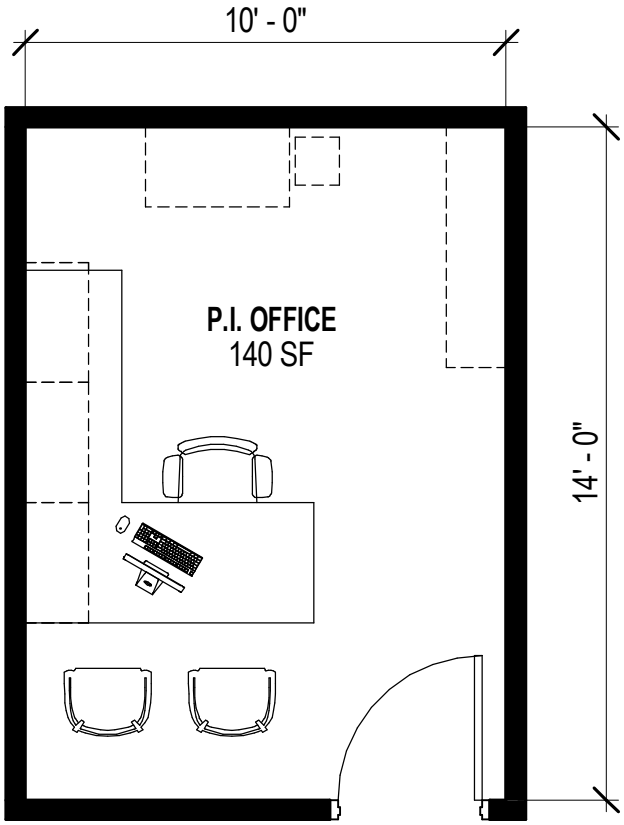
Individual Room Data Sheets / Pre-Schematic Finish Schedule

| | |
|---|---|
| **DEPARTMENT UNIT** | **Common Rooms** |
| **Space Name** | P.I. Office |
| **Space Number** | N/A |

| | |
|---|---|
| **1. SPACE PROGRAM** | |
| General Space Description: | Office |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 140 SF |
| (Quantity) & Location: | (12) at Levels 02, 03, 04 |
| Purpose of Space: | Staff Office |
| Number of Occupants: | 2 |
| Hours and Days Used: | 8am - 5pm, M-F |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | N/A |
| Must Be Near To: | N/A |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | None |
| Doors: | 3'-0" Wide Minimum |
| Floor: | Carpet |
| Wall: | Painted Gypsum Board |
| Ceiling: | Acoutical Tile |
| Ceiling Height: | 9'-0" Minimum |
| Acoustics: | STC 45 |
| General Character of Room: | Office |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | N/A |
| HVAC: | 72 Degrees F +/- 4 |
| Plumbing: | N/A |
| Electrical: | 120 V Outlets |
| Lighting: | Fluorescent/LED |
| Phone / Data: | Cat-6 Data & Voice |
| Vibration Criteria: | N/A |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Office Desk, Task Chair, Shelving, Guest Chairs |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

## ROOM DATA SHEET

### P.I. Office / 140 SF

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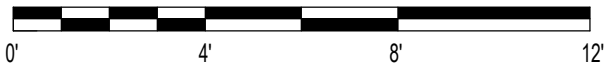


# 4 Space Program

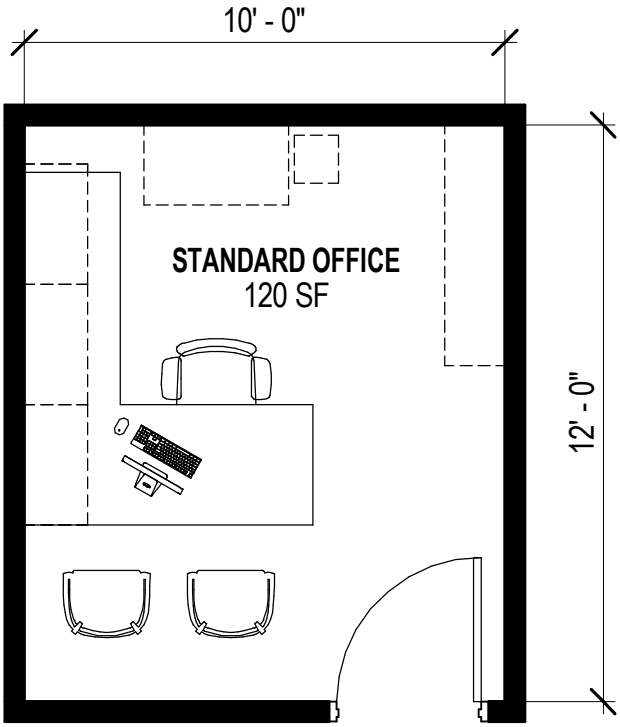
Individual Room Data Sheets / Pre-Schematic Finish Schedule

| | |
|---|---|
| **DEPARTMENT UNIT** | **Common Rooms** |
| **Space Name** | Staff Office |
| **Space Number** | N/A |

| | |
|---|---|
| **1. SPACE PROGRAM** | |
| General Space Description: | Office |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 120 SF |
| (Quantity) & Location: | (30) at Level 01; (08) at Levels 02, 03, 04; (58) at Level 05; (16) at Level 06 |
| Purpose of Space: | Staff Office |
| Number of Occupants: | 2 |
| Hours and Days Used: | 8am - 5pm, M-F |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | N/A |
| Must Be Near To: | N/A |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | None |
| Doors: | 3'-0" Wide Minimum |
| Floor: | Carpet |
| Wall: | Painted Gypsum Board |
| Ceiling: | Acoustical Tile |
| Ceiling Height: | 9'-0" Minimum |
| Acoustics: | STC 45 |
| General Character of Room: | Office |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | N/A |
| HVAC: | 72 Degrees F +/- 4 |
| Plumbing: | N/A |
| Electrical: | 120 V Outlets |
| Lighting: | Fluorescent/LED |
| Phone / Data: | Cat-6 Data & Voice |
| Vibration Criteria: | N/A |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Office Desk, Task Chair, Shelving, Guest Chairs |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

## ROOM DATA SHEET

### Staff Office / 120 SF



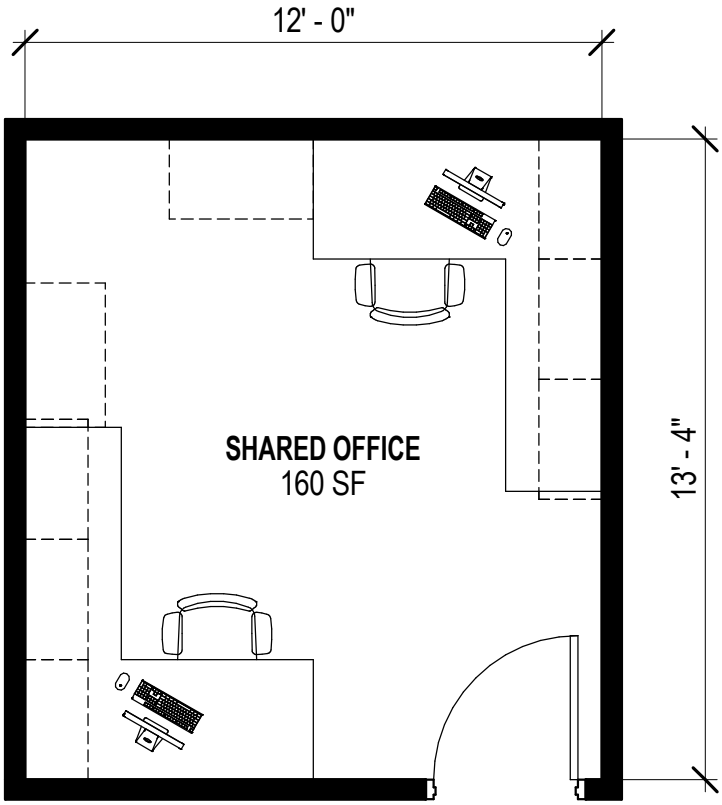

SCALE: 1/4" = 1'-0"

| | |
|---|---|
| **DEPARTMENT UNIT** | **Common Rooms** |
| **Space Name** | Shared Office |
| **Space Number** | N/A |

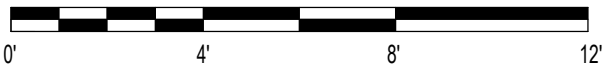
| | |
|---|---|
| **1. SPACE PROGRAM** | |
| General Space Description: | Office |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 160 SF |
| (Quantity) & Location: | Various at Levels 01, 05, 06 |
| Purpose of Space: | Staff Office |
| Number of Occupants: | 2 |
| Hours and Days Used: | 8am - 5pm, M-F |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | N/A |
| Must Be Near To: | N/A |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | Desirable |
| Doors: | 3'-0" Wide Minimum |
| Floor: | Carpet |
| Wall: | Painted Gypsum Board |
| Ceiling: | Acoustical Tile |
| Ceiling Height: | 9'-0" Minimum |
| Acoustics: | STC 45 |
| General Character of Room: | Office |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | N/A |
| HVAC: | 72 Degrees F +/- 4 |
| Plumbing: | N/A |
| Electrical: | 120 V Outlets |
| Lighting: | Fluorescent/LED |
| Phone / Data: | Cat-6 Data & Voice |
| Vibration Criteria: | N/A |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Office Desk, Task Chair, Shelving |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

## ROOM DATA SHEET

### Shared Office / 160 SF




SCALE: 1/4" = 1'-0"

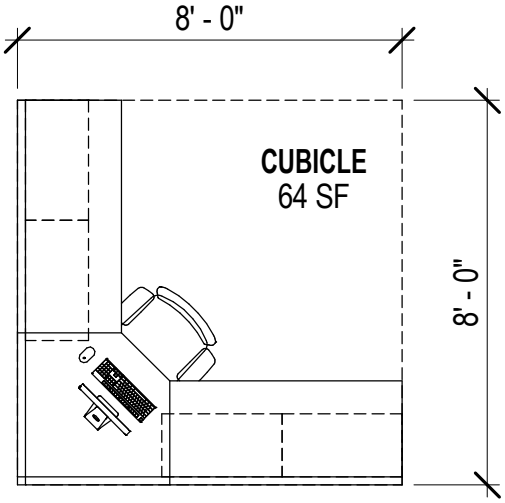


| DEPARTMENT UNIT | Common Rooms |
|---|---|
| Space Name | Cubicle |
| Space Number | N/A |

| 1. SPACE PROGRAM | |
|---|---|
| General Space Description: | Open Office Cubicle |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 64 SF |
| (Quantity) & Location: | Various at Levels 01, 02, 03, 04, 05, 06 |
| Purpose of Space: | Staff Office Space |
| Number of Occupants: | 1 |
| Hours and Days Used: | 8am - 5pm, M-F |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | N/A |
| Must Be Near To: | N/A |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | None |
| Doors: | None |
| Floor: | Carpet |
| Wall: | Painted Gypsum Board |
| Ceiling: | Acoustical Tile |
| Ceiling Height: | 9'-0" Minimum |
| Acoustics: | N/A |
| General Character of Room: | Staff Office Space |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | N/A |
| HVAC: | 72 Degrees F +/- 4 |
| Plumbing: | N/A |
| Electrical: | 120 V Outlets |
| Lighting: | Fluorescent/LED |
| Phone / Data: | Cat-6 Data & Voice |
| Vibration Criteria: | N/A |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Systems Furniture, Task Chair |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

## ROOM DATA SHEET

### Cubicle / 64 SF



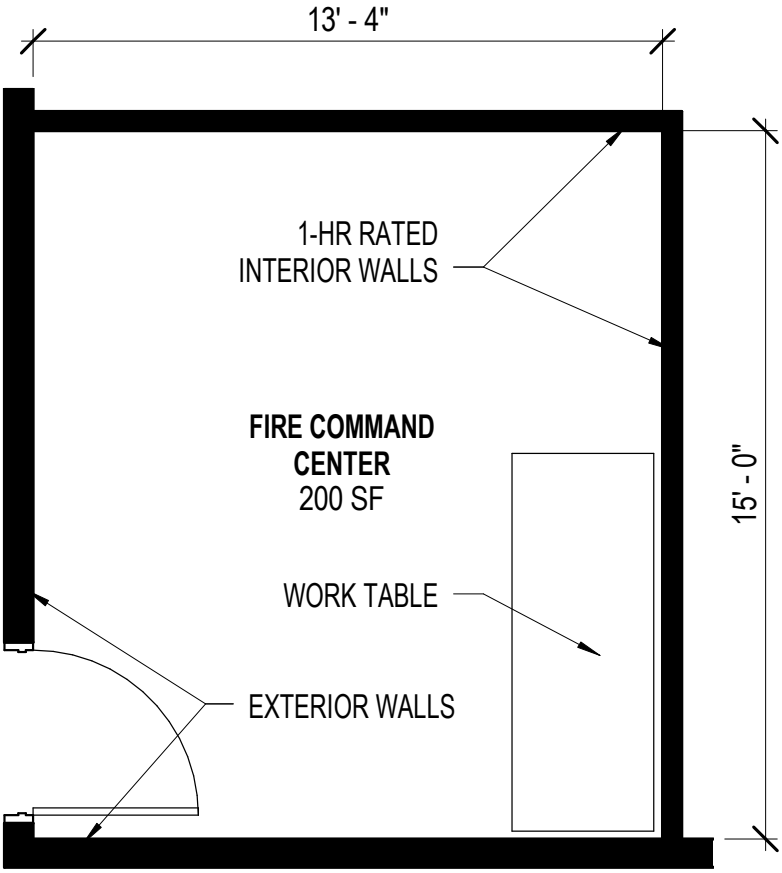

SCALE: 1/4" = 1'-0"

| DEPARTMENT UNIT | Common Rooms |
|---|---|
| Space Name | Fire Command Center |
| Space Number | N/A |

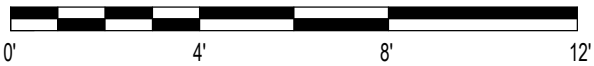
| 1. SPACE PROGRAM | |
|---|---|
| General Space Description: | Fire Command Center |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 200 SF |
| (Quantity) & Location: | (1) at Level 01 |
| Purpose of Space: | Fire Command Center |
| Number of Occupants: | 1 |
| Hours and Days Used: | 24/7 |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | N/A |
| Must Be Near To: | N/A |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | None |
| Doors: | 3'-6" Wide Minimum |
| Floor: | Sealed Concrete |
| Wall: | Painted Gypsum Board (1 Hour Separation) |
| Ceiling: | Acoustical Tile |
| Ceiling Height: | 9'-0" Minimum |
| Acoustics: | N/A |
| General Character of Room: | Fire Command Center |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | TBD |
| HVAC: | 72 Degrees F +/- 4 |
| Plumbing: | N/A |
| Electrical: | 120 V Outlets |
| Lighting: | Flourescent/LED |
| Phone / Data: | Cat-6 Data & Voice |
| Vibration Criteria: | N/A |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | "Emergency Voice/Alarm Communication System, Fire Department Communications System Annunciator, Annunciator Unit, Status Indicators & Controls for Air Distribution Systems, Fire-Fighter's Control Panel, Stairway Door Controls, Sprinkler Valve & Waterflow Detector Display Panels, Emergency & Standby Power Status Indicators, Fire Department Telephone, Fire Pump Status Indicators, Schematic Building Plans, Approved Building Information Card, Work Table, Generator Supervision Devices, Public Address System, Elevator Fire Switch, Elevator Emergency or Standby Power Selector Switches (Per IBC 2012, Section 911.1.5)" |

## ROOM DATA SHEET

### Fire Command Center / 200 SF




SCALE: 1/4" = 1'-0"

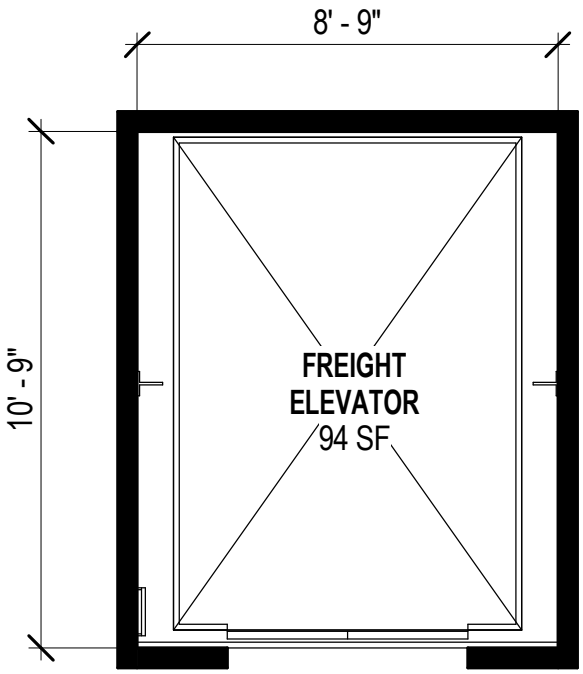


| DEPARTMENT UNIT | Common Rooms |
|---|---|
| Space Name | Freight Elevator |
| Space Number | N/A |

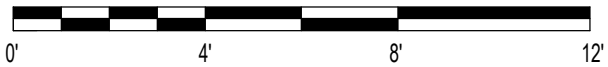
| 1. SPACE PROGRAM | |
|---|---|
| General Space Description: | Elevator |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 94 SF |
| (Quantity) & Location: | (2) at Levels A, 01, 02, 03, 04, 05, 06 |
| Purpose of Space: | Freight Transportation |
| Number of Occupants: | 1 |
| Hours and Days Used: | 12am - 12am, Su-Sa |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | Access Corridor |
| Must Be Near To: | Access Corridor |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | None |
| Doors: | 5'-0" Minimum Wide, 8'-0" Minimum High, Bi-Parting |
| Floor: | Resilient Flooring |
| Wall: | Stainless Steel |
| Ceiling: | Laminate |
| Ceiling Height: | 9'-0" Minimum |
| Acoustics: | N/A |
| General Character of Room: | Elevator Car |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | Card Access |
| HVAC: | 72 Degrees F +/- 4 |
| Plumbing: | N/A |
| Electrical: | Emergency Power |
| Lighting: | LED, Emergency Lighting |
| Phone / Data: | Emergency Phone |
| Vibration Criteria: | N/A |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | 6000 lb |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | 6000 lb Capacity, 250 fpm Speed, 5'-0" Deep Pit |

## ROOM DATA SHEET

### Freight Elevator / 94 SF




SCALE: 1/4" = 1'-0"

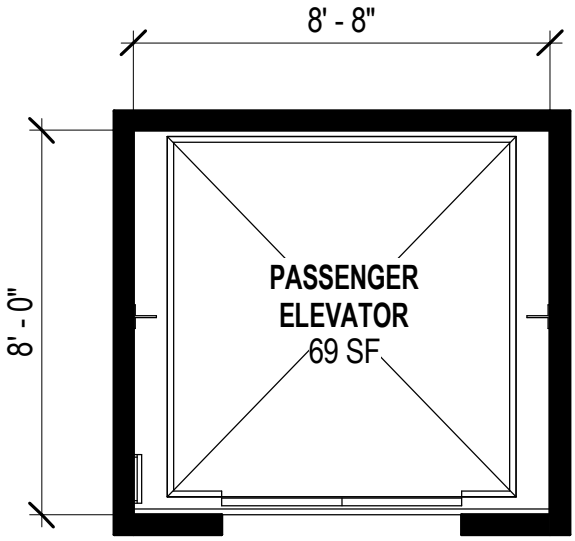


| DEPARTMENT UNIT | Common Rooms |
|---|---|
| Space Name | Passenger Elevator |
| Space Number | N/A |

| 1. SPACE PROGRAM | |
|---|---|
| General Space Description: | Elevator |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 69 SF |
| (Quantity) & Location: | (4) at Levels A, 01, 02, 03, 04, 05, 06 |
| Purpose of Space: | Passenger Transportation |
| Number of Occupants: | 1 |
| Hours and Days Used: | 12am - 12am, Su-Sa |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | Access Corridor |
| Must Be Near To: | Access Corridor |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | None |
| Doors: | 5'-0" Minimum Wide, 8'-0" Minimum High, Bi-Parting |
| Floor: | Resilient Flooring |
| Wall: | Stainless Steel |
| Ceiling: | Laminate |
| Ceiling Height: | 9'-0" Minimum |
| Acoustics: | N/A |
| General Character of Room: | Elevator Car |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | Card Access |
| HVAC: | 72 Degrees F +/- 4 |
| Plumbing: | N/A |
| Electrical: | Emergency Power |
| Lighting: | LED, Emergency Lighting |
| Phone / Data: | Emergency Phone |
| Vibration Criteria: | N/A |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | N/A |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | 3500 lb Capacity, 350 fpm Speed, 5'-0" Deep Pit |

## ROOM DATA SHEET

### Passenger Elevator / 69 SF



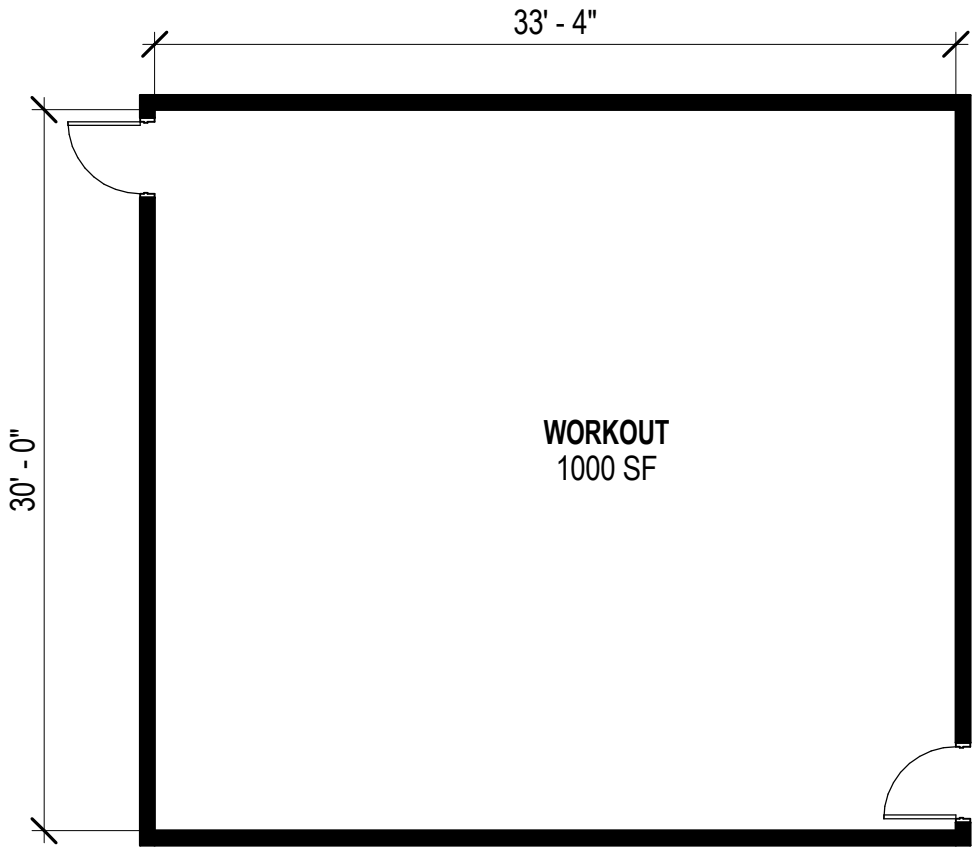

SCALE: 1/4" = 1'-0"

| DEPARTMENT UNIT | Common Rooms |
|---|---|
| Space Name | Workout Room |
| Space Number | N/A |

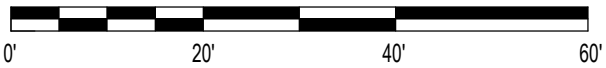
| 1. SPACE PROGRAM | |
|---|---|
| General Space Description: | Gym |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 1,000 SF |
| (Quantity) & Location: | (1) at Level 01 |
| Purpose of Space: | Workout |
| Number of Occupants: | 67 |
| Hours and Days Used: | 24/7 |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | Access Corridor |
| Must Be Near To: | Locker / Shower Room |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | At exterior or interior spaces |
| Doors: | 3'-0" (2 Exits) |
| Floor: | Rubber Tile |
| Wall: | Painted Gypsum Board |
| Ceiling: | Lay-in Ceiling Tile |
| Ceiling Height: | 9'-0" Minimum |
| Acoustics: | N/A |
| General Character of Room: | Fitness Center |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | Card Access |
| HVAC: | 72 Degrees F +/- 4 |
| Plumbing: | N/A |
| Electrical: | 110V & 208V |
| Lighting: | Fluorescent |
| Phone / Data: | Yes |
| Vibration Criteria: | N/A |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Workout Equipment |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

## ROOM DATA SHEET

### Workout Room / 1,000 SF




SCALE: 1/8" = 1'-0"

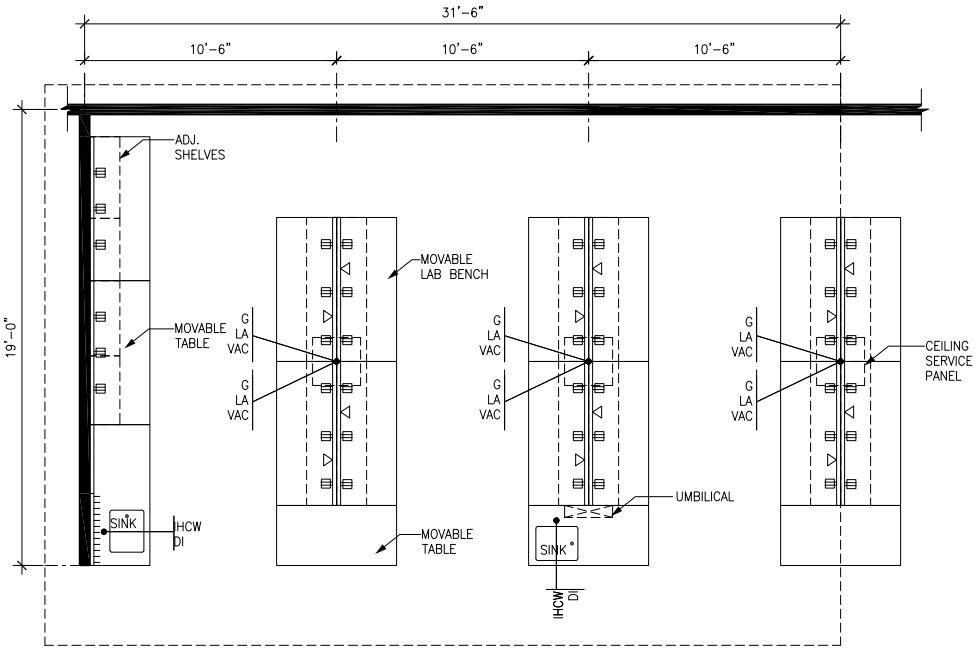


| DEPARTMENT UNIT | Laboratory |
|---|---|
| Space Name | Research Wet Laboratory |
| Space Number | N/A |

| 1. SPACE PROGRAM | |
|---|---|
| General Space Description: | Wet Lab |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 600 SF |
| (Quantity) & Location: | (2) at Levels 02, 03, 04 |
| Purpose of Space: | Lab |
| Number of Occupants: | 8 |
| Hours and Days Used: | 24/7 |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | Lab Support Rooms |
| Must Be Near To: | Faculty Offices, Lab user write up desk office space |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | Yes - to outside and building circulation corridor if possible |
| Doors: | 42" |
| Floor: | Tile |
| Wall: | Painted Gypsum Board |
| Ceiling: | Acoustic Tile |
| Ceiling Height: | 9'-0" minimum |
| Acoustics: | N/A |
| General Character of Room: | Wet Lab |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | Proximity Sensor |
| HVAC: | 72 degrees F +/- 4 |
| Plumbing: | DI and Industrial water at lab sink, Domestic water at Eyewash/ shower and at Eyewash at sink, Gas, Air, Vacuum to lab benches, floor drains for eyewash/shower |
| Electrical: | 120V outlets |
| Lighting: | Direct/Indirect susp. at ceiling, fluorescent task lighting at lab benches |
| Phone / Data: | Cat-6 Data & Voice to lab benches |
| Vibration Criteria: | 2000 Micro-inches/second |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Flexible lab benches with epoxy tops, movable wood base cabinets below and adjustable shelves above |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | Utility connections to lab benches via quick disconnects in ceiling service panels, windows to out side and to interior building corridor |

## ROOM DATA SHEET

### Research Wet Laboratory / 600 SF




SCALE: 1/8" = 1'-0"

0' 8' 16' 24'

# 4 Space Program

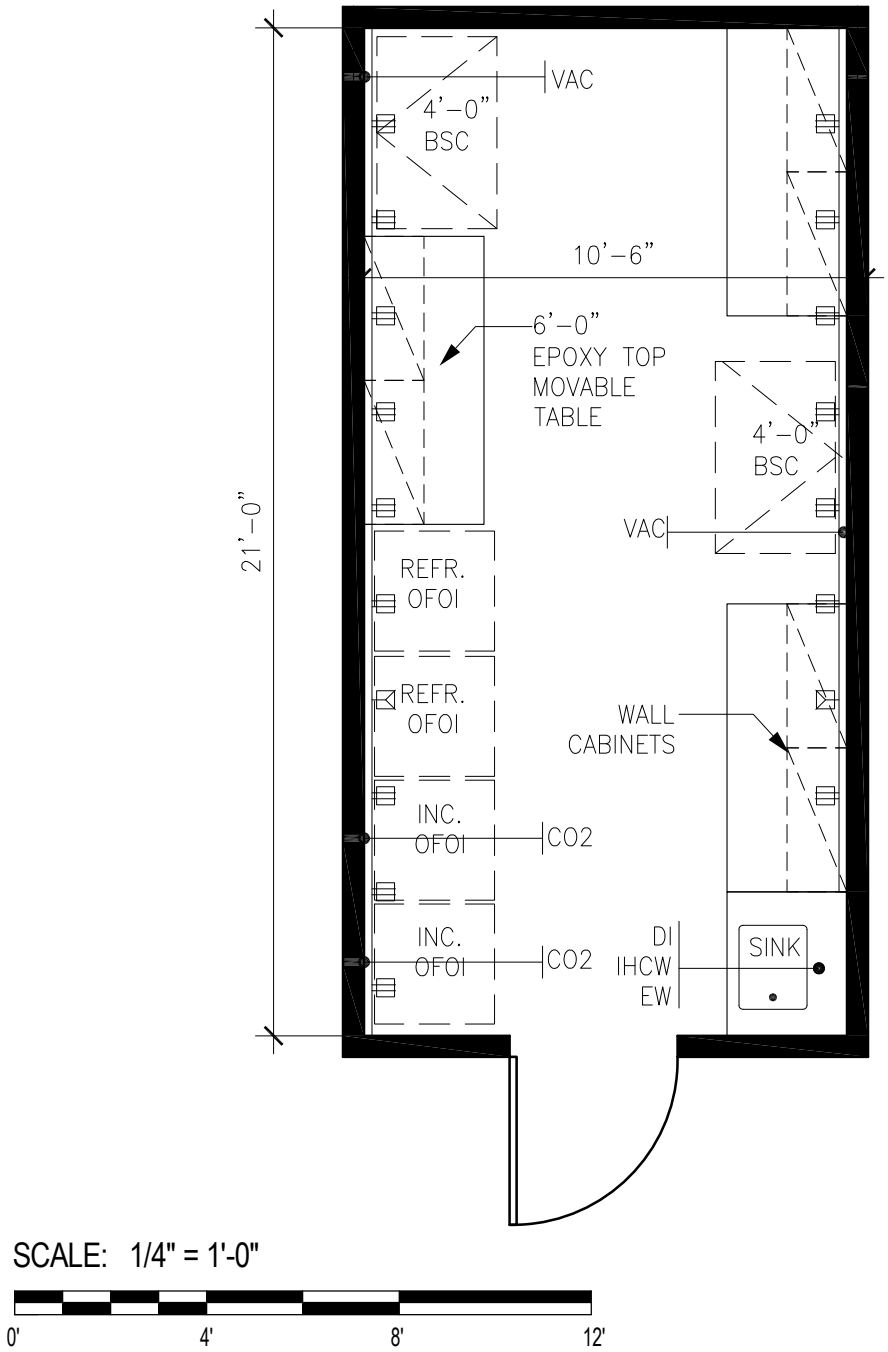
Individual Room Data Sheets / Pre-Schematic Finish Schedule

| DEPARTMENT UNIT | Laboratory |
|---|---|
| Space Name | Tissue Culture Lab |
| Space Number | N/A |

| 1. SPACE PROGRAM | |
|---|---|
| General Space Description: | Wet Lab |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 220 SF |
| (Quantity) & Location: | (2) at Levels 02, 03, 04 |
| Purpose of Space: | Lab |
| Number of Occupants: | 2 |
| Hours and Days Used: | 24/7 |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | Research Lab Space, Lab Support Rooms |
| Must Be Near To: | Faculty Offices, Lab User Write up Desk Office Space |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | None |
| Doors: | 42" |
| Floor: | Welded sheet vinyl |
| Wall: | Epoxy Painted Gypsum Board |
| Ceiling: | Epoxy Painted Gypsum Board |
| Ceiling Height: | 9'-0" minimum |
| Acoustics: | N/A |
| General Character of Room: | Wet Lab |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | Proximity Sensor |
| HVAC: | 72 degrees F +/- 4 |
| Plumbing: | DI and Industrial Water at Lab Sink, Domestic Water at Eyewash at Sink |
| Electrical: | 120V outlets, 208V outlets, UV in use light |
| Lighting: | Recessed Fluorescent |
| Phone / Data: | Cat-6 Data & Voice |
| Vibration Criteria: | 2000 Micro-inches/second |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Biosafety Cabinets (2), Incubators (2), Refrigerator, Epoxy counter with Wood cabinets and epoxy top, movable tables with epoxy top, mobile cabinets, wall cabinets, microscope use |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | Positive pressure to adjoining space, possible need for CO2 and/or nitrogen for Incubators, UV decon light in ceiling with toggle switch to white light |

## ROOM DATA SHEET

### Tissue Culture Lab / 220 SF



# 4 Space Program

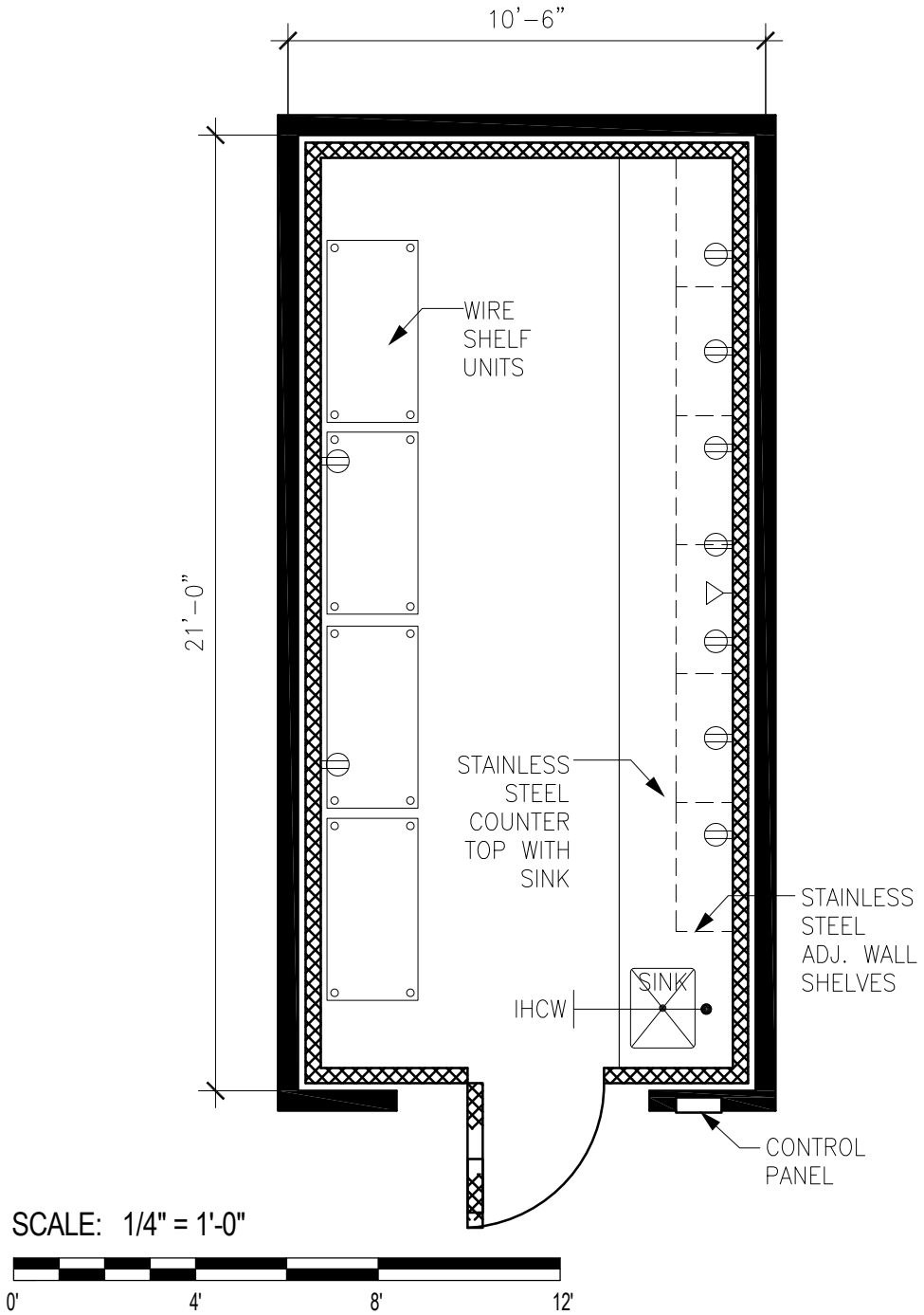
Individual Room Data Sheets / Pre-Schematic Finish Schedule

| | |
|---|---|
| **DEPARTMENT UNIT** | **Laboratory** |
| **Space Name** | Controlled Temperature Room Large |
| **Space Number** | N/A |

| | |
|---|---|
| **1. SPACE PROGRAM** | |
| General Space Description: | Wet Lab |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 200 SF |
| (Quantity) & Location: | (2) at Levels 02, 03, 04 |
| Purpose of Space: | Controlled environment room |
| Number of Occupants: | 2 |
| Hours and Days Used: | 24/7 |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | Research Lab, Lab Support Rooms |
| Must Be Near To: | N/A |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | None |
| Doors: | 36" / Always unlocked from inside |
| Floor: | Rubber Tile on Metal panels - recessed floor into slab |
| Wall: | Painted metal panels |
| Ceiling: | Metal panel with egg crate ceiling |
| Ceiling Height: | 8'-0" minimum |
| Acoustics: | N/A |
| General Character of Room: | Controlled Temp. Room |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | None |
| HVAC: | 4 degree - 37 degree, supply and exhaust from building system |
| Plumbing: | Industrial H/C water at lab sink, condensate drain line required |
| Electrical: | 120V outlets |
| Lighting: | Fluorescent |
| Phone / Data: | None |
| Vibration Criteria: | None |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Wall mounted S.S. Counter/Shelves |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | Unit on EP with alarm, Water Cooled Condenser Unit (requires cooling water) |

## ROOM DATA SHEET

### Controlled Temperature Room Large / 200 SF



# 4 Space Program

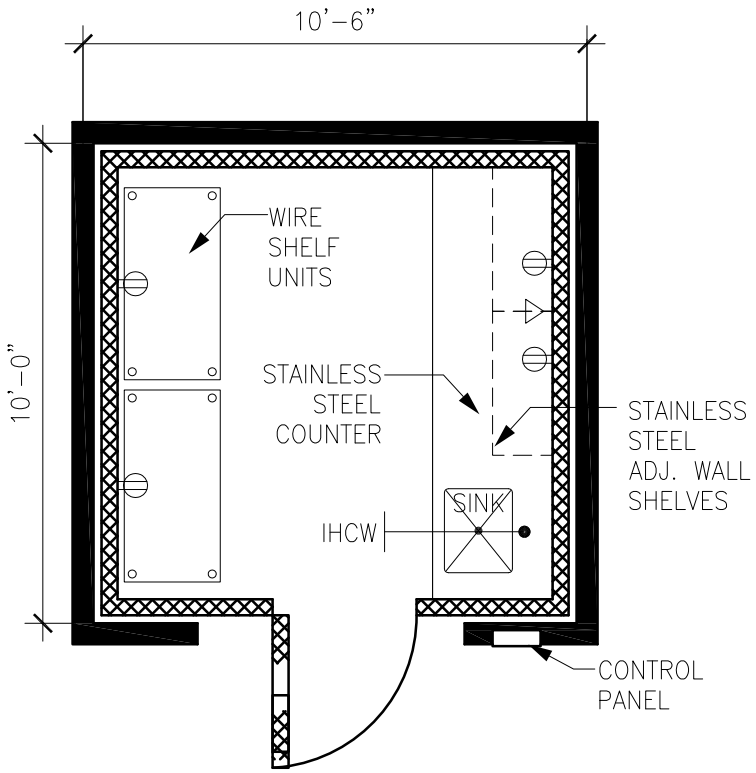
Individual Room Data Sheets / Pre-Schematic Finish Schedule

| DEPARTMENT UNIT | Laboratory |
|---|---|
| Space Name | Controlled Temperature Room Small |
| Space Number | N/A |

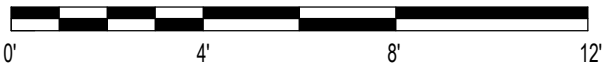
| | |
|---|---|
| **1. SPACE PROGRAM** | |
| General Space Description: | Wet Lab |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 100 SF |
| (Quantity) & Location: | (2) at Levels 02, 03, 04 |
| Purpose of Space: | Controlled environment room |
| Number of Occupants: | 1 |
| Hours and Days Used: | 24/7 |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | Research Lab, Lab Support Rooms |
| Must Be Near To: | N/A |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | None |
| Doors: | 36" / Always unlocked from inside room |
| Floor: | Rubber Tile on Metal panels - recessed floor into slab |
| Wall: | Painted metal panels |
| Ceiling: | Metal panel with egg crate ceiling |
| Ceiling Height: | 8'-0" minimum |
| Acoustics: | N/A |
| General Character of Room: | Controlled Temp. Room |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | None |
| HVAC: | 4 degree - 37 degree, supply and exhaust from building system |
| Plumbing: | Industrial H/C water at lab sink, condensate drain line required |
| Electrical: | 120V outlets |
| Lighting: | Fluorescent |
| Phone / Data: | None |
| Vibration Criteria: | None |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Wall mounted S.S. counter/shelves |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | Unit on EP with alarm, Water Cooled Condenser Unit (requires cooling water) |

## ROOM DATA SHEET

### Controlled Temperature Room Small / 100 SF




SCALE: 1/4" = 1'-0"

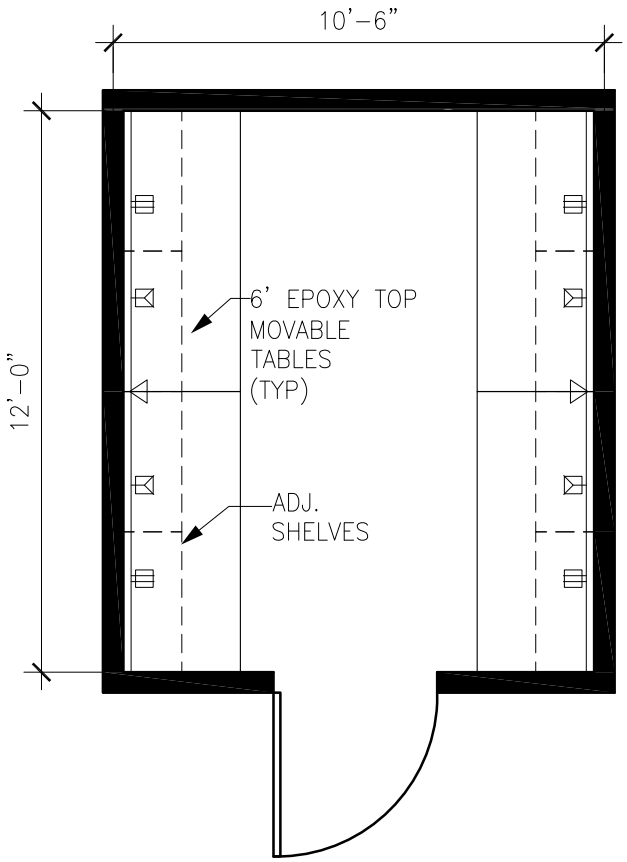


| DEPARTMENT UNIT | Laboratory |
|---|---|
| Space Name | Lab Support Instrument Room |
| Space Number | N/A |

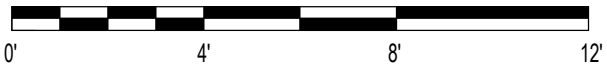
| 1. SPACE PROGRAM | |
|---|---|
| General Space Description: | Wet Lab |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 120 SF |
| (Quantity) & Location: | (2) at Levels 02, 03, 04 |
| Purpose of Space: | Lab |
| Number of Occupants: | 1 |
| Hours and Days Used: | 24/7 |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | Research Lab, Lab Support Rooms |
| Must Be Near To: | N/A |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | None required |
| Doors: | 42" |
| Floor: | Tile |
| Wall: | Painted Gypsum Board |
| Ceiling: | Acoustic Tile |
| Ceiling Height: | 9'-0" minimum |
| Acoustics: | N/A |
| General Character of Room: | Wet Lab |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | None |
| HVAC: | 72 degrees F +/- 4 |
| Plumbing: | None |
| Electrical: | 120V outlets, 208V outlets |
| Lighting: | Direct/Indirect Fluorescent |
| Phone / Data: | Cat-6 Data & Voice |
| Vibration Criteria: | 2000 Micro-inches/second |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Movable tables with epoxy top and mobile wood base cabinets below and adjustable shelves above. |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | Instrumentation unknown at this time and will be discussed/ determined during the design phase of the project |

## ROOM DATA SHEET

### Lab Support Instrument Room / 120 SF




SCALE: 1/4" = 1'-0"



# 4 Space Program

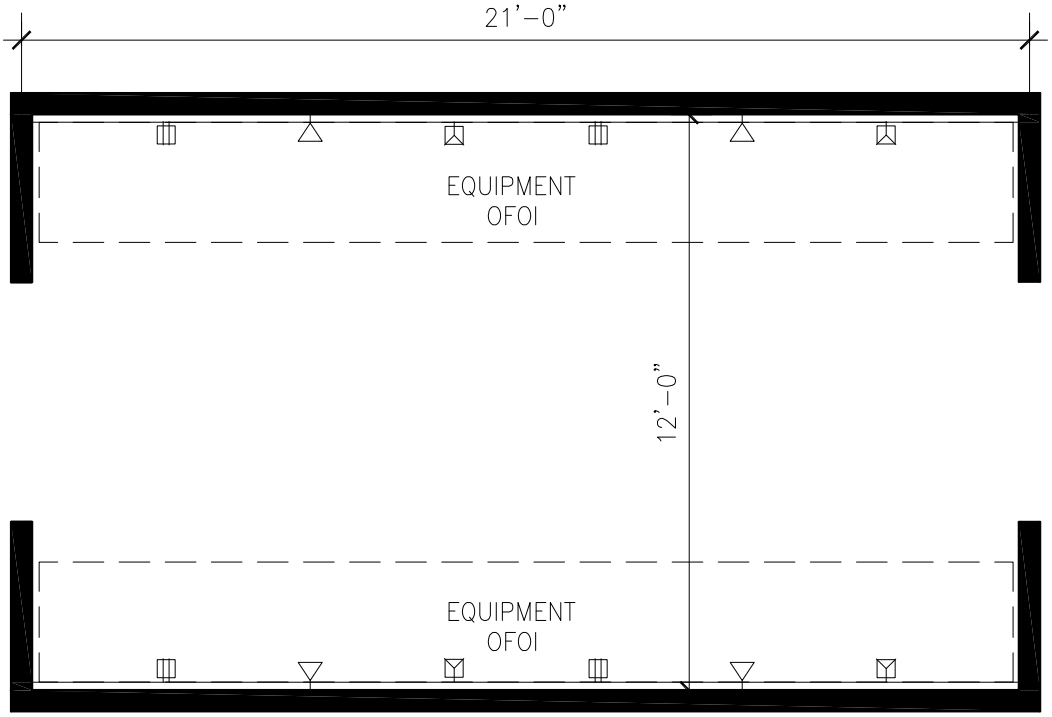
Individual Room Data Sheets / Pre-Schematic Finish Schedule

| | |
|---|---|
| **DEPARTMENT UNIT** | **Laboratory** |
| **Space Name** | Lab Support Linear Equipment Room |
| **Space Number** | N/A |

| | |
|---|---|
| **1. SPACE PROGRAM** | |
| General Space Description: | Equipment Room spaced |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 240 ASF/ two bay lab module |
| (Quantity) & Location: | (2) at Levels 02, 03, 04 |
| Purpose of Space: | Equipment room |
| Number of Occupants: | 0 |
| Hours and Days Used: | 24/7 |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | Research Lab, Lab Support Rooms |
| Must Be Near To: | N/A |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | None required, but a few desired if possible |
| Doors: | 42" to lab, Pair 3'-0" to building corridor |
| Floor: | Tile |
| Wall: | Painted Gypsum Board |
| Ceiling: | None required |
| Ceiling Height: | N/A |
| Acoustics: | N/A |
| General Character of Room: | Equipment Room |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | Proximity Sensor to building corridor |
| HVAC: | 72 degrees F +/- 4 |
| Plumbing: | None required unless for specific equipment |
| Electrical: | 120V outlets, 208V outlets |
| Lighting: | Direct/Indirect Fluorescent |
| Phone / Data: | Cat-6 Data & Voice |
| Vibration Criteria: | 2000 Micro-inches/second |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Room has mainly lab equipment such as refrigerators, freezers, and centrifuges. It is anticipated that lab users will utilize some storage in this room so provisions for some full height adjustable shelves should be provided. |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | Verify heat/cooling load requirements |

## ROOM DATA SHEET

### Lab Support Linear Equipment Room / 240 SF



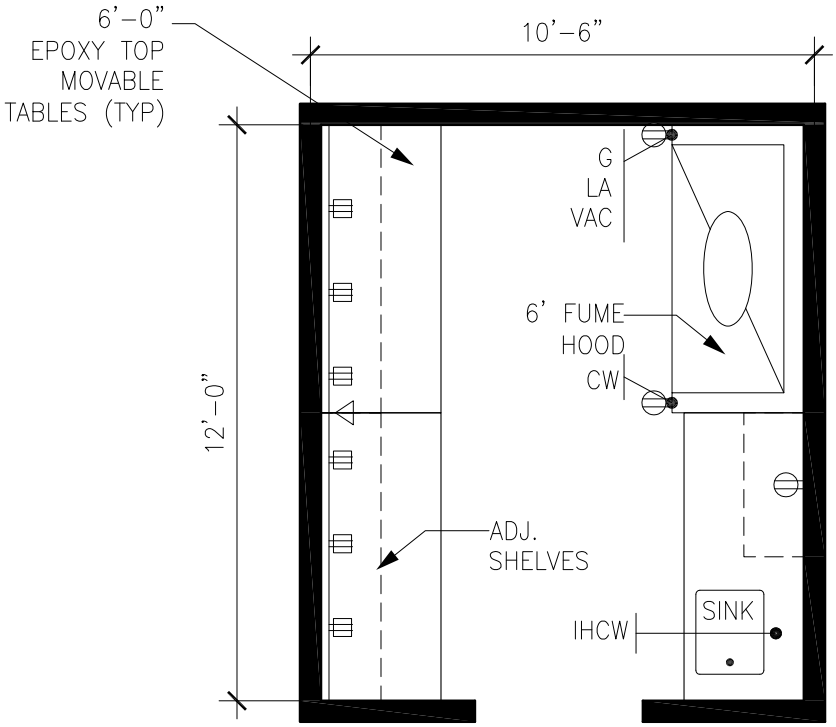

SCALE: 1/4" = 1'-0"

| DEPARTMENT UNIT | Laboratory |
|---|---|
| Space Name | Lab Support Fume Hood Alcove |
| Space Number | N/A |

| 1. SPACE PROGRAM | |
|---|---|
| General Space Description: | Wet Lab |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 120 SF |
| (Quantity) & Location: | (2) at Levels 02, 03, 04 |
| Purpose of Space: | Lab |
| Number of Occupants: | 1 |
| Hours and Days Used: | 24/7 |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | Research Lab |
| Must Be Near To: | Lab Support Rooms |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | None required |
| Doors: | None required |
| Floor: | Tile |
| Wall: | Painted Gypsum Board |
| Ceiling: | Acoustic Tile |
| Ceiling Height: | 9'-0" minimum |
| Acoustics: | N/A |
| General Character of Room: | Wet Lab |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | None |
| HVAC: | 72 degrees F +/- 4 |
| Plumbing: | Gas, air, vacuum, CW to hood, sink with industrial hot and cold water |
| Electrical: | 120V outlets |
| Lighting: | Direct/Indirect Fluorescent |
| Phone / Data: | Cat-6 Data & Voice |
| Vibration Criteria: | 2000 Micro-inches/second |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Epoxy counter with wood base cabinets below and adjustable shelves above. Movable tables with epoxy top and mobile wood base cabinets. 6' chemical fume hood with chemical storage cabinets below. |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

## ROOM DATA SHEET

### Lab Support Fume Hood Alcove / 120 SF




SCALE: 1/4" = 1'-0"

# 4 Space Program

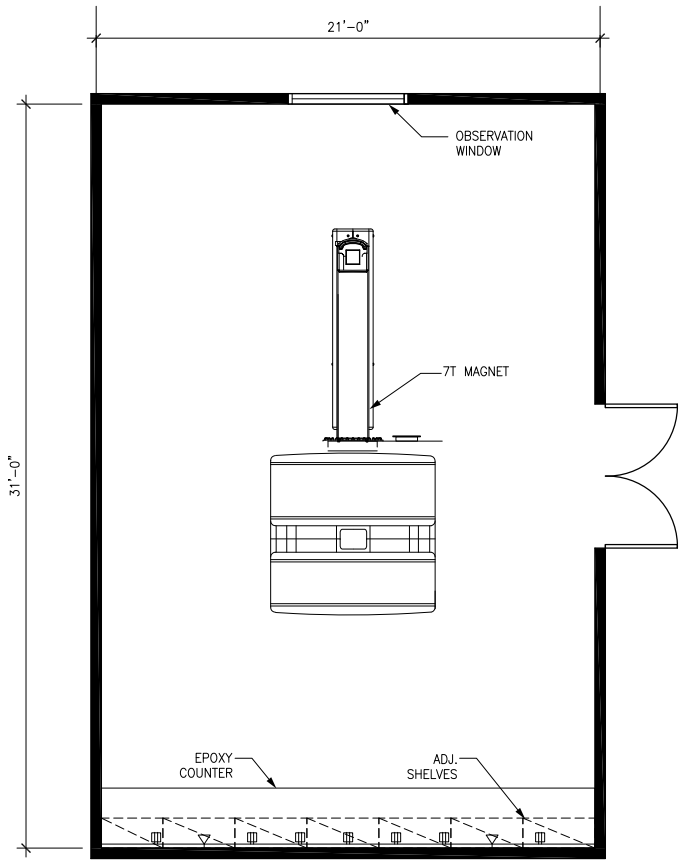
Individual Room Data Sheets / Pre-Schematic Finish Schedule

| | |
|---|---|
| **DEPARTMENT UNIT** | **Laboratory** |
| **Space Name** | Imaging Suite - MRI Room |
| **Space Number** | N/A |

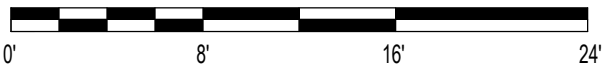
| | |
|---|---|
| **1. SPACE PROGRAM** | |
| General Space Description: | MRI Room |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 600 SF |
| (Quantity) & Location: | (1) at Level A |
| Purpose of Space: | Specialty Instrument Room |
| Number of Occupants: | 1 |
| Hours and Days Used: | 24/7 |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | Imaging Suite |
| Must Be Near To: | Vivarium |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | None required |
| Doors: | None required |
| Floor: | Tile |
| Wall: | Painted Gypsum Board |
| Ceiling: | Acoustic Tile |
| Ceiling Height: | N/A |
| Acoustics: | N/A |
| General Character of Room: | Instrument Room |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | Proximity Sensor |
| HVAC: | Unknown at this time |
| Plumbing: | Unknown at this time |
| Electrical: | 120V outlets at Lab Bench, specialty power for MRI Unit |
| Lighting: | Dimmable Incandescent Lighting |
| Phone / Data: | Cat-6 Data & Voice |
| Vibration Criteria: | 2000 Micro-inches/second |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Epoxy Counter with Wood Base Cabinets below and adjustable shelves above. Gas Cylinder Rack. |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |

## ROOM DATA SHEET

### Imaging Suite - MRI Room / 600 SF




SCALE: 1/8" = 1'-0"

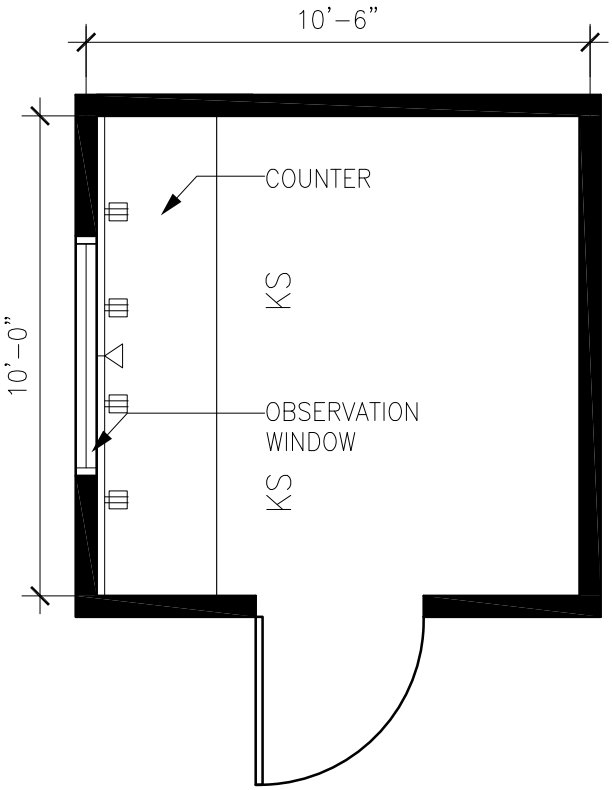


| DEPARTMENT UNIT | Laboratory |
|---|---|
| Space Name | Imaging Suite - MRI Observation Console Room |
| Space Number | N/A |

| 1. SPACE PROGRAM | |
|---|---|
| General Space Description: | MRI Observation Room |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 100 SF |
| (Quantity) & Location: | (1) at Level A |
| Purpose of Space: | Observation Room |
| Number of Occupants: | 2 |
| Hours and Days Used: | 24/7 |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | Imaging Suite |
| Must Be Near To: | Vivarium |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | Verify if window to Imaging MRI room is required. |
| Doors: | None required |
| Floor: | Tile |
| Wall: | Painted Gypsum Board |
| Ceiling: | Acoustic Tile |
| Ceiling Height: | 9'-0" minimum |
| Acoustics: | N/A |
| General Character of Room: | Observation Room |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | Proximity Sensor |
| HVAC: | 72 degrees F +/- 4 |
| Plumbing: | None |
| Electrical: | 120V outlets |
| Lighting: | Recessed Fluorescent |
| Phone / Data: | Cat-6 Data & Voice |
| Vibration Criteria: | 2000 Micro-inches/second |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Epoxy Counter with Wood Base Cabinets below. Knee spaces for 2 people. |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | Computer connection between this room and the MRI magnet for controlling the unit. |

## ROOM DATA SHEET

### Imaging Suite - MRI Observation Console Room / 100 SF



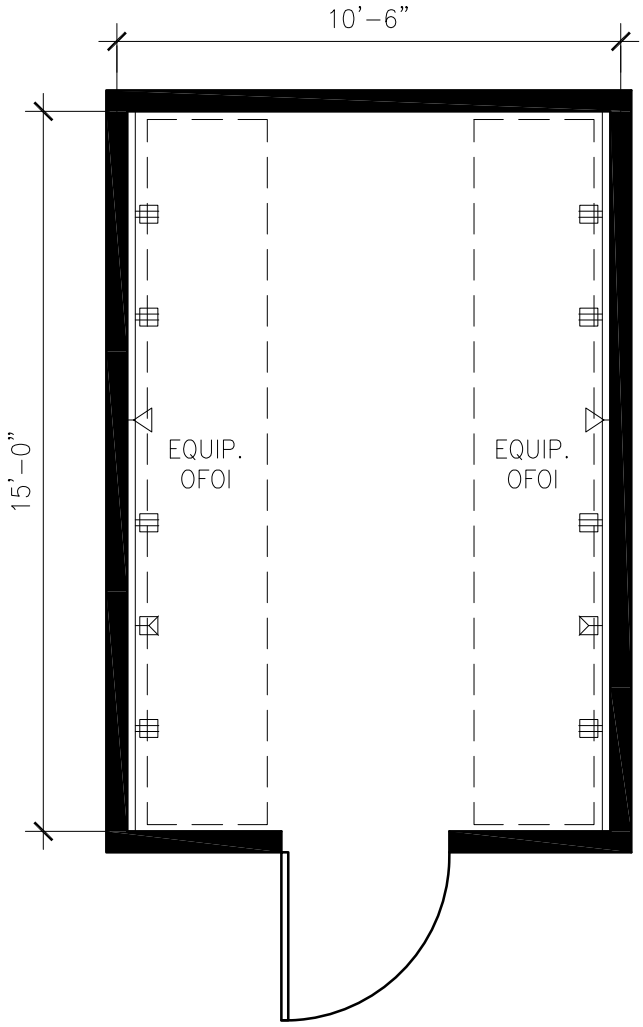

SCALE: 1/4" = 1'-0"

| DEPARTMENT UNIT | Laboratory |
|---|---|
| Space Name | Imaging Suite - MRI Equipment Room |
| Space Number | N/A |

| 1. SPACE PROGRAM | |
|---|---|
| General Space Description: | MRI Equipment Room |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 150 SF |
| (Quantity) & Location: | (1) at Level A |
| Purpose of Space: | Equipment Space |
| Number of Occupants: | 0 |
| Hours and Days Used: | 24/7 |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | Imaging Suite |
| Must Be Near To: | Vivarium |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | None required |
| Doors: | 42" |
| Floor: | Tile |
| Wall: | Painted Gypsum Board |
| Ceiling: | Acoustic Tile |
| Ceiling Height: | 9'-0" minimum |
| Acoustics: | N/A |
| General Character of Room: | Equipment Room |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | None |
| HVAC: | 72 degrees F +/- 4 |
| Plumbing: | None |
| Electrical: | 120V outlets, verify actual equipment power needs. |
| Lighting: | Recessed Fluorescent |
| Phone / Data: | Cat-6 Data & Voice |
| Vibration Criteria: | 2000 Micro-inches/second |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | MRI Equipment |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

## ROOM DATA SHEET

### Imaging Suite - MRI Equipment Room / 150 SF




SCALE: 1/4" = 1'-0"

0' 4' 8' 12'

# 4 Space Program

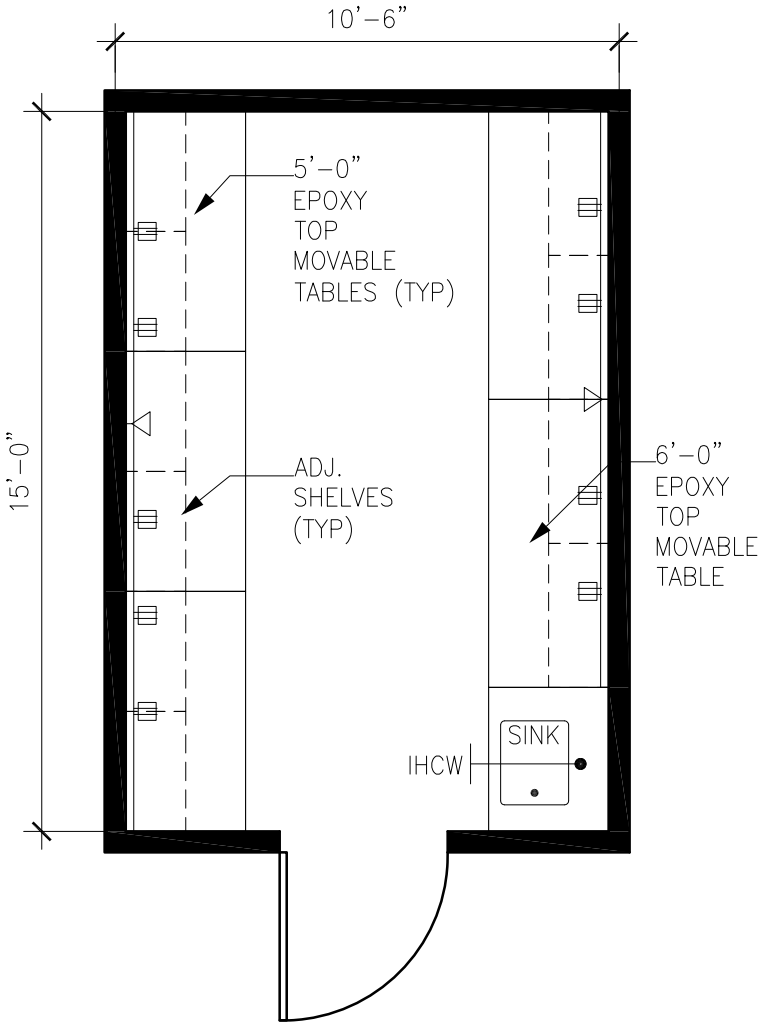
Individual Room Data Sheets / Pre-Schematic Finish Schedule

| | |
|---|---|
| **DEPARTMENT UNIT** | **Laboratory** |
| **Space Name** | Imaging Suite - MRI Prep Room |
| **Space Number** | N/A |

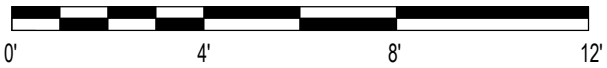
| | |
|---|---|
| **1. SPACE PROGRAM** | |
| General Space Description: | MRI Room |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 150 SF |
| (Quantity) & Location: | (1) at Level A |
| Purpose of Space: | Sample Prep Lab |
| Number of Occupants: | 2 |
| Hours and Days Used: | 24/7 |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | Imaging Suite |
| Must Be Near To: | Vivarium |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | None required |
| Doors: | None required |
| Floor: | Tile |
| Wall: | Painted Gypsum Board |
| Ceiling: | Acoustic Tile |
| Ceiling Height: | 9'-0" minimum |
| Acoustics: | N/A |
| General Character of Room: | General Wet Lab |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | Proximity Sensor |
| HVAC: | 72 degrees F +/- 4 |
| Plumbing: | Sink with industrial H/CW |
| Electrical: | 120V outlets. |
| Lighting: | Recessed Fluorescent |
| Phone / Data: | Cat-6 Data & Voice |
| Vibration Criteria: | 2000 Micro-inches/second |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Epoxy Counter with Wood Base Cabinets below and adjustable shelves above |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

## ROOM DATA SHEET

### Imaging Suite - MRI Prep Room / 150 SF




SCALE: 1/4" = 1'-0"



# 4 Space Program

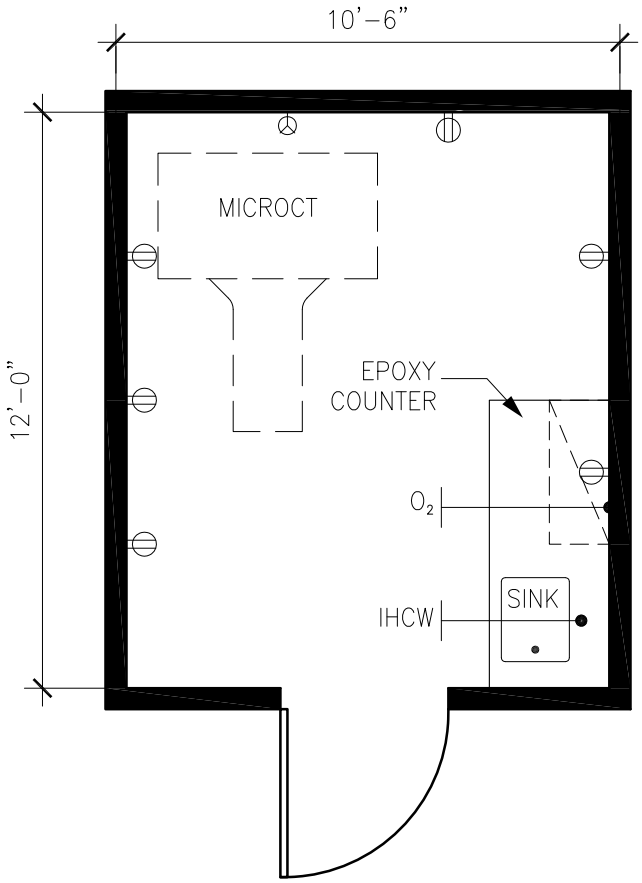
Individual Room Data Sheets / Pre-Schematic Finish Schedule

| | |
|---|---|
| **DEPARTMENT UNIT** | **Laboratory** |
| **Space Name** | Imaging Suite - Micro CT |
| **Space Number** | N/A |

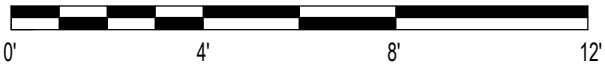
| | |
|---|---|
| **1. SPACE PROGRAM** | |
| General Space Description: | Instrument Room |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 120 SF |
| (Quantity) & Location: | (1) at Level A |
| Purpose of Space: | Instrument Room |
| Number of Occupants: | 2 |
| Hours and Days Used: | 24/7 |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | Imaging Suite |
| Must Be Near To: | Vivarium |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | Observation Window |
| Doors: | 42" |
| Floor: | Tile |
| Wall: | Painted Gypsum Board |
| Ceiling: | Acoustic Tile |
| Ceiling Height: | 10'-0" minimum |
| Acoustics: | N/A |
| General Character of Room: | Instrument Room |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | Proximity Sensor |
| HVAC: | 72 degrees F +/- 4 |
| Plumbing: | Small sink with industrial H/CW, O2 |
| Electrical: | 120V outlets. Verify equipment power needs. |
| Lighting: | Direct Fluorescent |
| Phone / Data: | Cat-6 Data & Voice |
| Vibration Criteria: | 2000 Micro-inches/second |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Epoxy Counter with Wood Base Cabinets below and Cabinets above |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

## ROOM DATA SHEET

### Imaging Suite - Micro CT / 120 SF




SCALE: 1/4" = 1'-0"



# 4 Space Program

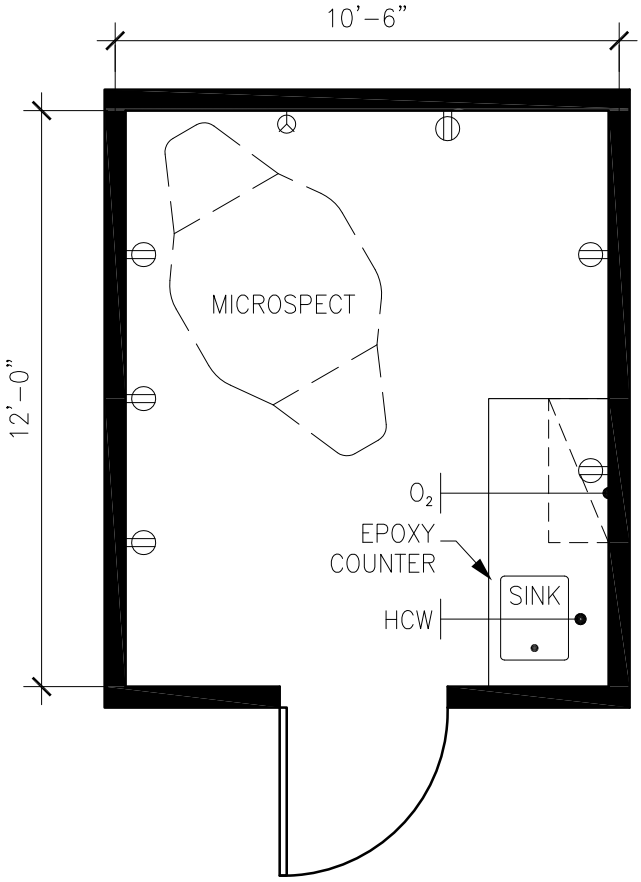
Individual Room Data Sheets / Pre-Schematic Finish Schedule

| | |
|---|---|
| **DEPARTMENT UNIT** | **Laboratory** |
| **Space Name** | Imaging Suite - Microspect |
| **Space Number** | N/A |

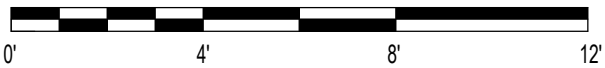
| | |
|---|---|
| **1. SPACE PROGRAM** | |
| General Space Description: | Instrument Room |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 120 SF |
| (Quantity) & Location: | (1) at Level A |
| Purpose of Space: | Instrument Room |
| Number of Occupants: | 2 |
| Hours and Days Used: | 24/7 |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | Imaging Suite |
| Must Be Near To: | Vivarium |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | Observation Window |
| Doors: | 42" |
| Floor: | Tile |
| Wall: | Painted Gypsum Board |
| Ceiling: | Acoustic Tile |
| Ceiling Height: | 10'-0" minimum |
| Acoustics: | N/A |
| General Character of Room: | Instrument Room |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | Proximity Sensor |
| HVAC: | 72 degrees F +/- 4 |
| Plumbing: | Small sink with industrial H/CW, O2 |
| Electrical: | 120V outlets. |
| Lighting: | Recessed Fluorescent |
| Phone / Data: | Cat-6 Data & Voice |
| Vibration Criteria: | 2000 Micro-inches/second |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Epoxy Counter with Wood Base Cabinets below and Cabinets above |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

## ROOM DATA SHEET

### Imaging Suite - Microspect / 120 SF




SCALE: 1/4" = 1'-0"



# 4 Space Program

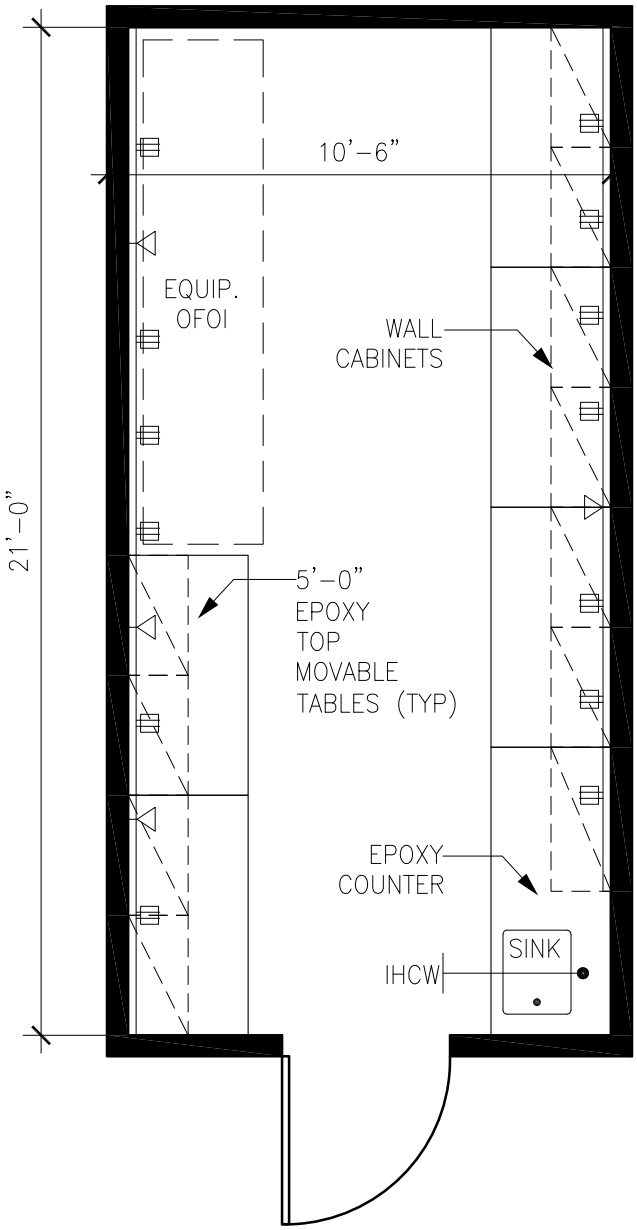
Individual Room Data Sheets / Pre-Schematic Finish Schedule

| | |
|---|---|
| **DEPARTMENT UNIT** | **Laboratory** |
| **Space Name** | Imaging Suite - Optical Imaging |
| **Space Number** | N/A |

| | |
|---|---|
| **1. SPACE PROGRAM** | |
| General Space Description: | MRI Room |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 200 SF |
| (Quantity) & Location: | (1) at Level A |
| Purpose of Space: | Instrument Room |
| Number of Occupants: | 4 |
| Hours and Days Used: | 24/7 |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | Imaging Suite |
| Must Be Near To: | Vivarium |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | None required |
| Doors: | 42" |
| Floor: | Tile |
| Wall: | Painted Gypsum Board |
| Ceiling: | Acoustic Tile |
| Ceiling Height: | 10'-0" minimum |
| Acoustics: | N/A |
| General Character of Room: | Instrument Room |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | Proximity Sensor |
| HVAC: | 72 degrees F +/- 4 |
| Plumbing: | Small sink with industrial H/CW, O2 |
| Electrical: | 120V outlets. |
| Lighting: | Recessed Fluorescent |
| Phone / Data: | Cat-6 Data & Voice |
| Vibration Criteria: | 2000 Micro-inches/second |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Epoxy Counter with Wood Base Cabinets below and Cabinets above |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

## ROOM DATA SHEET

### Imaging Suite - Optical Imaging / 200 SF




SCALE: 1/4" = 1'-0"

0' 4' 8' 12'

# 4 Space Program

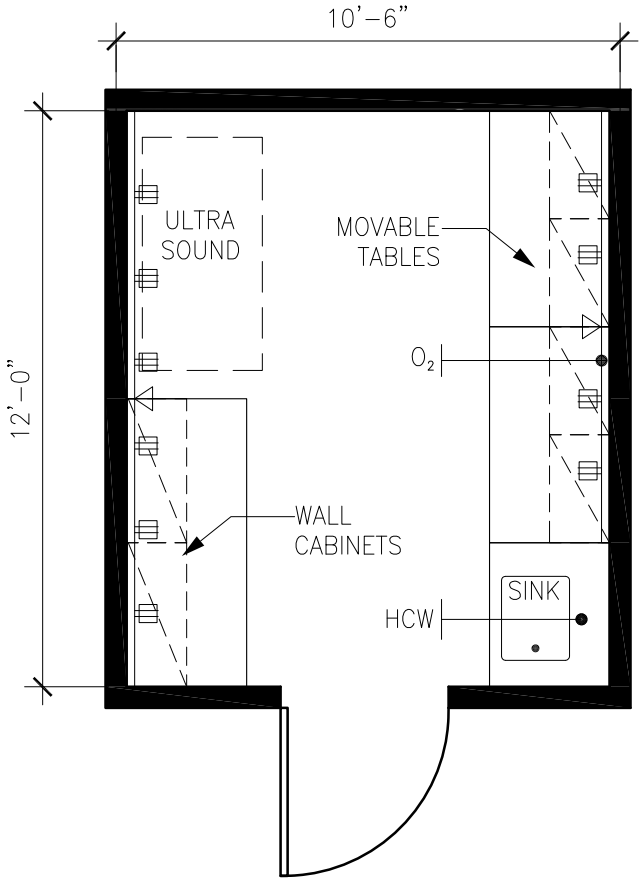
Individual Room Data Sheets / Pre-Schematic Finish Schedule

| | |
|---|---|
| **DEPARTMENT UNIT** | **Laboratory** |
| **Space Name** | Imaging Suite - Ultra Sound |
| **Space Number** | N/A |

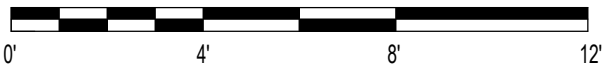
| | |
|---|---|
| **1. SPACE PROGRAM** | |
| General Space Description: | Instrument Room |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 120 SF |
| (Quantity) & Location: | (1) at Level A |
| Purpose of Space: | Instrument Room |
| Number of Occupants: | 2 |
| Hours and Days Used: | 24/7 |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | Imaging Suite |
| Must Be Near To: | Vivarium |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | None required |
| Doors: | 42" |
| Floor: | Tile |
| Wall: | Painted Gypsum Board |
| Ceiling: | Acoustic Tile |
| Ceiling Height: | 10'-0" minimum |
| Acoustics: | N/A |
| General Character of Room: | Instrument Room |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | Proximity Sensor |
| HVAC: | 72 degrees F +/- 4 |
| Plumbing: | Small sink with industrial H/CW, O2 |
| Electrical: | 120V outlets. |
| Lighting: | Recessed Fluorescent |
| Phone / Data: | Cat-6 Data & Voice |
| Vibration Criteria: | 2000 Micro-inches/second |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Epoxy Counter with Wood Base Cabinets below and Cabinets above |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

## ROOM DATA SHEET

### Imaging Suite - Ultra Sound / 120 SF




SCALE: 1/4" = 1'-0"



# 4 Space Program

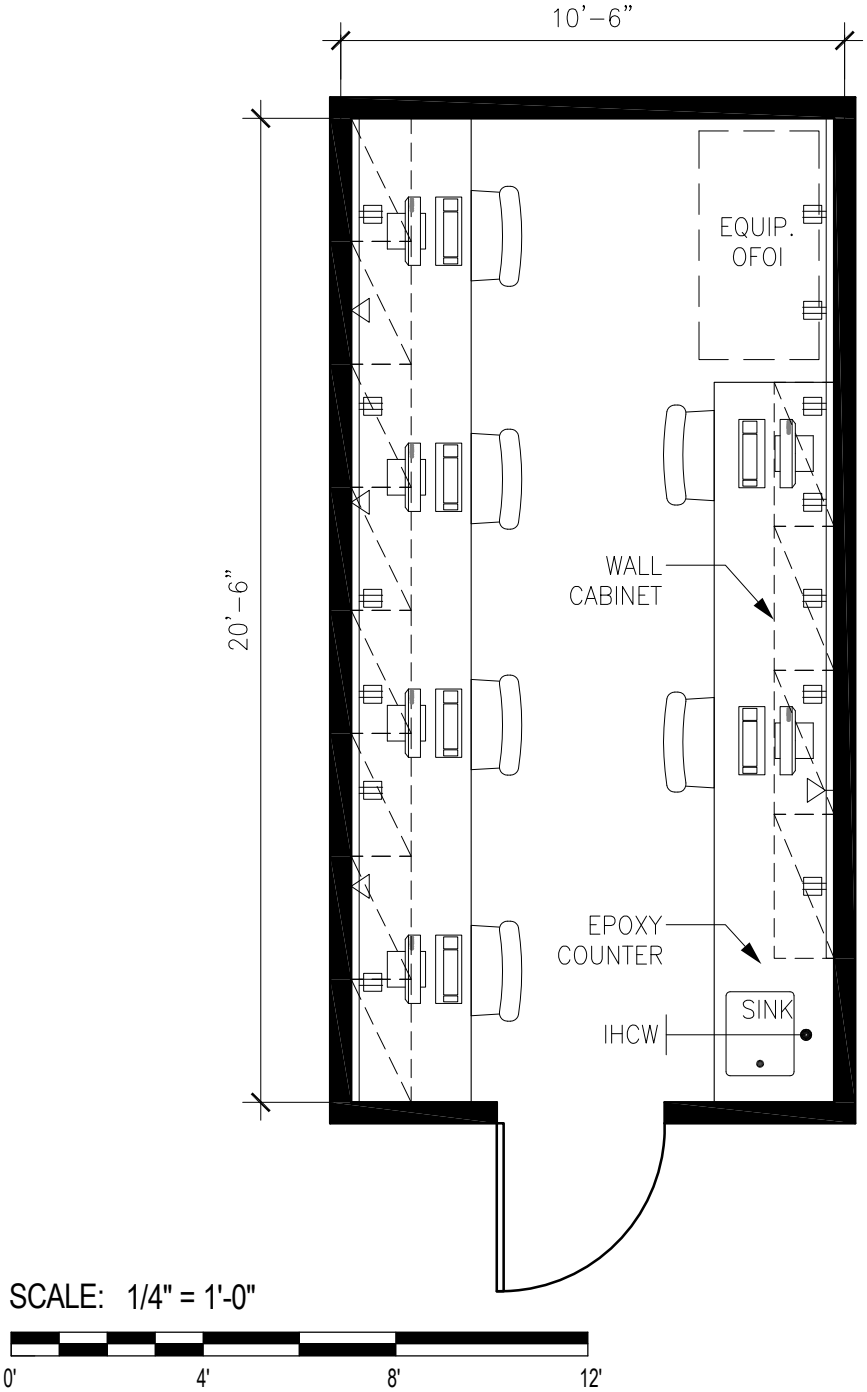
Individual Room Data Sheets / Pre-Schematic Finish Schedule

| | |
|---|---|
| **DEPARTMENT UNIT** | **Laboratory** |
| **Space Name** | Imaging Suite - Computer Room |
| **Space Number** | N/A |

| | |
|---|---|
| **1. SPACE PROGRAM** | |
| General Space Description: | MRI Room |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 200 SF |
| (Quantity) & Location: | (1) at Level A |
| Purpose of Space: | Computer Room |
| Number of Occupants: | 6 |
| Hours and Days Used: | 24/7 |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | Imaging Suite |
| Must Be Near To: | Vivarium |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | None required |
| Doors: | 42" |
| Floor: | Tile |
| Wall: | Painted Gypsum Board |
| Ceiling: | Acoustic Tile |
| Ceiling Height: | 10'-0" minimum |
| Acoustics: | N/A |
| General Character of Room: | Computer Room |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | Proximity Sensor |
| HVAC: | 72 degrees F +/- 4 |
| Plumbing: | Sink with H/CW |
| Electrical: | 120V outlets. |
| Lighting: | Recessed Fluorescent |
| Phone / Data: | Cat-6 Data & Voice |
| Vibration Criteria: | 2000 Micro-inches/second |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Epoxy Counter with Wood Base Cabinets below and Cabinets above. Knee spaces for up to 6 computer stations. |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

## ROOM DATA SHEET

### Imaging Suite - Computer Room / 200 SF



# 4 Space Program

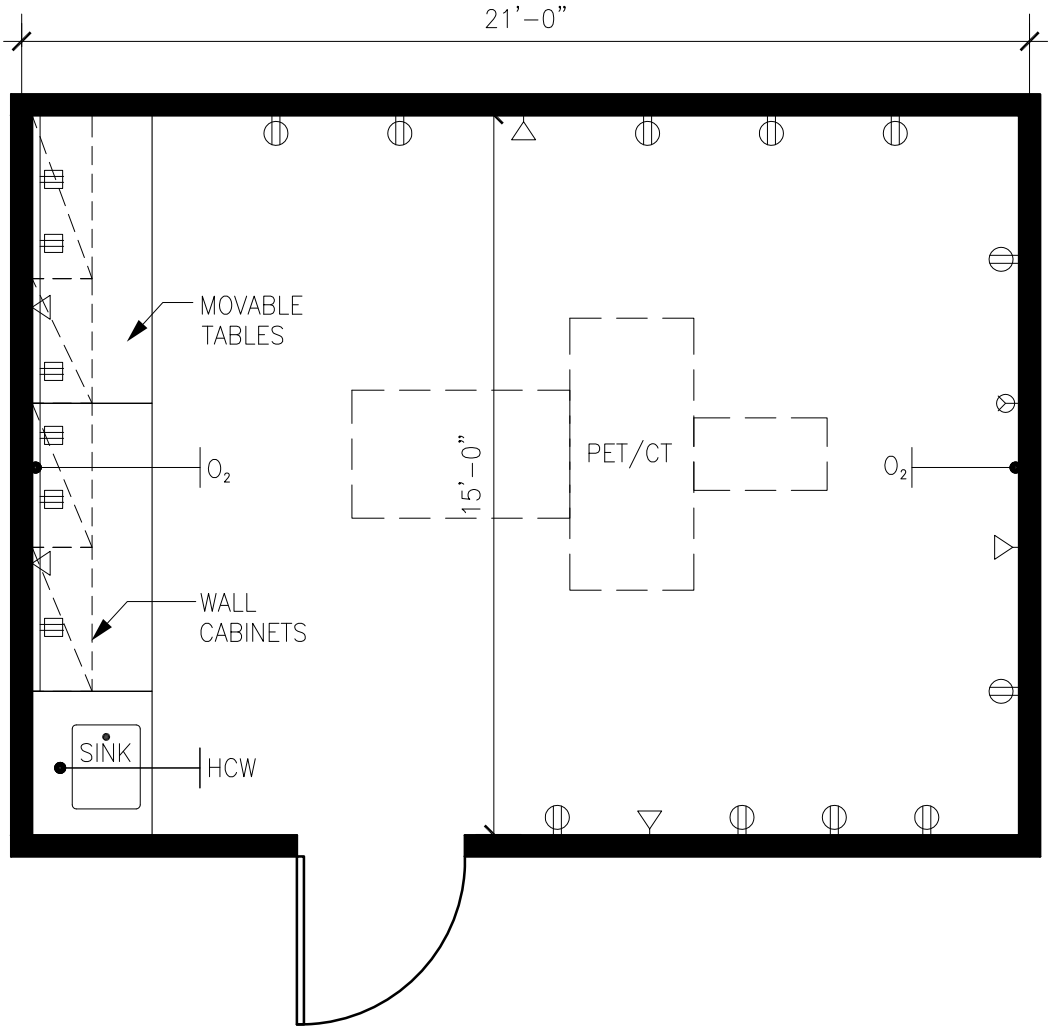
Individual Room Data Sheets / Pre-Schematic Finish Schedule

| DEPARTMENT UNIT | Laboratory |
|---|---|
| Space Name | Imaging Suite - PET/CT |
| Space Number | N/A |

| 1. SPACE PROGRAM | |
|---|---|
| General Space Description: | Instrument Room |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 330 SF |
| (Quantity) & Location: | (1) at Level A |
| Purpose of Space: | Instrument Room |
| Number of Occupants: | 3 |
| Hours and Days Used: | 24/7 |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | Imaging Suite, Imaging Hot Lab and Hot Holding |
| Must Be Near To: | Vivarium |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | Observation Window |
| Doors: | 42" |
| Floor: | Tile |
| Wall: | Painted Gypsum Board |
| Ceiling: | Acoustic Tile |
| Ceiling Height: | 10'-0" minimum |
| Acoustics: | N/A |
| General Character of Room: | Instrument Room |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | Proximity Sensor |
| HVAC: | 72 degrees F +/- 4 |
| Plumbing: | Small sink with industrial H/CW, O2 |
| Electrical: | 120V outlets. |
| Lighting: | Recessed Fluorescent |
| Phone / Data: | Cat-6 Data & Voice |
| Vibration Criteria: | 2000 Micro-inches/second |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Epoxy counter with wood base cabinets below and cabinets above. |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

## ROOM DATA SHEET

### Imaging Suite - PET/CT / 330 SF



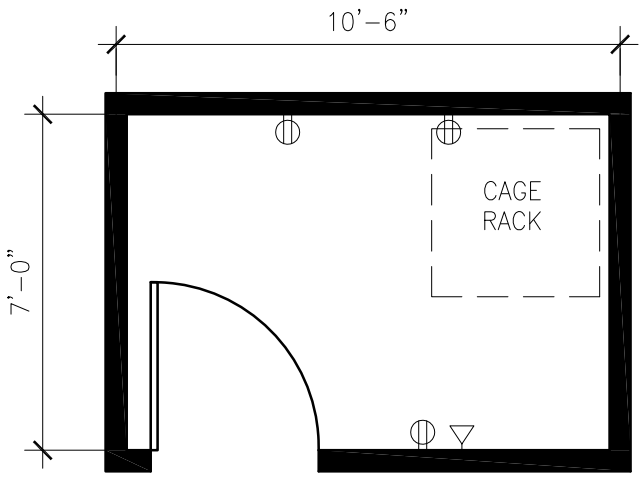

SCALE: 1/4" = 1'-0"

| DEPARTMENT UNIT | Laboratory |
|---|---|
| Space Name | Imaging Suite - Hot Mice Holding |
| Space Number | N/A |

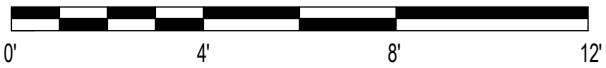
| 1. SPACE PROGRAM | |
|---|---|
| General Space Description: | Mice Holding Room |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 70 SF |
| (Quantity) & Location: | (1) at Level A |
| Purpose of Space: | Mice Holding Room |
| Number of Occupants: | 0 |
| Hours and Days Used: | 24/7 |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | Imaging Suite, Imaging Hot Procedure Room |
| Must Be Near To: | Vivarium |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | None |
| Doors: | 42" |
| Floor: | Seamless Sheet Vinyl or Trowel on Epoxy |
| Wall: | Epoxy Painted Gypsum Board, verify if shielding is required |
| Ceiling: | Epoxy Painted Gypsum Board |
| Ceiling Height: | 10'-0" minimum |
| Acoustics: | N/A |
| General Character of Room: | Mice Holding |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | Proximity Sensor |
| HVAC: | 72 degrees F +/- 4 |
| Plumbing: | None |
| Electrical: | 120V outlets. |
| Lighting: | Recessed Fluorescent |
| Phone / Data: | Cat-6 Data & Voice |
| Vibration Criteria: | 2000 Micro-inches/second |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Shielded Mice Holding Rack (1) |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

## ROOM DATA SHEET

### Imaging Suite - Hot Mice Holding / 70 SF




SCALE: 1/4" = 1'-0"



# 4 Space Program

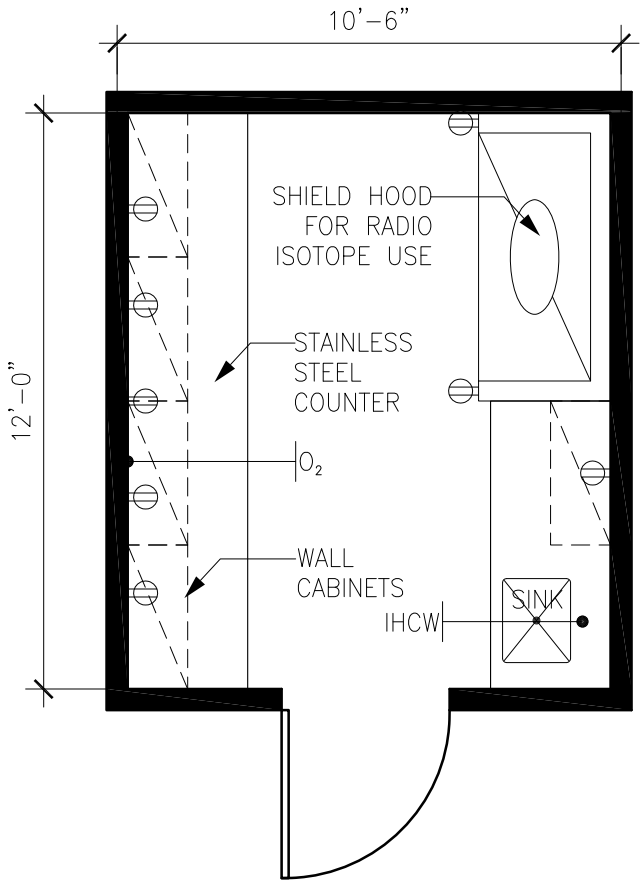
Individual Room Data Sheets / Pre-Schematic Finish Schedule

| | |
|---|---|
| **DEPARTMENT UNIT** | **Laboratory** |
| **Space Name** | Imaging Suite - Hot Mice Procedure Room |
| **Space Number** | N/A |

| | |
|---|---|
| **1. SPACE PROGRAM** | |
| General Space Description: | Rodent procedure room |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 120 SF |
| (Quantity) & Location: | (1) at Level A |
| Purpose of Space: | Rodent procedure room |
| Number of Occupants: | 2 |
| Hours and Days Used: | 24/7 |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | Imaging Suite, Imaging Hot Holding |
| Must Be Near To: | Vivarium |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | None |
| Doors: | 42" |
| Floor: | Seamless Sheet Vinyl or Trowel on Epoxy |
| Wall: | Epoxy Painted Gypsum Board |
| Ceiling: | Epoxy Painted Gypsum Board |
| Ceiling Height: | 10'-0" minimum |
| Acoustics: | N/A |
| General Character of Room: | Rodent procedure room |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | Proximity Sensor |
| HVAC: | 72 degrees F +/- 4, Radio Hood |
| Plumbing: | Small sink with H/CW, O2 |
| Electrical: | 120V outlets. |
| Lighting: | Recessed Fluorescent |
| Phone / Data: | Cat-6 Data & Voice |
| Vibration Criteria: | 2000 Micro-inches/second |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Stainless Steel Counter with Phenolic Resin Base Cabinets below and Cabinets above. |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

## ROOM DATA SHEET

### Imaging Suite - Hot Mice Procedure Room / 120 SF



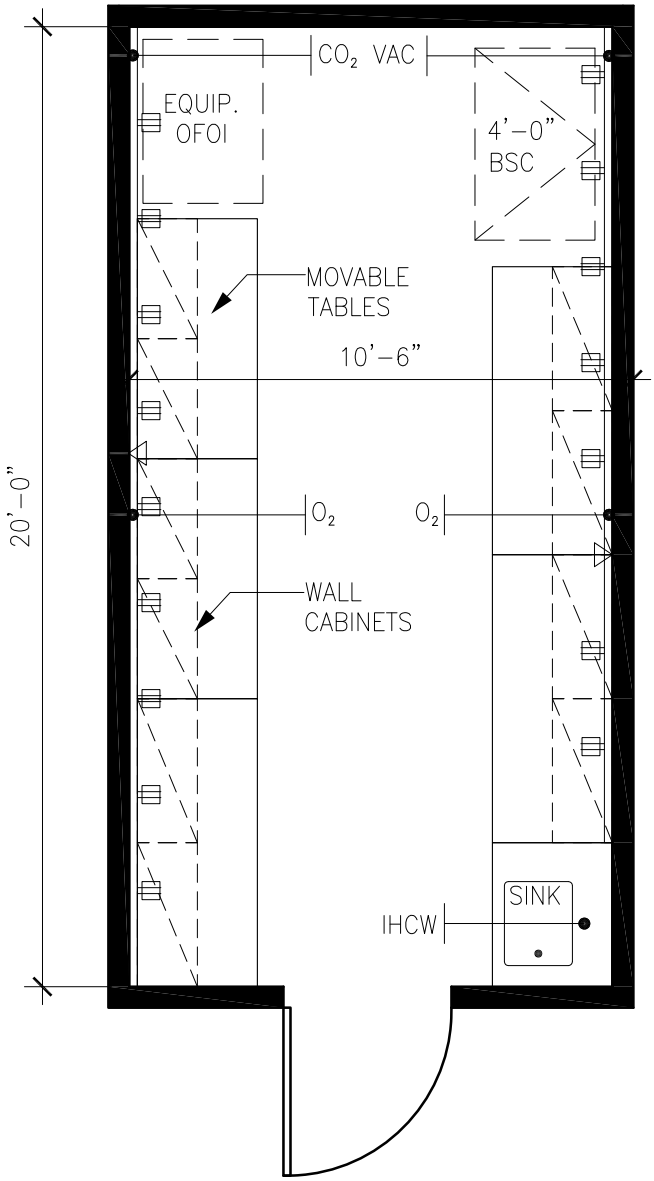

SCALE: 1/4" = 1'-0"

| DEPARTMENT UNIT | Laboratory |
|---|---|
| Space Name | Imaging Suite - Xvivo Imaging Room |
| Space Number | N/A |

| 1. SPACE PROGRAM | |
|---|---|
| General Space Description: | Instrument Room |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 200 SF |
| (Quantity) & Location: | (1) at Level A |
| Purpose of Space: | Instrument Room |
| Number of Occupants: | 3 |
| Hours and Days Used: | 24/7 |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | Imaging Suite |
| Must Be Near To: | Vivarium |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | Observation Window |
| Doors: | 42" |
| Floor: | Tile |
| Wall: | Painted Gypsum Board |
| Ceiling: | Acoustic Tile |
| Ceiling Height: | 10'-0" minimum |
| Acoustics: | N/A |
| General Character of Room: | Instrument Room |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | Proximity Sensor |
| HVAC: | 72 degrees F +/- 4 |
| Plumbing: | Small sink with industrial H/CW, O2 |
| Electrical: | 120V outlets. |
| Lighting: | Recessed Fluorescent |
| Phone / Data: | Cat-6 Data & Voice |
| Vibration Criteria: | 2000 Micro-inches/second |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Epoxy Counter with Wood Base Cabinets below and adjustable Cabinets above. |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

## ROOM DATA SHEET

### Imaging Suite - Xvivo Imaging Room / 200 SF




SCALE: 1/4" = 1'-0"

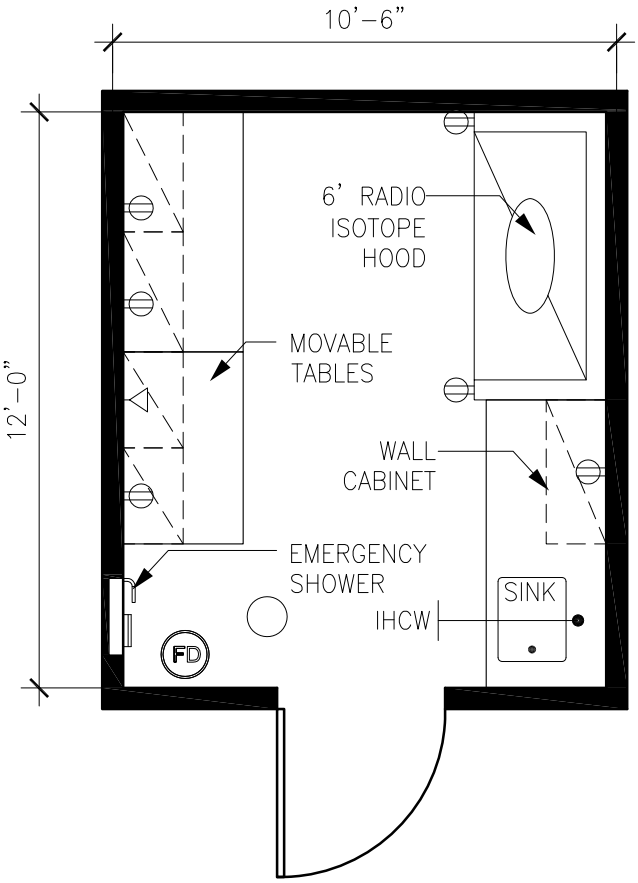
0' 4' 8' 12'

| DEPARTMENT UNIT | Laboratory |
|---|---|
| Space Name | Imaging Suite - Radio Therapy Room |
| Space Number | N/A |

| 1. SPACE PROGRAM | |
|---|---|
| General Space Description: | Instrument Room |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 120 SF |
| (Quantity) & Location: | (1) at Level A |
| Purpose of Space: | Instrument Room |
| Number of Occupants: | 2 |
| Hours and Days Used: | 24/7 |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | Imaging Suite |
| Must Be Near To: | Vivarium |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | Observation Window |
| Doors: | 42" |
| Floor: | Tile |
| Wall: | Painted Gypsum Board |
| Ceiling: | Acoustic Tile |
| Ceiling Height: | 10'-0" minimum |
| Acoustics: | N/A |
| General Character of Room: | Instrument Room |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | Proximity Sensor |
| HVAC: | 72 degrees F +/- 4, Verify if Radioisotope Hood is required |
| Plumbing: | Small sink with industrial H/CW, O2 |
| Electrical: | 120V outlets. |
| Lighting: | Recessed Fluorescent |
| Phone / Data: | Cat-6 Data & Voice |
| Vibration Criteria: | 2000 Micro-inches/second |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Epoxy Counter with Wood Base Cabinets below and adjustable Cabinets above. If Radioisotopes are used in this room, verify if Stainless Steel Countertop is required. |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

## ROOM DATA SHEET

### Instrument Room / 120 SF




SCALE: 1/4" = 1'-0"

# 4 Space Program

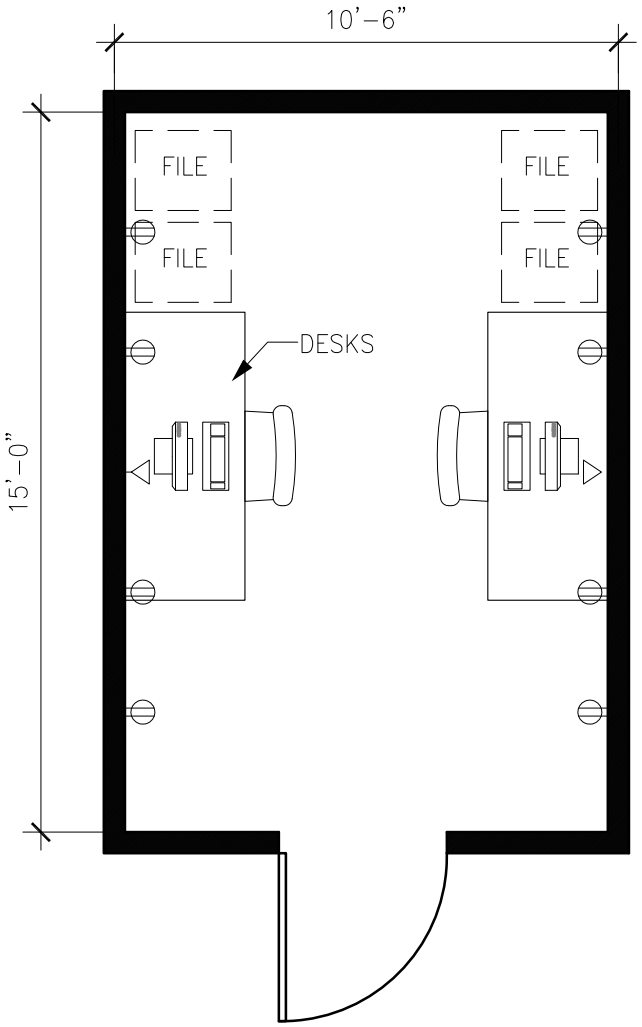
Individual Room Data Sheets / Pre-Schematic Finish Schedule

| | |
|---|---|
| **DEPARTMENT UNIT** | **Laboratory** |
| **Space Name** | Imaging Suite - Office |
| **Space Number** | N/A |

| | |
|---|---|
| **1. SPACE PROGRAM** | |
| General Space Description: | Office |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 150 SF |
| (Quantity) & Location: | (1) at Level A |
| Purpose of Space: | Office |
| Number of Occupants: | 2 |
| Hours and Days Used: | 24/7 |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | Imaging Suite |
| Must Be Near To: | Vivarium |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | Window to interior corridor |
| Doors: | 42" |
| Floor: | Tile |
| Wall: | Painted Gypsum Board |
| Ceiling: | Acoustic Tile |
| Ceiling Height: | 9'-0" minimum |
| Acoustics: | N/A |
| General Character of Room: | Office |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | Proximity Sensor |
| HVAC: | 72 degrees F +/- 4 |
| Plumbing: | None |
| Electrical: | 120V outlets. |
| Lighting: | Recessed Fluorescent |
| Phone / Data: | Cat-6 Data & Voice |
| Vibration Criteria: | 2000 Micro-inches/second |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Office Furniture |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | Locate at front entry of suite |

## ROOM DATA SHEET

### Imaging Suite - Office / 150 SF




SCALE: 1/4" = 1'-0"

# 4 Space Program

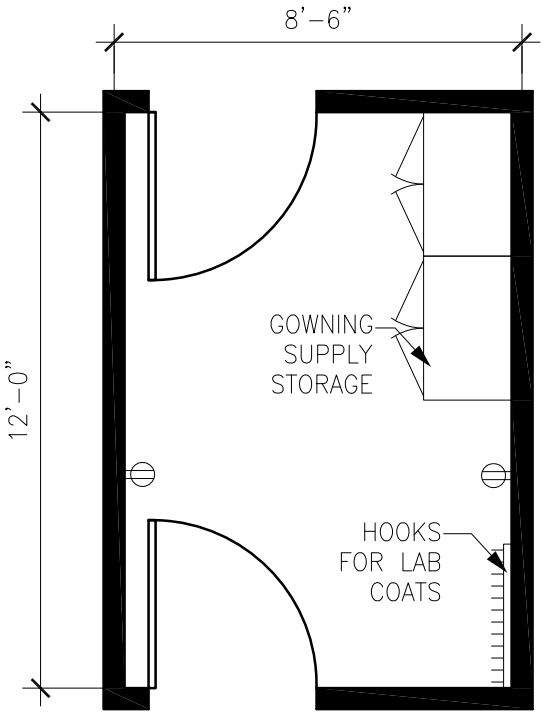
Individual Room Data Sheets / Pre-Schematic Finish Schedule

| DEPARTMENT UNIT | Laboratory |
|---|---|
| Space Name | Imaging Suite - BL2 Gowning Entry |
| Space Number | N/A |

| 1. SPACE PROGRAM | |
|---|---|
| General Space Description: | Entry Vestibule |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 100 SF |
| (Quantity) & Location: | (1) at Level A |
| Purpose of Space: | Entry Vestibule |
| Number of Occupants: | 0 |
| Hours and Days Used: | 24/7 |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | Imaging Suite, BL2 rooms |
| Must Be Near To: | Vivarium |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | None |
| Doors: | 42" |
| Floor: | Seamless Sheet Vinyl or Trowel on Epoxy |
| Wall: | Epoxy Painted Gypsum Board |
| Ceiling: | Acoustic Tile |
| Ceiling Height: | 9'-0" minimum |
| Acoustics: | N/A |
| General Character of Room: | Entry Vestibule |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | Proximity Sensor |
| HVAC: | 72 degrees F +/- 4 |
| Plumbing: | None |
| Electrical: | 120V outlets. |
| Lighting: | Recessed Fluorescent |
| Phone / Data: | None |
| Vibration Criteria: | 2000 Micro-inches/second |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Gowning Supply Storage and Lab Coat Hooks |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

## ROOM DATA SHEET

### Imaging Suite - BL2 Gowning Entry / 100 SF




SCALE: 1/4" = 1'-0"

# 4 Space Program

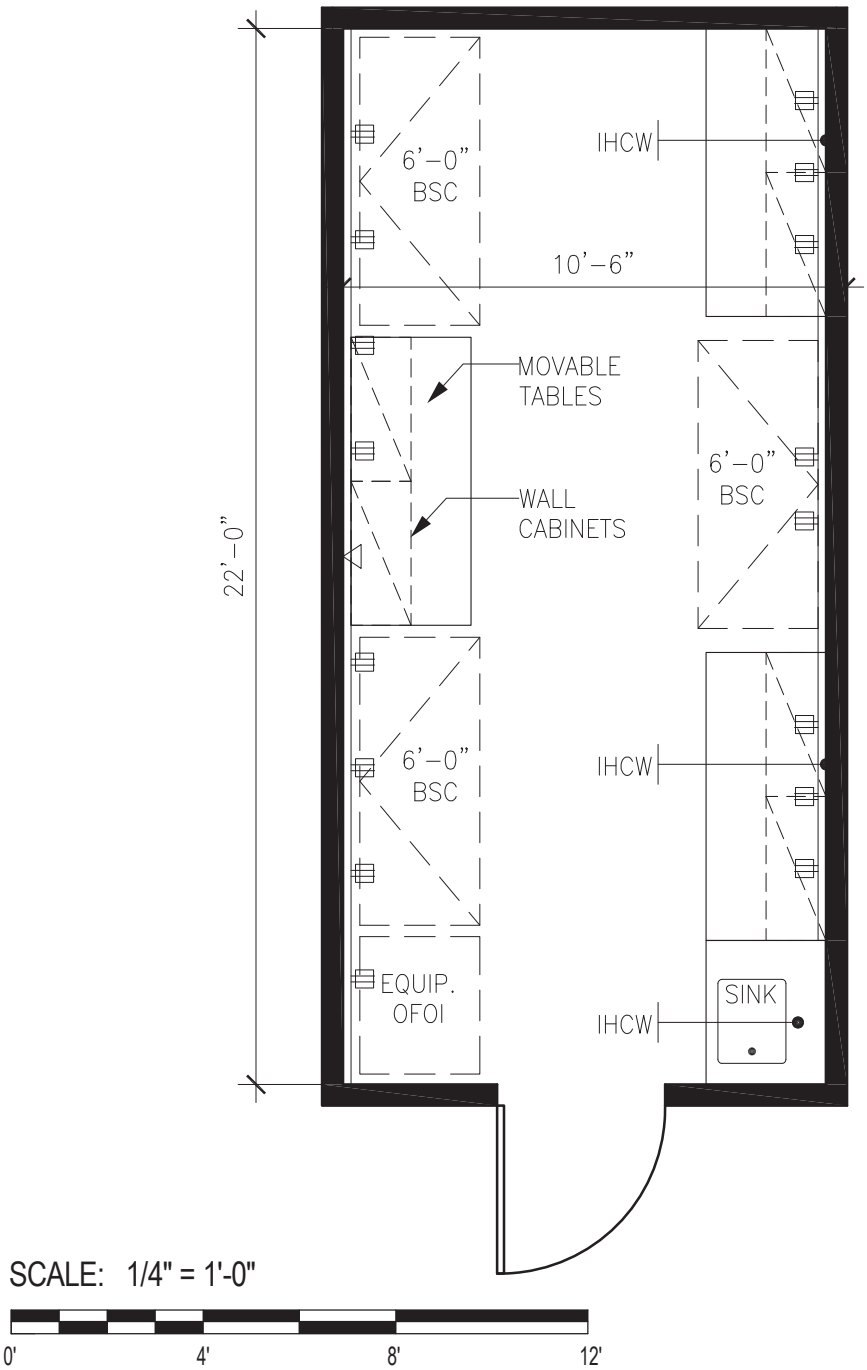
Individual Room Data Sheets / Pre-Schematic Finish Schedule

| | |
|---|---|
| **DEPARTMENT UNIT** | **Laboratory** |
| **Space Name** | Imaging Suite - BL2 Lab |
| **Space Number** | N/A |

| | |
|---|---|
| **1. SPACE PROGRAM** | |
| General Space Description: | Wet Lab |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 220 SF |
| (Quantity) & Location: | (1) at Level A |
| Purpose of Space: | Wet Lab |
| Number of Occupants: | 4 |
| Hours and Days Used: | 24/7 |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | Imaging Suite, BL2 lab spaces |
| Must Be Near To: | Vivarium |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | None |
| Doors: | 42" |
| Floor: | Seamless Sheet Vinyl or Trowel on Epoxy |
| Wall: | Epoxy Painted Gypsum Board |
| Ceiling: | Acoustic Tile |
| Ceiling Height: | 10'-0" minimum |
| Acoustics: | N/A |
| General Character of Room: | Wet Lab |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | Proximity Sensor |
| HVAC: | 72 degrees F +/- 4, Verify BSC types required |
| Plumbing: | Small sink with industrial H/CW, O2 |
| Electrical: | 120V outlets. |
| Lighting: | Recessed Fluorescent |
| Phone / Data: | Cat-6 Data & Voice |
| Vibration Criteria: | 2000 Micro-inches/second |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | S.S. Counter with Phenolic Resin base Cabinets below and Cabinets above. |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

## ROOM DATA SHEET

### Imaging Suite - BL2 Lab / 220 SF



# 4 Space Program

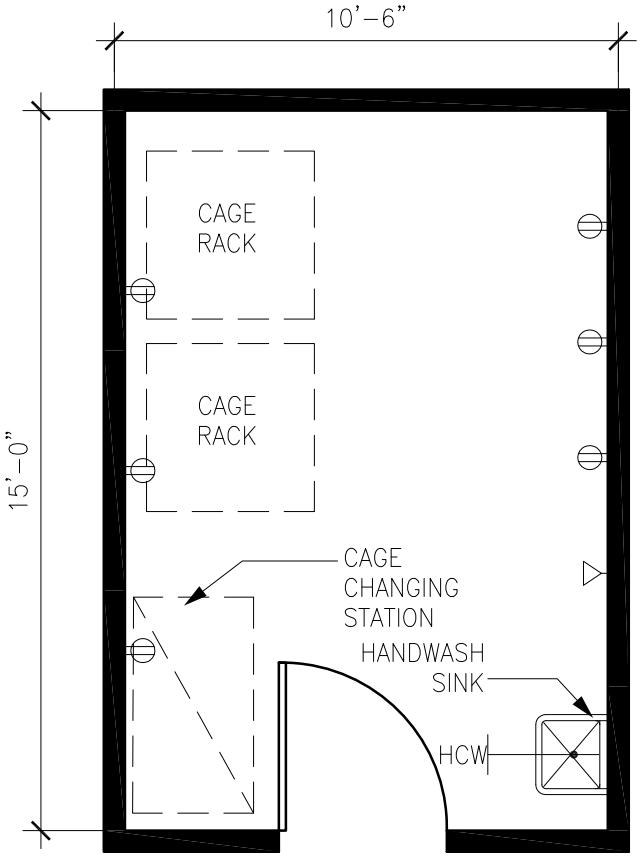
Individual Room Data Sheets / Pre-Schematic Finish Schedule

| | |
|---|---|
| **DEPARTMENT UNIT** | **Laboratory** |
| **Space Name** | Imaging Suite - BL2 Mice Holding |
| **Space Number** | N/A |

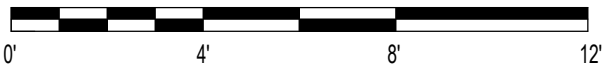
| | |
|---|---|
| **1. SPACE PROGRAM** | |
| General Space Description: | Mouse Holding Room |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 150 SF |
| (Quantity) & Location: | (1) at Level A |
| Purpose of Space: | Mouse Holding Room |
| Number of Occupants: | 0 |
| Hours and Days Used: | 24/7 |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | Imaging Suite, BL2 lab spaces |
| Must Be Near To: | Vivarium |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | None |
| Doors: | 42" |
| Floor: | Seamless Sheet Vinyl or Trowel on Epoxy |
| Wall: | Epoxy Painted Gypsum Board |
| Ceiling: | Epoxy Painted Gypsum Board |
| Ceiling Height: | 10'-0" minimum |
| Acoustics: | N/A |
| General Character of Room: | Mouse Holding Room |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | Proximity Sensor |
| HVAC: | 72 degrees F +/- 4 |
| Plumbing: | Small sink with H/CW |
| Electrical: | 120V outlets. |
| Lighting: | Recessed Fluorescent |
| Phone / Data: | Cat-6 Data & Voice |
| Vibration Criteria: | 2000 Micro-inches/second |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | S.S. Hand Wash Sink |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | Requires space for a minimum of 2 animal racks |

## ROOM DATA SHEET

### Imaging Suite - BL2 Mice Holding / 150 SF




SCALE: 1/4" = 1'-0"

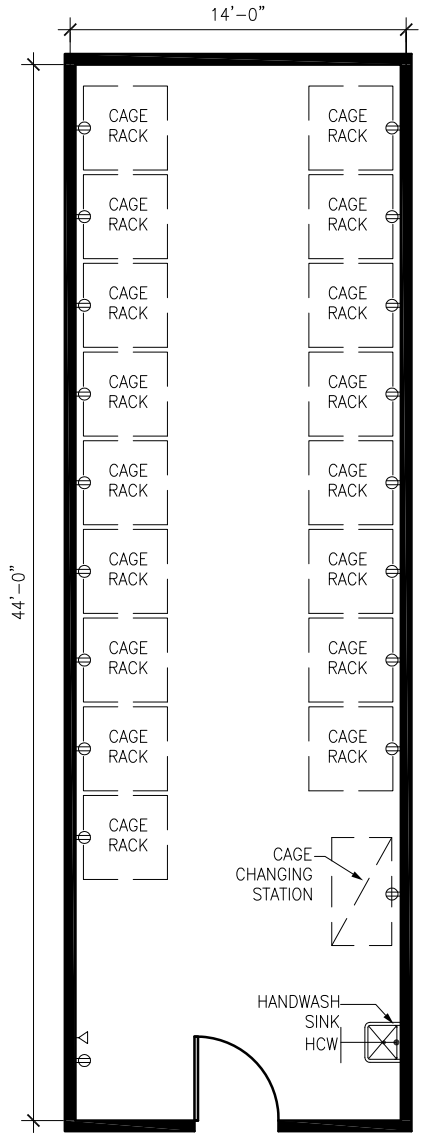


| DEPARTMENT UNIT | Laboratory |
|---|---|
| Space Name | Vivarium - Mice Holding |
| Space Number | N/A |

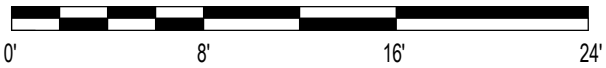
| | |
|---|---|
| **1. SPACE PROGRAM** | |
| General Space Description: | Mouse Holding Room Standard |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 616 SF |
| (Quantity) & Location: | (1) at Level A |
| Purpose of Space: | Mouse Holding Room |
| Number of Occupants: | 0 |
| Hours and Days Used: | 24/7 |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | Vivarium Spaces |
| Must Be Near To: | Imaging Suite |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | None |
| Doors: | 42" |
| Floor: | Seamless Sheet Vinyl or Trowel on Epoxy |
| Wall: | Epoxy Painted Gypsum Board |
| Ceiling: | Epoxy Painted Gypsum Board |
| Ceiling Height: | 10'-0" minimum |
| Acoustics: | N/A |
| General Character of Room: | Mouse Holding Room |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | Proximity Sensor |
| HVAC: | 72 degrees F +/- 4 |
| Plumbing: | Small sink with H/CW |
| Electrical: | 120V outlets. |
| Lighting: | Recessed Fluorescent on Timer System |
| Phone / Data: | Cat-6 Data & Voice |
| Vibration Criteria: | 2000 Micro-inches/second |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | S.S. Hand Wash sink, Changing Station |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | Requires space for 17 Animal Racks (1700 cages) |

## ROOM DATA SHEET

### Vivarium - Mice Holding / 616 SF




SCALE: 1/8" = 1'-0"

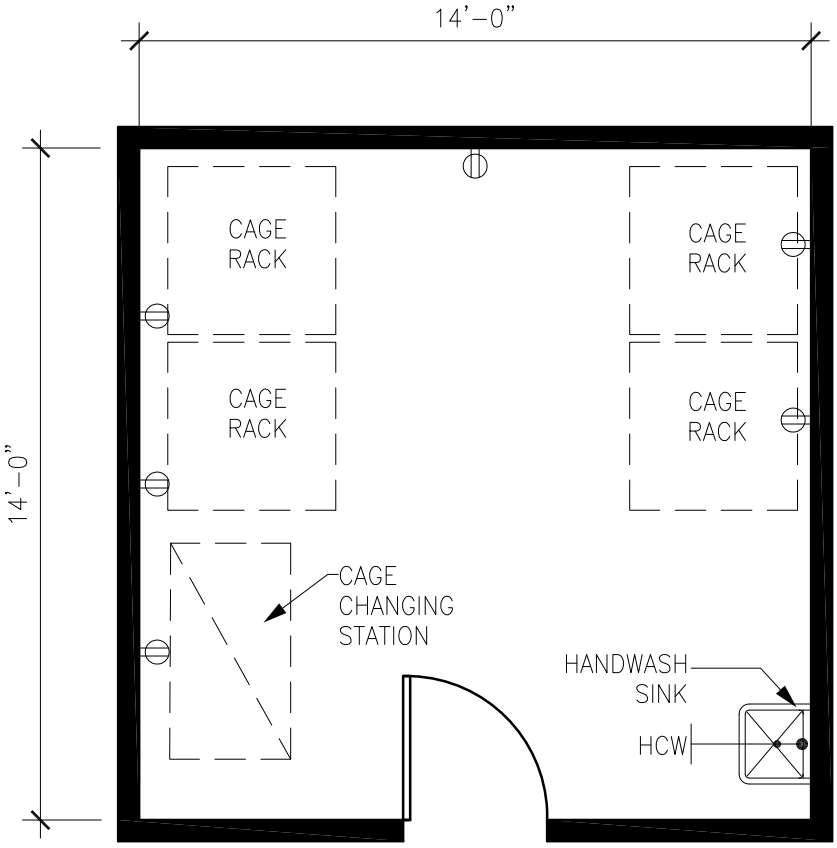


| DEPARTMENT UNIT | Laboratory |
|---|---|
| Space Name | Vivarium - Mice Holding Immunodeficient |
| Space Number | N/A |

| 1. SPACE PROGRAM | |
|---|---|
| General Space Description: | Mouse Holding Room immunodeficient |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 200 SF |
| (Quantity) & Location: | (1) at Level A |
| Purpose of Space: | Mouse Holding Room |
| Number of Occupants: | 0 |
| Hours and Days Used: | 24/7 |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | Vivarium Spaces |
| Must Be Near To: | Imaging Suite |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | None |
| Doors: | 42" |
| Floor: | Seamless Sheet Vinyl or Trowel on Epoxy |
| Wall: | Epoxy Painted Gypsum Board |
| Ceiling: | Epoxy Painted Gypsum Board |
| Ceiling Height: | 10'-0" minimum |
| Acoustics: | N/A |
| General Character of Room: | Mouse Holding Room |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | Proximity Sensor |
| HVAC: | 72 degrees F +/- 4 |
| Plumbing: | Small sink with H/CW |
| Electrical: | 120V outlets. |
| Lighting: | Recessed Fluorescent on timer system |
| Phone / Data: | Cat-6 Data & Voice |
| Vibration Criteria: | 2000 Micro-inches/second |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | S.S. Hand Wash sink, Changing Station |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | Requires space for 4 Animal Racks (400 cages) |

## ROOM DATA SHEET

### Vivarium - Mice Holding Immunodeficient / 200 SF




SCALE: 1/4" = 1'-0"

# 4 Space Program

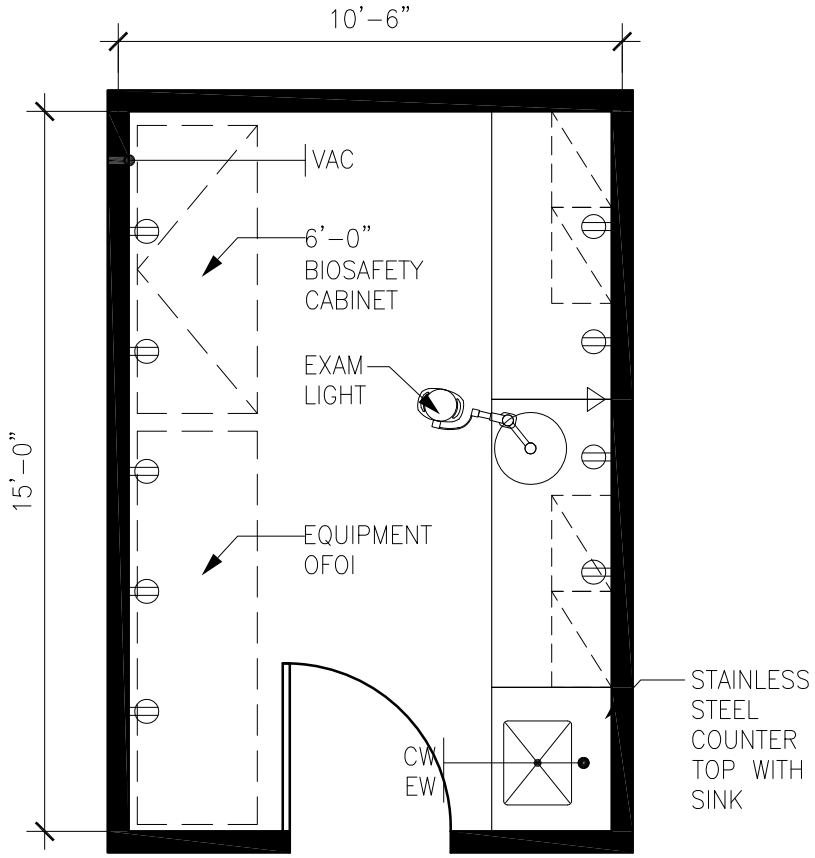
Individual Room Data Sheets / Pre-Schematic Finish Schedule

| | |
|---|---|
| **DEPARTMENT UNIT** | **Laboratory** |
| **Space Name** | Vivarium - Mice Procedure Rooms |
| **Space Number** | N/A |

| | |
|---|---|
| **1. SPACE PROGRAM** | |
| General Space Description: | Wet Lab Procedure Room |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 150 SF |
| (Quantity) & Location: | (1) at Level A |
| Purpose of Space: | Wet Lab Procedure Room |
| Number of Occupants: | 2 |
| Hours and Days Used: | 24/7 |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | Vivarium Spaces |
| Must Be Near To: | Imaging Suite |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | None |
| Doors: | 42" |
| Floor: | Seamless Sheet Vinyl or Trowel on Epoxy |
| Wall: | Epoxy Painted Gypsum Board |
| Ceiling: | Epoxy Painted Gypsum Board |
| Ceiling Height: | 10'-0" minimum |
| Acoustics: | N/A |
| General Character of Room: | Wet Lab Procedure Room |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | Proximity Sensor |
| HVAC: | 72 degrees F +/- 4 |
| Plumbing: | Small sink with H/CW |
| Electrical: | 120V outlets, Exam light |
| Lighting: | Recessed Fluorescent on timer system |
| Phone / Data: | Cat-6 Data & Voice |
| Vibration Criteria: | 2000 Micro-inches/second |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | S.S. countertops on Phenolic Resin Base Cabinets with Overhead Cabinets |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

## ROOM DATA SHEET

### Vivarium - Mice Procedure Room / 150 SF




SCALE: 1/4" = 1'-0"

# 4 Space Program

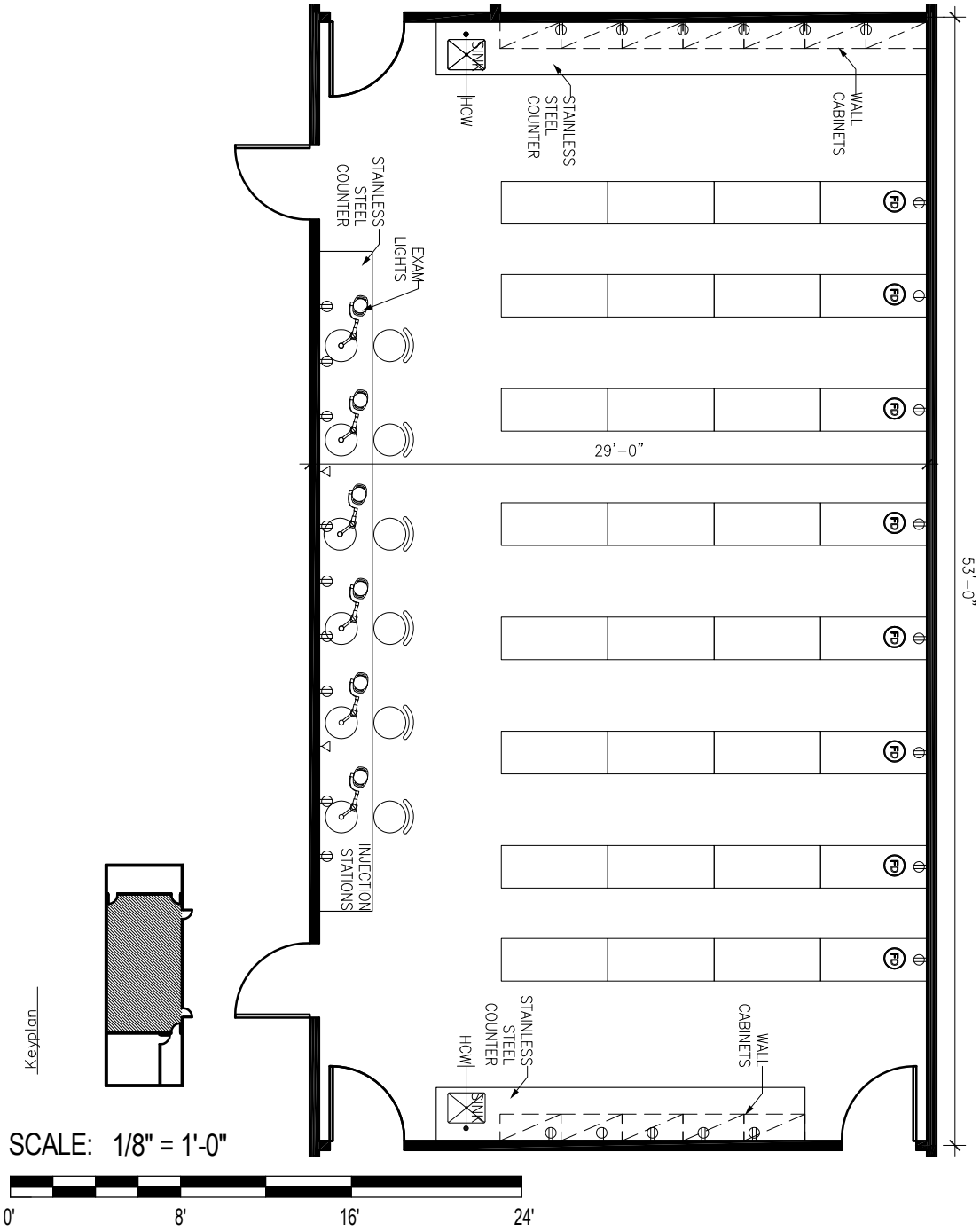
Individual Room Data Sheets / Pre-Schematic Finish Schedule

| | |
|---|---|
| **DEPARTMENT UNIT** | **Laboratory** |
| **Space Name** | Vivarium - Zebra Fish Holding Room |
| **Space Number** | N/A |

| | |
|---|---|
| **1. SPACE PROGRAM** | |
| General Space Description: | Fish Holding Room |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 1,537 SF |
| (Quantity) & Location: | (1) at Level A |
| Purpose of Space: | Wet Lab Procedure Room |
| Number of Occupants: | 6 |
| Hours and Days Used: | 24/7 |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | Zebra Fish Suite, Vivarium |
| Must Be Near To: | Imaging Suite |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | None |
| Doors: | 42" |
| Floor: | Seamless Sheet Vinyl or Trowel on Epoxy-sloped to drain |
| Wall: | Epoxy Painted Gypsum Board |
| Ceiling: | Epoxy Painted Gypsum Board |
| Ceiling Height: | 10'-0" minimum |
| Acoustics: | N/A |
| General Character of Room: | Fish Holding Room |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | Proximity Sensor |
| HVAC: | 72 degrees F +/- 4 |
| Plumbing: | Sink with H/CW, floor drains |
| Electrical: | 120V outlets, Exam lights |
| Lighting: | Recessed Fluorescent |
| Phone / Data: | Cat-6 Data & Voice |
| Vibration Criteria: | 2000 Micro-inches/second |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | S.S. Countertops on Phenolic Resin Base Cabinets with Overhead Cabinets. Provide Microscope Stations for up to 6 people. |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | Zebra Fish Racks - quantity to be determined |

## ROOM DATA SHEET

### Vivarium - Zebra Fish Holding Room / 1,537 SF



# 4 Space Program

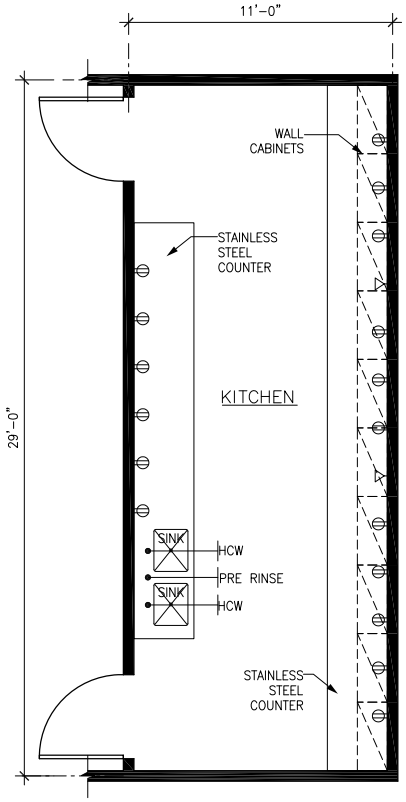
Individual Room Data Sheets / Pre-Schematic Finish Schedule

| DEPARTMENT UNIT | Laboratory |
|---|---|
| Space Name | Vivarium - Zebra Fish Prep. Kitchen |
| Space Number | N/A |

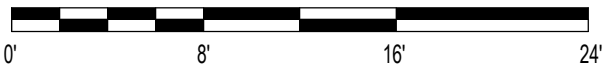
| | |
|---|---|
| **1. SPACE PROGRAM** | |
| General Space Description: | Wet Lab Procedure Room |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 320 SF |
| (Quantity) & Location: | (1) at Level A |
| Purpose of Space: | Wet Lab Procedure Room |
| Number of Occupants: | 2 |
| Hours and Days Used: | 24/7 |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | Zebra Fish Suite, Vivarium |
| Must Be Near To: | Imaging Suite |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | None |
| Doors: | 42" |
| Floor: | Seamless Sheet Vinyl or Trowel on Epoxy |
| Wall: | Epoxy Painted Gypsum Board |
| Ceiling: | Epoxy Painted Gypsum Board |
| Ceiling Height: | 10'-0" minimum |
| Acoustics: | N/A |
| General Character of Room: | Wet Lab Procedure Room |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | Proximity Sensor |
| HVAC: | 72 degrees F +/- 4 |
| Plumbing: | Large sink with H/CW and Spray Hose |
| Electrical: | 120V outlets |
| Lighting: | Recessed Fluorescent |
| Phone / Data: | Cat-6 Data & Voice |
| Vibration Criteria: | 2000 Micro-inches/second |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | S.S. Countertops on Phenolic Resin Base Cabinets with Overhead Cabinets |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

## ROOM DATA SHEET

### Vivarium - Zebra Fish Prep. Kitchen / 320 SF




SCALE: 1/8" = 1'-0"




Keyplan

# 4 Space Program

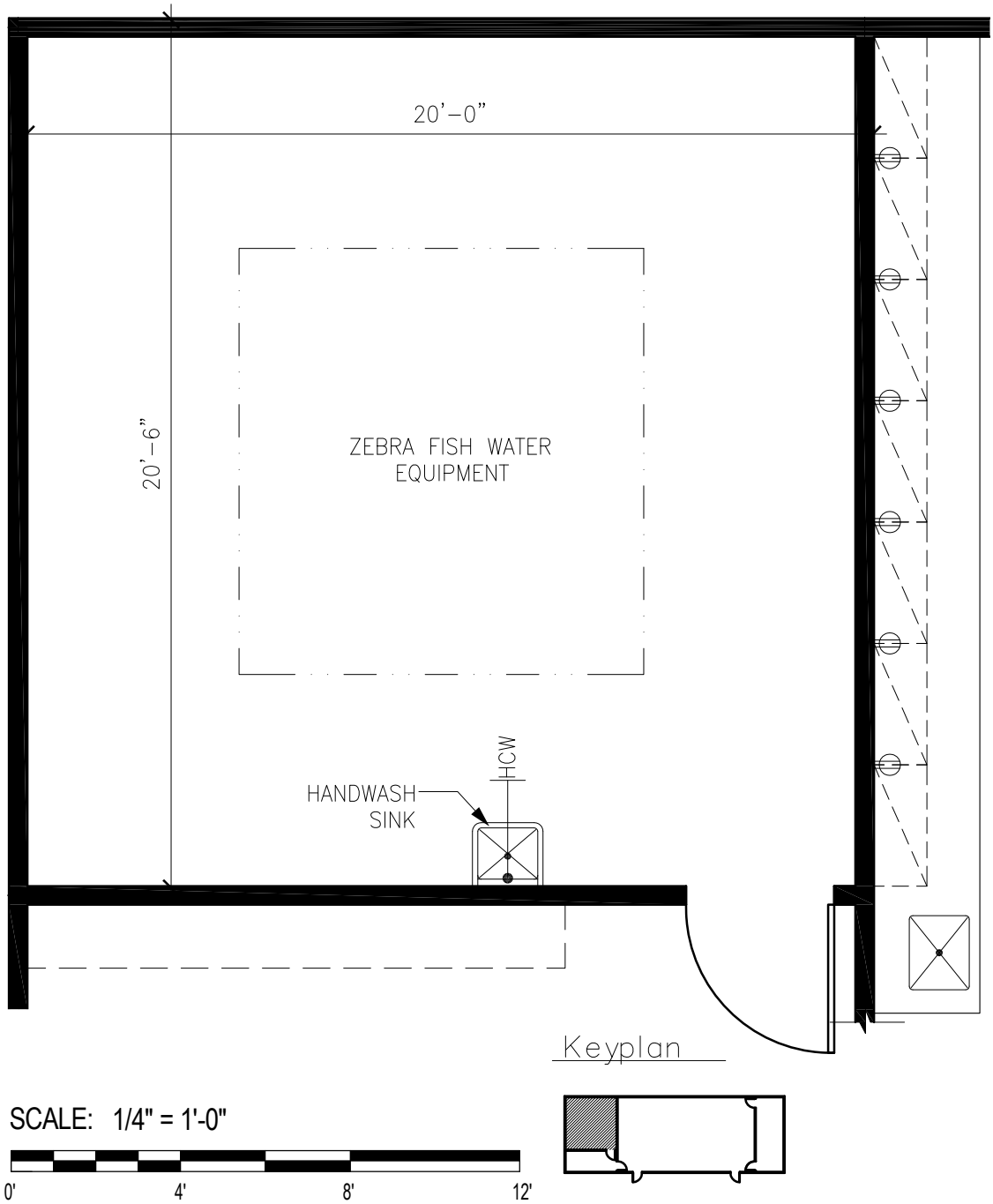
Individual Room Data Sheets / Pre-Schematic Finish Schedule

| | |
|---|---|
| **DEPARTMENT UNIT** | **Laboratory** |
| **Space Name** | Vivarium - Zebra Fish Equipment Room |
| **Space Number** | N/A |

| | |
|---|---|
| **1. SPACE PROGRAM** | |
| General Space Description: | Equipment Room |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 410 SF |
| (Quantity) & Location: | (1) at Level A |
| Purpose of Space: | Equipment Room |
| Number of Occupants: | 2 |
| Hours and Days Used: | 24/7 |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | Zebra Fish Suite, Vivarium |
| Must Be Near To: | Imaging Suite |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | None |
| Doors: | 42" |
| Floor: | Seamless Sheet Vinyl or Trowel on Epoxy |
| Wall: | Epoxy Painted Gypsum Board |
| Ceiling: | Epoxy Painted Gypsum Board |
| Ceiling Height: | 10'-0" minimum |
| Acoustics: | N/A |
| General Character of Room: | Equipment Room |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | None |
| HVAC: | 72 degrees F +/- 4 |
| Plumbing: | Small sink with H/CW |
| Electrical: | 120V outlets, verify power needs for equipment |
| Lighting: | Recessed Fluorescent |
| Phone / Data: | Cat-6 Data & Voice |
| Vibration Criteria: | 2000 Micro-inches/second |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Water Equipment for Zebra Fish Racks |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

**ROOM DATA SHEET**

**Vivarium - Zebra Fish Equipment Room / 410 SF**



# 4 Space Program

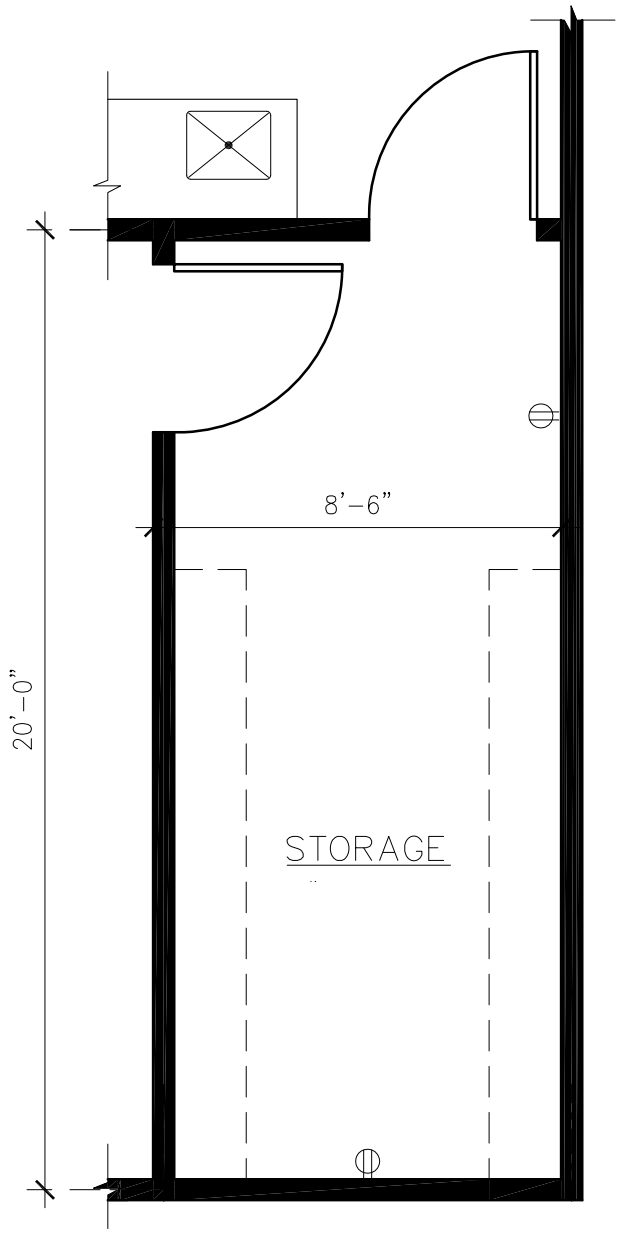
Individual Room Data Sheets / Pre-Schematic Finish Schedule

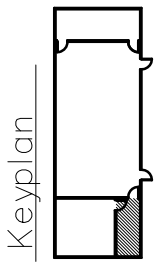
| | |
|---|---|
| **DEPARTMENT UNIT** | **Laboratory** |
| **Space Name** | Vivarium - Zebra Fish Storage |
| **Space Number** | N/A |

| | |
|---|---|
| **1. SPACE PROGRAM** | |
| General Space Description: | Storage Room for Supplies for Zebra Fish |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 170 SF |
| (Quantity) & Location: | (1) at Level A |
| Purpose of Space: | Storage Room |
| Number of Occupants: | 2 |
| Hours and Days Used: | 24/7 |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | Zebra Fish Suite, Vivarium |
| Must Be Near To: | Imaging Suite |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | None |
| Doors: | 42" |
| Floor: | Seamless Sheet Vinyl or Trowel on Epoxy |
| Wall: | Epoxy Painted Gypsum Board |
| Ceiling: | Epoxy Painted Gypsum Board |
| Ceiling Height: | 10'-0" minimum |
| Acoustics: | N/A |
| General Character of Room: | Storage Room |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | Proximity Sensor |
| HVAC: | 72 degrees F +/- 4 |
| Plumbing: | None |
| Electrical: | 120V outlets |
| Lighting: | Recessed Fluorescent |
| Phone / Data: | None |
| Vibration Criteria: | None |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Industrial Metal Storage Shelving System |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

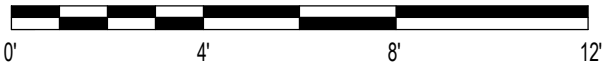
## ROOM DATA SHEET

### Vivarium - Zebra Fish Storage / 170 SF




SCALE: 1/4" = 1'-0"



# 4 Space Program

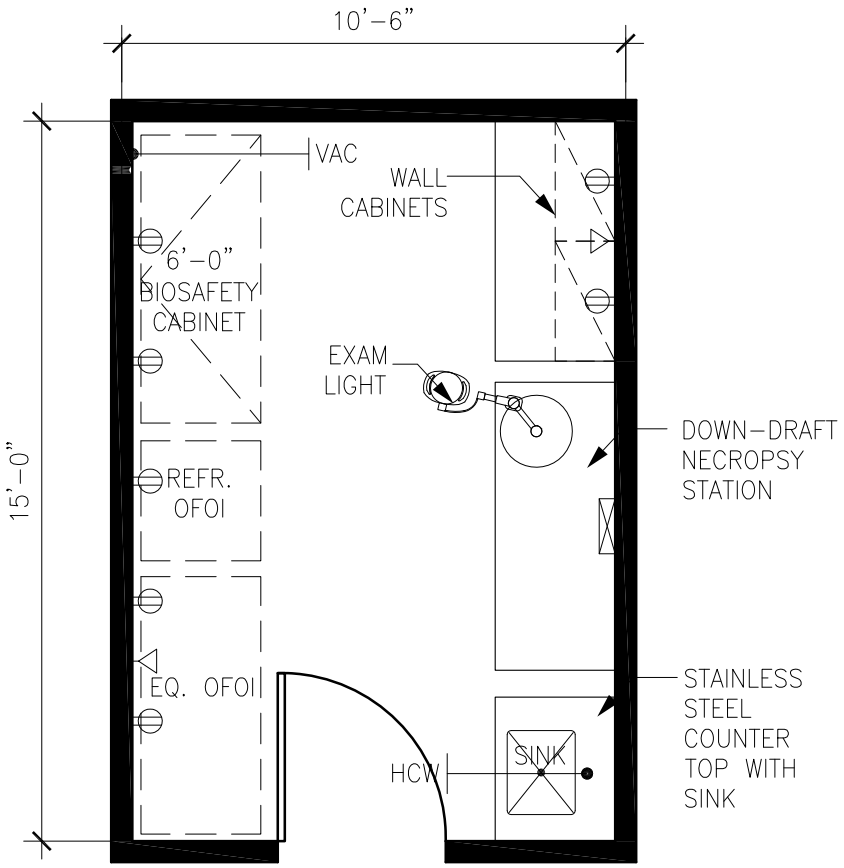
Individual Room Data Sheets / Pre-Schematic Finish Schedule

| DEPARTMENT UNIT | Laboratory |
|---|---|
| Space Name | Vivarium - Necropsy |
| Space Number | N/A |

| 1. SPACE PROGRAM | |
|---|---|
| General Space Description: | Wet Lab Necropsy Room |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 150 SF |
| (Quantity) & Location: | (1) at Level A |
| Purpose of Space: | Histology of rodents |
| Number of Occupants: | 1 |
| Hours and Days Used: | 24/7 |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | Vivarium Spaces |
| Must Be Near To: | Imaging Suite |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | None |
| Doors: | 42" |
| Floor: | Seamless Sheet Vinyl or Trowel on Epoxy |
| Wall: | Epoxy Painted Gypsum Board |
| Ceiling: | Epoxy Painted Gypsum Board |
| Ceiling Height: | 10'-0" minimum |
| Acoustics: | N/A |
| General Character of Room: | Wet Lab Procedure Room |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | Proximity Sensor |
| HVAC: | 72 degrees F +/- 4, Downdraft Necropsy Table |
| Plumbing: | Sink with H/CW |
| Electrical: | 120V outlets, Exam light |
| Lighting: | Recessed Fluorescent |
| Phone / Data: | Cat-6 Data & Voice |
| Vibration Criteria: | 2000 Micro-inches/second |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | S.S. Countertops on Phenolic Resin Base Cabinets with Overhead Cabinets, Lab Freezer in this room |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

## ROOM DATA SHEET

### Vivarium - Necropsy / 150 SF




SCALE: 1/4" = 1'-0"

0' 4' 8' 12'

# 4 Space Program

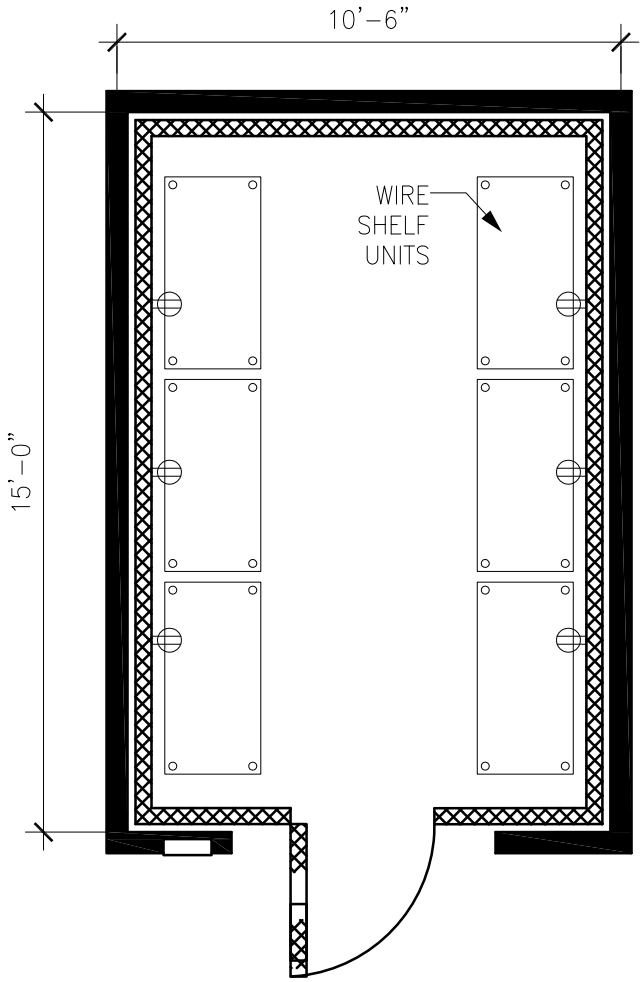
Individual Room Data Sheets / Pre-Schematic Finish Schedule

| DEPARTMENT UNIT | Laboratory |
|---|---|
| Space Name | Vivarium - Food Storage |
| Space Number | N/A |

| | |
|---|---|
| **1. SPACE PROGRAM** | |
| General Space Description: | Walk in Cooler for Mouse Feed Storage |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 150 SF |
| (Quantity) & Location: | (1) at Level A |
| Purpose of Space: | Storage Room |
| Number of Occupants: | 0 |
| Hours and Days Used: | 24/7 |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | Vivarium Spaces |
| Must Be Near To: | Imaging Suite |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | None |
| Doors: | 36" |
| Floor: | Rubber Flooring on Metal Panels |
| Wall: | Painted Metal Panels |
| Ceiling: | Metal panels |
| Ceiling Height: | 9'-0" minimum |
| Acoustics: | N/A |
| General Character of Room: | Storage Room |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | Proximity Sensor |
| HVAC: | 37 degrees F +/- 4 |
| Plumbing: | None |
| Electrical: | 120V outlets |
| Lighting: | Fluorescent |
| Phone / Data: | None |
| Vibration Criteria: | None |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Wall mounted stainless steel shelving |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | This is a walk in cooler room for storage of animal feed |

## ROOM DATA SHEET

### Vivarium - Food Storage / 150 SF




SCALE: 1/4" = 1'-0"

# 4 Space Program

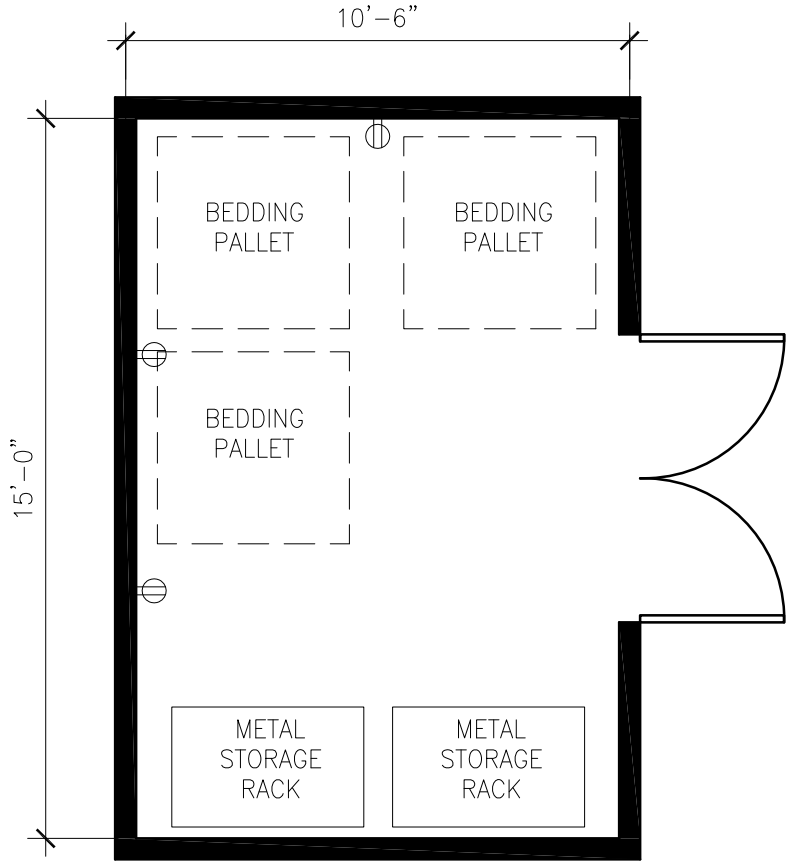
Individual Room Data Sheets / Pre-Schematic Finish Schedule

| DEPARTMENT UNIT | Laboratory |
|---|---|
| Space Name | Vivarium - Bedding Storage |
| Space Number | N/A |

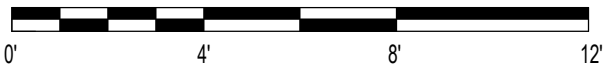
| 1. SPACE PROGRAM | |
|---|---|
| General Space Description: | Storage Room |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 150 SF |
| (Quantity) & Location: | (1) at Level A |
| Purpose of Space: | Storage Room |
| Number of Occupants: | 0 |
| Hours and Days Used: | 24/7 |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | Vivarium Spaces |
| Must Be Near To: | Imaging Suite |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | None |
| Doors: | Double 36" door |
| Floor: | Concrete |
| Wall: | Epoxy Painted Gypsum Board |
| Ceiling: | Epoxy Painted Gypsum Board |
| Ceiling Height: | 9'-0" minimum |
| Acoustics: | N/A |
| General Character of Room: | Storage Room |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | Proximity Sensor |
| HVAC: | 72 degrees F +/- 4 |
| Plumbing: | None |
| Electrical: | 120V outlets |
| Lighting: | Fluorescent |
| Phone / Data: | None |
| Vibration Criteria: | None |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Provisions for storage of bedding on pallets and Metal Storage Rack System |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

## ROOM DATA SHEET

### Vivarium - Bedding Storage / 150 SF




SCALE: 1/4" = 1'-0"

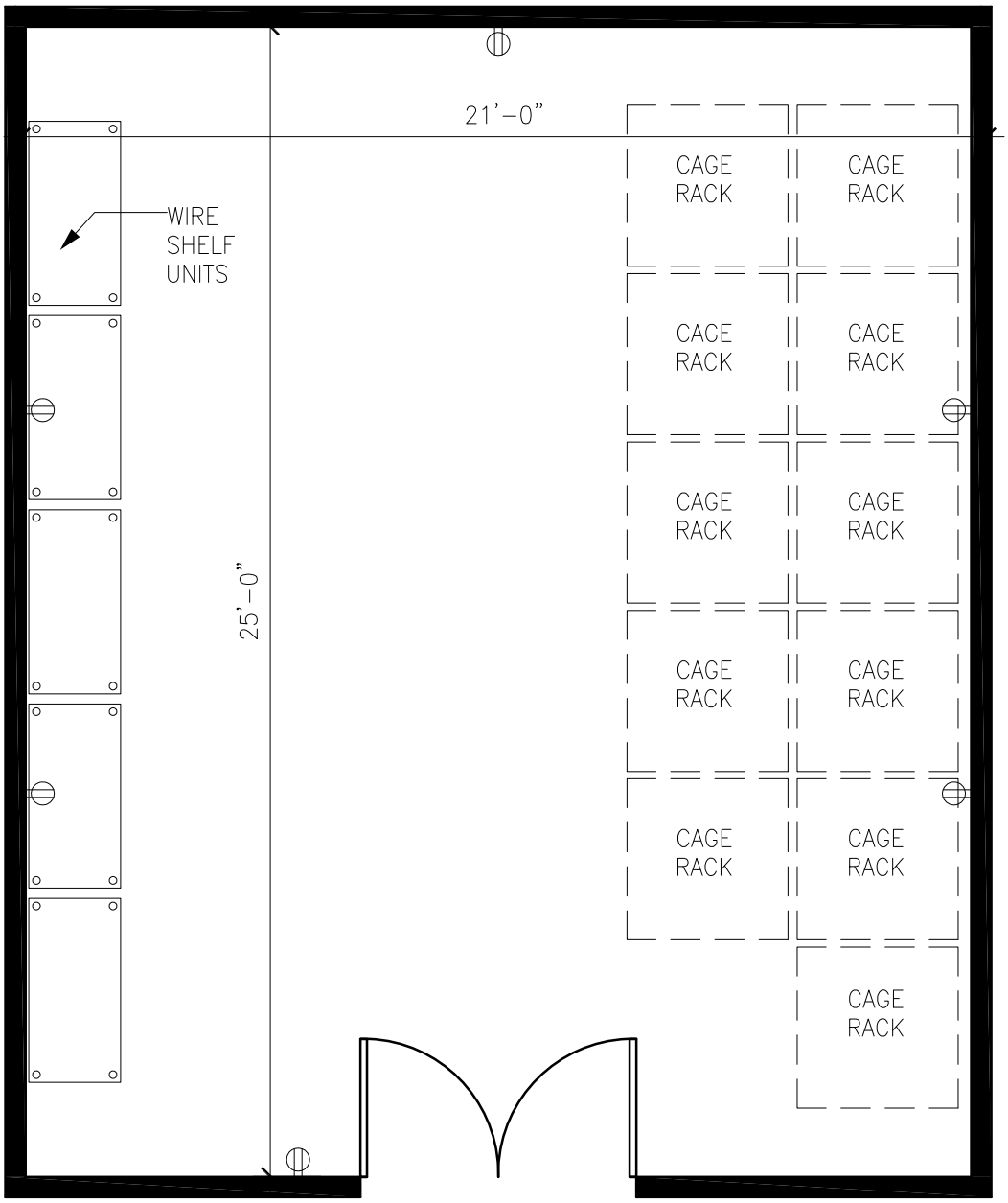


| DEPARTMENT UNIT | Laboratory |
|---|---|
| Space Name | Vivarium - Cage/Rack Storage |
| Space Number | N/A |

| 1. SPACE PROGRAM | |
|---|---|
| General Space Description: | Storage of Vivarium Supplies |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 500 SF |
| (Quantity) & Location: | (1) at Level A |
| Purpose of Space: | Storage Room |
| Number of Occupants: | 0 |
| Hours and Days Used: | 24/7 |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | Vivarium Spaces |
| Must Be Near To: | Imaging Suite |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | None |
| Doors: | Double 36" door |
| Floor: | Seamless Sheet Vinyl or Trowel on Epoxy |
| Wall: | Epoxy Painted Gypsum Board |
| Ceiling: | Epoxy Painted Gypsum Board |
| Ceiling Height: | 9'-0" minimum |
| Acoustics: | N/A |
| General Character of Room: | Storage Room |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | Proximity Sensor |
| HVAC: | 72 degrees F +/- 4 |
| Plumbing: | None |
| Electrical: | 120V outlets |
| Lighting: | Fluorescent |
| Phone / Data: | None |
| Vibration Criteria: | None |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Provisions for storage of supplies on Metal Storage Rack System, space for storing Cages/Racks |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

## ROOM DATA SHEET

### Vivarium - Cage/Rack Storage / 500 SF




SCALE: 1/4" = 1'-0"

# 4 Space Program

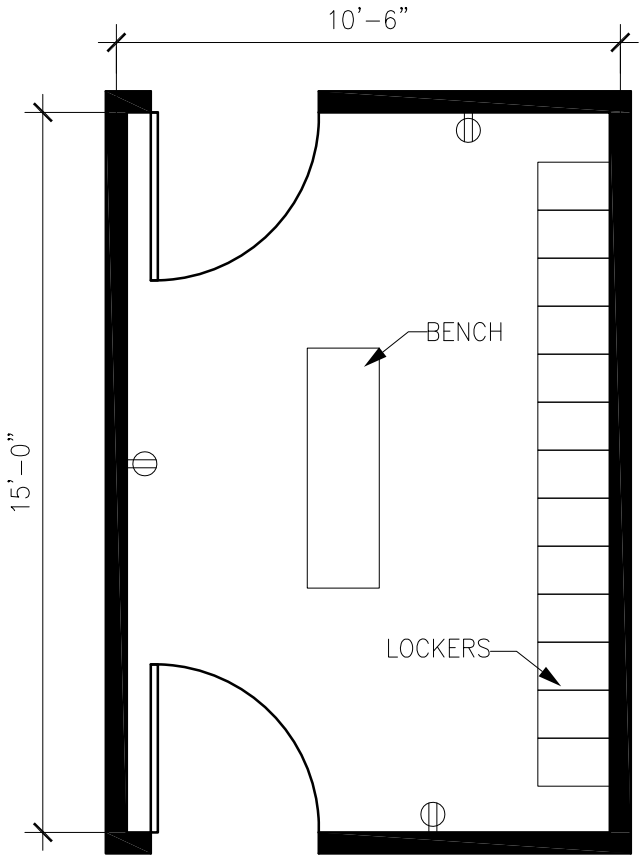
Individual Room Data Sheets / Pre-Schematic Finish Schedule

| | |
|---|---|
| **DEPARTMENT UNIT** | **Laboratory** |
| **Space Name** | Vivarium - Changing Room Men |
| **Space Number** | N/A |

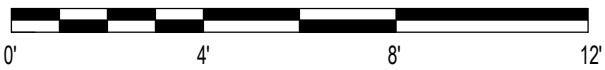
| | |
|---|---|
| **1. SPACE PROGRAM** | |
| General Space Description: | Entry Changing Room for Men |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 150 SF |
| (Quantity) & Location: | (1) at Level A |
| Purpose of Space: | Changing Room |
| Number of Occupants: | 0 |
| Hours and Days Used: | 24/7 |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | Vivarium Spaces |
| Must Be Near To: | Imaging Suite |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | None |
| Doors: | 42" door |
| Floor: | Seamless Sheet Vinyl or Trowel on Epoxy |
| Wall: | Epoxy Painted Gypsum Board |
| Ceiling: | Epoxy Painted Gypsum Board |
| Ceiling Height: | 9'-0" minimum |
| Acoustics: | N/A |
| General Character of Room: | Changing Room |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | Proximity Sensor |
| HVAC: | 72 degrees F +/- 4 |
| Plumbing: | None |
| Electrical: | 120V outlets |
| Lighting: | Fluorescent |
| Phone / Data: | None |
| Vibration Criteria: | None |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Lockers for up to 12 people, Changing Area with Bench |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

## ROOM DATA SHEET

### Vivarium - Changing Room Men / 150 SF




SCALE: 1/4" = 1'-0"



# 4 Space Program

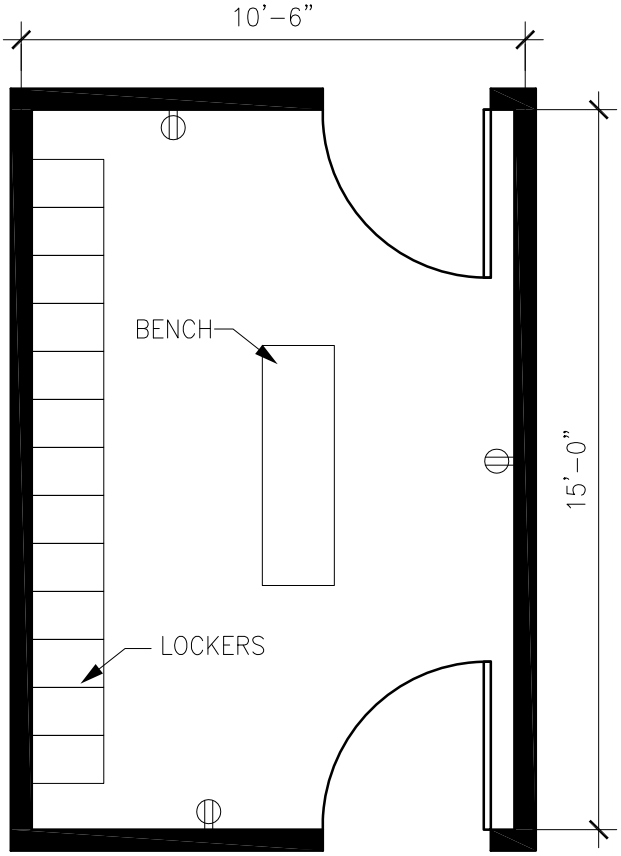
Individual Room Data Sheets / Pre-Schematic Finish Schedule

| DEPARTMENT UNIT | Laboratory |
|---|---|
| Space Name | Vivarium - Changing Room Women |
| Space Number | N/A |

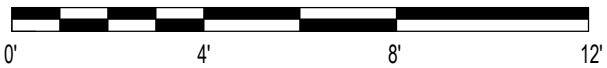
| | |
|---|---|
| **1. SPACE PROGRAM** | |
| General Space Description: | Entry Changing Room for Women |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 150 SF |
| (Quantity) & Location: | (1) at Level A |
| Purpose of Space: | Changing Room |
| Number of Occupants: | 0 |
| Hours and Days Used: | 24/7 |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | Vivarium Spaces |
| Must Be Near To: | Imaging Suite |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | None |
| Doors: | 42" door |
| Floor: | Seamless Sheet Vinyl or Trowel on Epoxy |
| Wall: | Epoxy Painted Gypsum Board |
| Ceiling: | Epoxy Painted Gypsum Board |
| Ceiling Height: | 9'-0" minimum |
| Acoustics: | N/A |
| General Character of Room: | Changing Room |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | Proximity Sensor |
| HVAC: | 72 degrees F +/- 4 |
| Plumbing: | None |
| Electrical: | 120V outlets |
| Lighting: | Fluorescent |
| Phone / Data: | None |
| Vibration Criteria: | None |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Lockers for up to 12 people, Changing area with Bench |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

## ROOM DATA SHEET

### Vivarium - Changing Room Women / 150 SF




SCALE: 1/4" = 1'-0"



# 4 Space Program

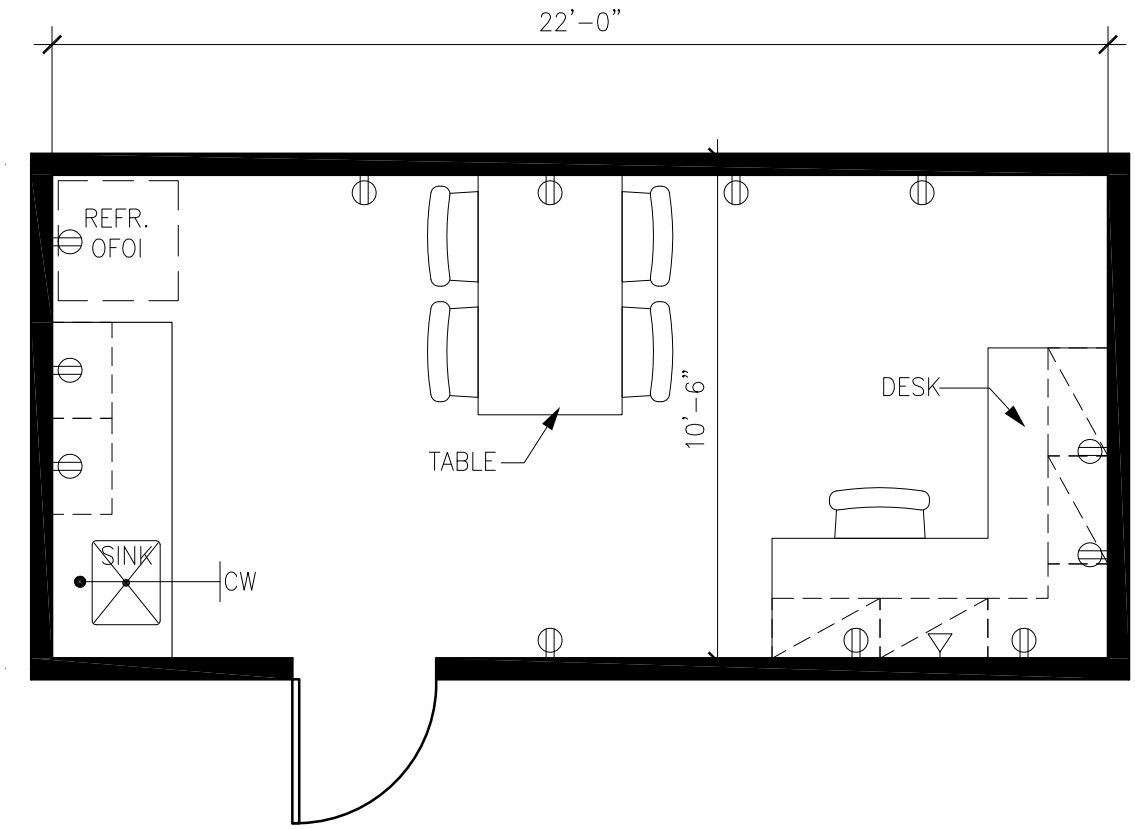
Individual Room Data Sheets / Pre-Schematic Finish Schedule

| DEPARTMENT UNIT | Laboratory |
|---|---|
| Space Name | Vivarium - Office Break Room |
| Space Number | N/A |

| | |
|---|---|
| **1. SPACE PROGRAM** | |
| General Space Description: | Office/Break Area for Vivarium |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 220 SF |
| (Quantity) & Location: | (1) at Level A |
| Purpose of Space: | Office/Break Room |
| Number of Occupants: | 4 |
| Hours and Days Used: | 24/7 |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | Vivarium Spaces |
| Must Be Near To: | Imaging Suite |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | Window to interior corridor |
| Doors: | 42" door |
| Floor: | Seamless Sheet Vinyl or Trowel on Epoxy |
| Wall: | Epoxy Painted Gypsum Board |
| Ceiling: | Epoxy Painted Gypsum Board |
| Ceiling Height: | 9'-0" minimum |
| Acoustics: | N/A |
| General Character of Room: | Office/Break Room |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | Proximity Sensor |
| HVAC: | 72 degrees F +/- 4 |
| Plumbing: | Sink with H/CW |
| Electrical: | 120V outlets |
| Lighting: | Fluorescent |
| Phone / Data: | Cat-6 Data & Voice |
| Vibration Criteria: | None |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Office Furniture, Coffee maker, Microwave, Refrigerator |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

## ROOM DATA SHEET

### Vivarium - Office Break Room / 220 SF




SCALE: 1/4" = 1'-0"

# 4 Space Program

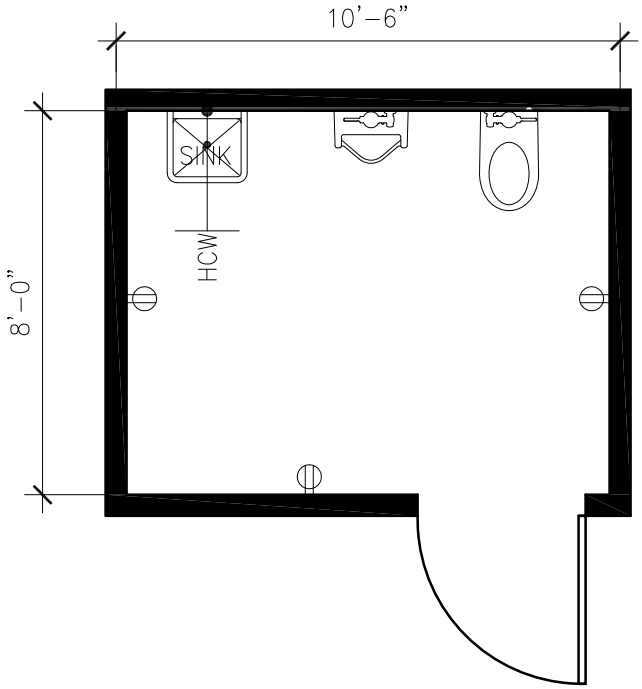
Individual Room Data Sheets / Pre-Schematic Finish Schedule

| DEPARTMENT UNIT | Laboratory |
|---|---|
| Space Name | Vivarium - Restroom Men |
| Space Number | N/A |

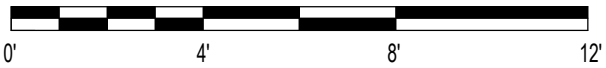
| 1. SPACE PROGRAM | |
|---|---|
| General Space Description: | Restroom for Men |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 80 SF |
| (Quantity) & Location: | (1) at Level A |
| Purpose of Space: | Restroom for men |
| Number of Occupants: | 0 |
| Hours and Days Used: | 24/7 |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | Vivarium Spaces |
| Must Be Near To: | Imaging Suite |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | None |
| Doors: | 42" door |
| Floor: | Seamless Sheet Vinyl or Trowel on Epoxy |
| Wall: | Epoxy Painted Gypsum Board |
| Ceiling: | Epoxy Painted Gypsum Board |
| Ceiling Height: | 9'-0" minimum |
| Acoustics: | N/A |
| General Character of Room: | Restroom for men |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | None |
| HVAC: | 72 degrees F +/- 4 |
| Plumbing: | Toilet, Urinal, Sink with H/CW |
| Electrical: | 120V outlets |
| Lighting: | Fluorescent |
| Phone / Data: | None |
| Vibration Criteria: | None |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | N/A |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

## ROOM DATA SHEET

### Vivarium - Restroom Men / 80 SF




SCALE: 1/4" = 1'-0"



# 4 Space Program

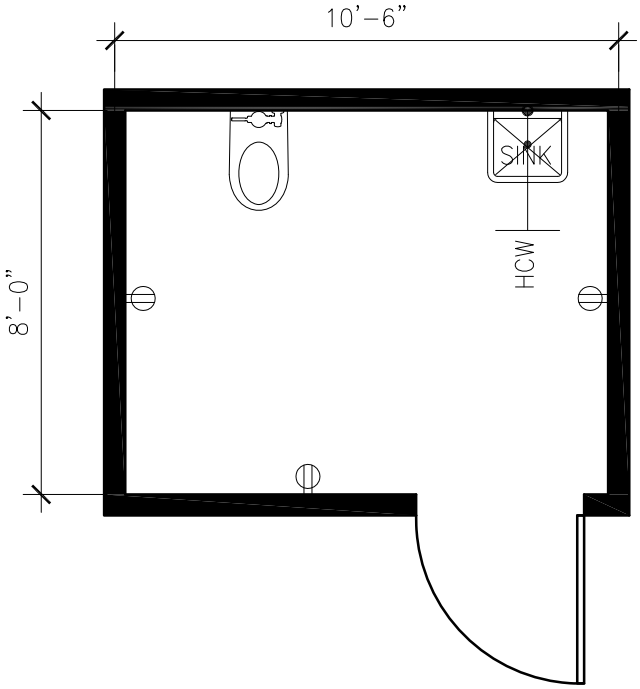
Individual Room Data Sheets / Pre-Schematic Finish Schedule

| | |
|---|---|
| **DEPARTMENT UNIT** | **Laboratory** |
| **Space Name** | Vivarium - Restroom Women |
| **Space Number** | N/A |

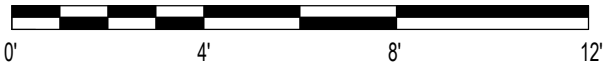
| | |
|---|---|
| **1. SPACE PROGRAM** | |
| General Space Description: | Restroom for Women |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 80 SF |
| (Quantity) & Location: | (1) at Level A |
| Purpose of Space: | Restroom for women |
| Number of Occupants: | 0 |
| Hours and Days Used: | 24/7 |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | Vivarium Spaces |
| Must Be Near To: | Imaging Suite |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | None |
| Doors: | 42" door |
| Floor: | Seamless Sheet Vinyl or Trowel on Epoxy |
| Wall: | Epoxy Painted Gypsum Board |
| Ceiling: | Epoxy Painted Gypsum Board |
| Ceiling Height: | 9'-0" minimum |
| Acoustics: | N/A |
| General Character of Room: | Restroom for women |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | None |
| HVAC: | 72 degrees F +/- 4 |
| Plumbing: | Toilet, Sink with H/CW |
| Electrical: | 120V outlets |
| Lighting: | Fluorescent |
| Phone / Data: | None |
| Vibration Criteria: | None |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | N/A |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

## ROOM DATA SHEET

### Vivarium - Restroom Women / 80 SF




SCALE: 1/4" = 1'-0"



# 4 Space Program

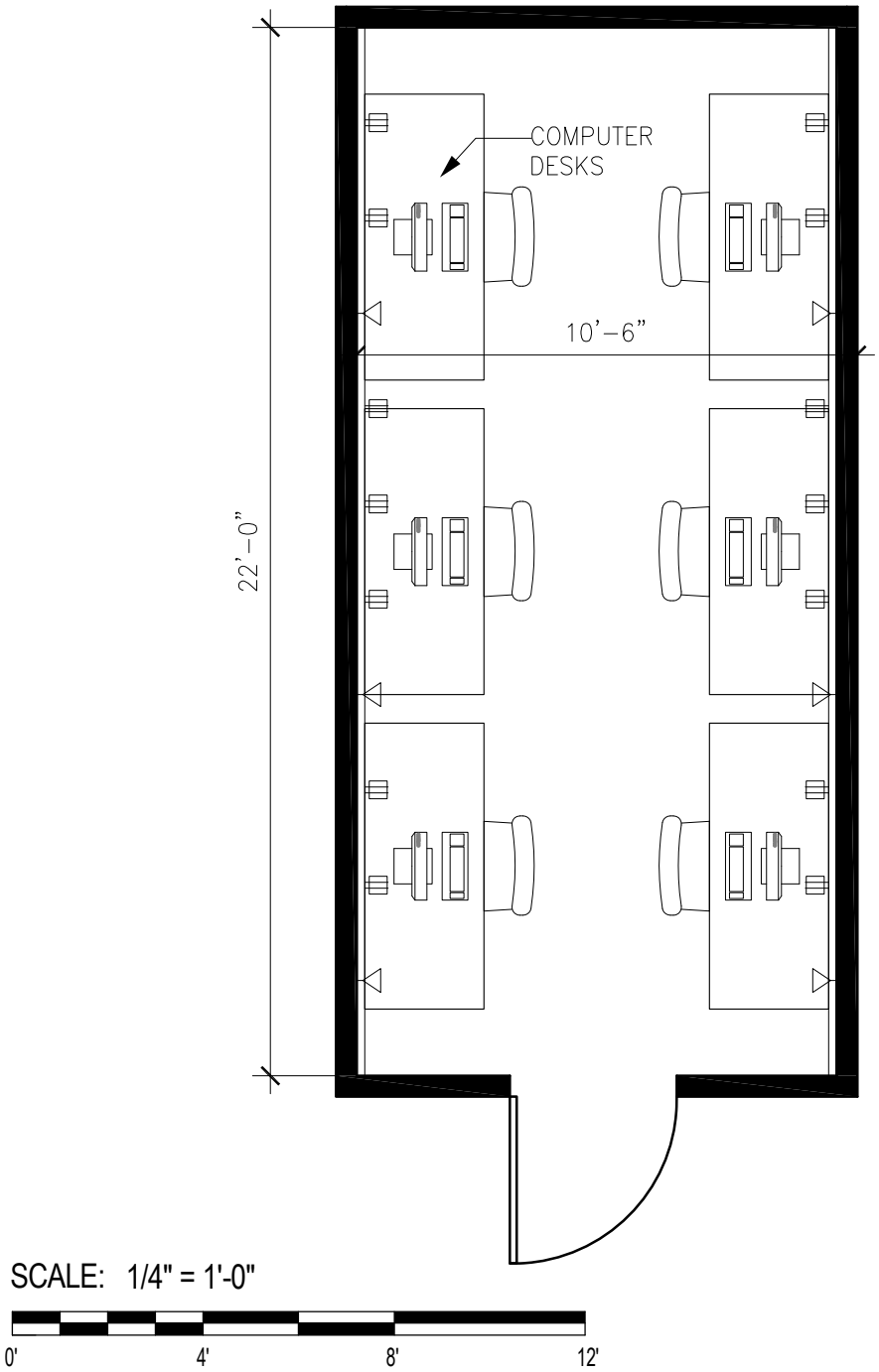
Individual Room Data Sheets / Pre-Schematic Finish Schedule

| | |
|---|---|
| **DEPARTMENT UNIT** | **Laboratory** |
| **Space Name** | Imaging Analysis Computer Room |
| **Space Number** | N/A |

| | |
|---|---|
| **1. SPACE PROGRAM** | |
| General Space Description: | Computer Work Room |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 220 SF |
| (Quantity) & Location: | (1) at Level A |
| Purpose of Space: | Lab |
| Number of Occupants: | 6 |
| Hours and Days Used: | 24/7 |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | Vivarium, Imaging Suite |
| Must Be Near To: | Faculty Offices, Lab user write up desk office space |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | Yes - to building circulation corridor if possible |
| Doors: | 42" |
| Floor: | Carpet |
| Wall: | Painted Gypsum Board |
| Ceiling: | Acoustic Tile |
| Ceiling Height: | 9'-0" minimum |
| Acoustics: | N/A |
| General Character of Room: | Computer Work Room |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | Proximity Sensor |
| HVAC: | 72 degrees F +/- 4 |
| Plumbing: | None |
| Electrical: | 120V outlets |
| Lighting: | Direct/Indirect susp. at ceiling, fluorescent task lighting at lab benches |
| Phone / Data: | Cat-6 Data & Voice to lab benches |
| Vibration Criteria: | None |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Office Furniture for Computer Work Stations |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | Room requires location outside of Vivarium and Imaging Suite for computer data analysis |

## ROOM DATA SHEET

### Imaging Analysis Computer Room / 220 SF



# 4 Space Program

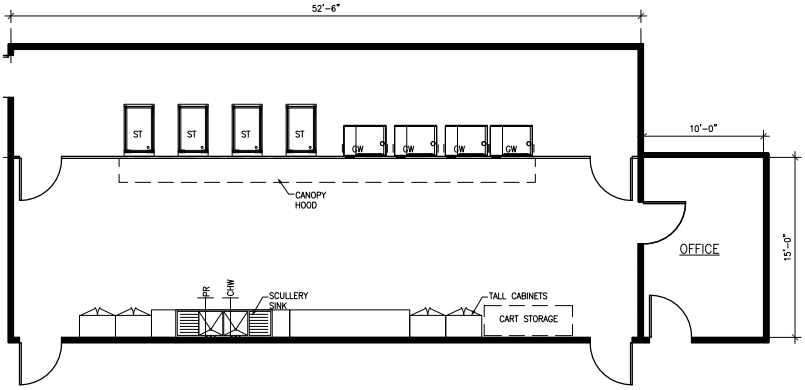
Individual Room Data Sheets / Pre-Schematic Finish Schedule

| DEPARTMENT UNIT | Laboratory |
|---|---|
| Space Name | Research Central Glasswash |
| Space Number | N/A |

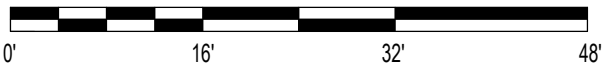
| | |
|---|---|
| **1. SPACE PROGRAM** | |
| General Space Description: | Wet wash Room |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 1,260 SF |
| (Quantity) & Location: | (1) at Level 01 |
| Purpose of Space: | Lab |
| Number of Occupants: | 2 |
| Hours and Days Used: | 24/7 |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | N/A |
| Must Be Near To: | Freight Elevator |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | None |
| Doors: | 42" |
| Floor: | Trowel on Epoxy |
| Wall: | Epoxy Painted Gypsum Board |
| Ceiling: | Acoustic Tile |
| Ceiling Height: | 9'-0" minimum |
| Acoustics: | N/A |
| General Character of Room: | Wet Lab |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | Proximity Sensor |
| HVAC: | 72 degrees F +/- 4, canopy hoods |
| Plumbing: | DI and Industrial Water for Glass Washers, Industrial water for Auto-claves, H/CW to large S.S. Scullery Sink |
| Electrical: | 120V outlets, 208V outlets |
| Lighting: | Recessed Fluorescent |
| Phone / Data: | Cat-6 Data & Voice to Lab Benches |
| Vibration Criteria: | None |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Stainless Steel Counters/Sculler sink, Phenolic Resin Glass Ware Storage Cabinet |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | Verify equipment needs for this room. Assume 3 large floor standing glass ware washers with accessories and three (3) 26 x 26 Auto-claves |

## ROOM DATA SHEET

### Research Central Glasswash / 1,260 SF




SCALE: 1/16" = 1'-0"

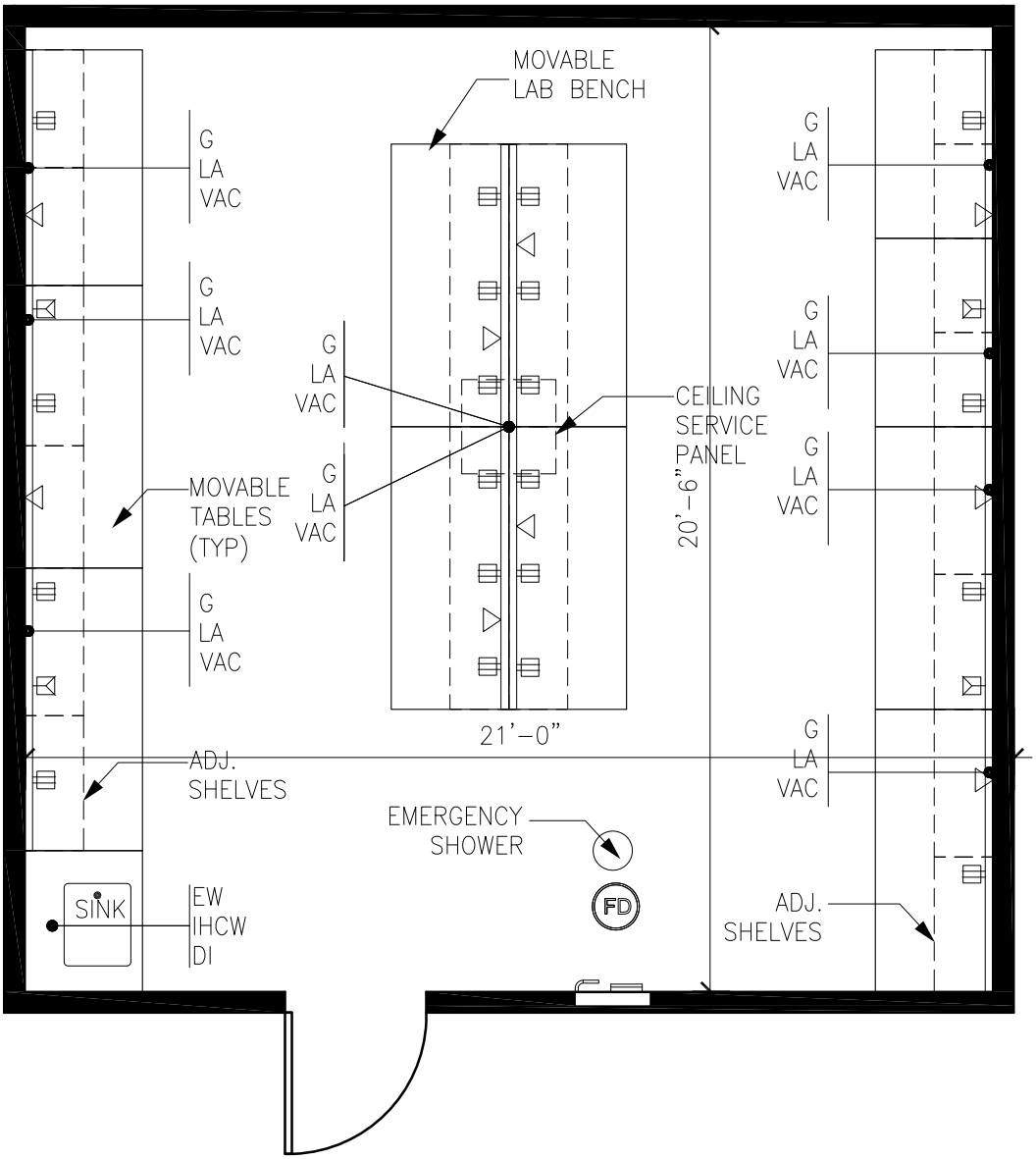


| DEPARTMENT UNIT | Laboratory |
|---|---|
| Space Name | Micro Array Lab |
| Space Number | N/A |

| 1. SPACE PROGRAM | |
|---|---|
| General Space Description: | Support Core Wet PCR Lab |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 440 SF |
| (Quantity) & Location: | (1) at Level 01 |
| Purpose of Space: | Lab |
| Number of Occupants: | 8 |
| Hours and Days Used: | 24/7 |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | N/A |
| Must Be Near To: | N/A |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | Yes - to building circulation corridor if possible |
| Doors: | 42" |
| Floor: | Tile |
| Wall: | Painted Gypsum Board |
| Ceiling: | Acoustic Tile |
| Ceiling Height: | 9'-0" minimum |
| Acoustics: | N/A |
| General Character of Room: | Wet Lab |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | Proximity Sensor |
| HVAC: | 72 degrees F +/- 4 |
| Plumbing: | DI and Industrial Water at Lab Sink, Domestic Water at Eyewash/ Shower and at Eyewash at sink, Gas, Air, Vacuum to Lab Benches |
| Electrical: | 120V outlets, 208V outlets |
| Lighting: | Direct/Indirect susp. at ceiling, Fluorescent Task Lighting at Lab Benches |
| Phone / Data: | Cat-6 Data & Voice to Lab Benches |
| Vibration Criteria: | 2000 Micro-inches/second |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Flexible Lab Benches with Epoxy Tops, movable wood base cabinets below and adjustable shelves above. Verify instrumentation to go in this lab. |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | Utility connections to Lab Benches via quick disconnects in ceiling service panels, windows to out side and to interior building corridor. |
| | Verify if this lab is one larger lab or two smaller interconnecting labs Does this room require a chemical fume hood? |

## ROOM DATA SHEET

### Micro Array Lab / 440 SF




SCALE: 1/4" = 1'-0"

0' 4' 8' 12'

# 4 Space Program

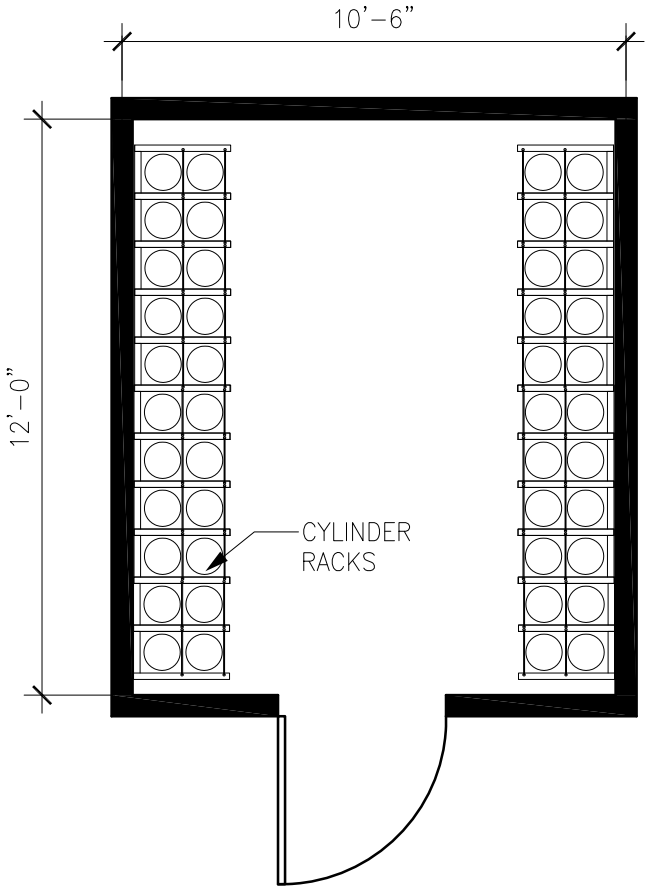
Individual Room Data Sheets / Pre-Schematic Finish Schedule

| DEPARTMENT UNIT | Laboratory |
|---|---|
| Space Name | Gas Cylinder Storage - Outgoing |
| Space Number | N/A |

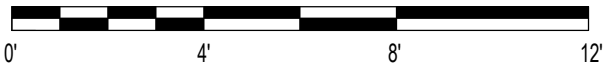
| 1. SPACE PROGRAM | |
|---|---|
| General Space Description: | Storage of Empty Gas Cylinders |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 120 SF |
| (Quantity) & Location: | (1) at Level A |
| Purpose of Space: | Storage of Empty Gas Cylinders |
| Number of Occupants: | 0 |
| Hours and Days Used: | 24/7 |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | Loading Dock |
| Must Be Near To: | N/A |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | None |
| Doors: | 42" |
| Floor: | Concrete |
| Wall: | Painted Gypsum Board |
| Ceiling: | None |
| Ceiling Height: | None |
| Acoustics: | N/A |
| General Character of Room: | Storage |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | Proximity Sensor |
| HVAC: | 72 degrees F +/- 4 |
| Plumbing: | None |
| Electrical: | None |
| Lighting: | Recessed Fluorescent |
| Phone / Data: | None |
| Vibration Criteria: | None |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Gas Cylinder Racks for storage of empty cylinders |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

## ROOM DATA SHEET

### Gas Cylinder Storage - Outgoing / 120 SF




SCALE: 1/4" = 1'-0"

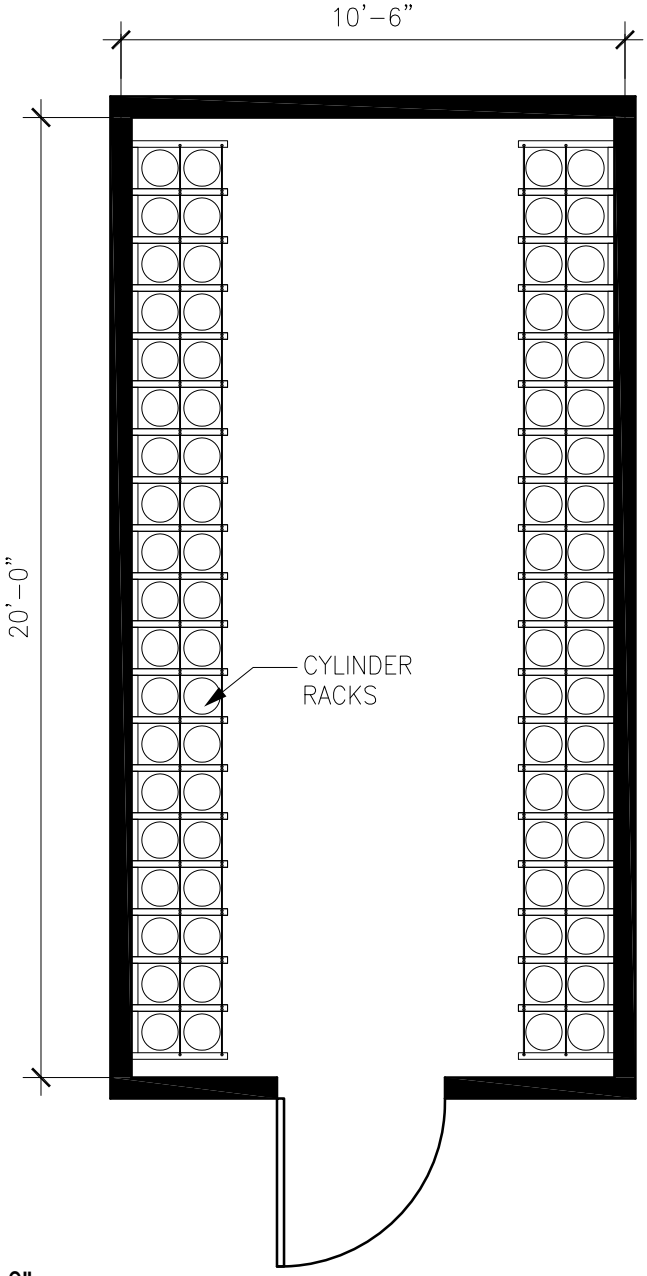


| DEPARTMENT UNIT | Laboratory |
|---|---|
| Space Name | Gas Cylinder Room |
| Space Number | N/A |

| 1. SPACE PROGRAM | |
|---|---|
| General Space Description: | Storage of Full Gas Cylinders |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 200 SF |
| (Quantity) & Location: | (1) at Level A |
| Purpose of Space: | Storage of In-use gas cylinders that serves the building lab spaces |
| Number of Occupants: | 0 |
| Hours and Days Used: | 24/7 |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | Loading Dock |
| Must Be Near To: | N/A |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | None |
| Doors: | 42" |
| Floor: | Concrete |
| Wall: | Painted Gypsum Board |
| Ceiling: | None |
| Ceiling Height: | None |
| Acoustics: | N/A |
| General Character of Room: | Storage |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | Proximity Sensor |
| HVAC: | 72 degrees F +/- 4 |
| Plumbing: | None |
| Electrical: | None |
| Lighting: | Recessed Fluorescent |
| Phone / Data: | Alarm monitoring |
| Vibration Criteria: | None |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Gas Cylinder Racks for storage of full cylinders |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | Verify all specialty gases required in this project (such as nitrogen, CO2, Oxygen, etc.) and whether this project will utilize outdoor tanks or smaller cylinders in this room. If in this room, cylinders require switchover manifolds, and room may require oxygen sensors on alarms. |

## ROOM DATA SHEET

### Gas Cylinder Room / 200 SF




SCALE: 1/4" = 1'-0"

# 4 Space Program

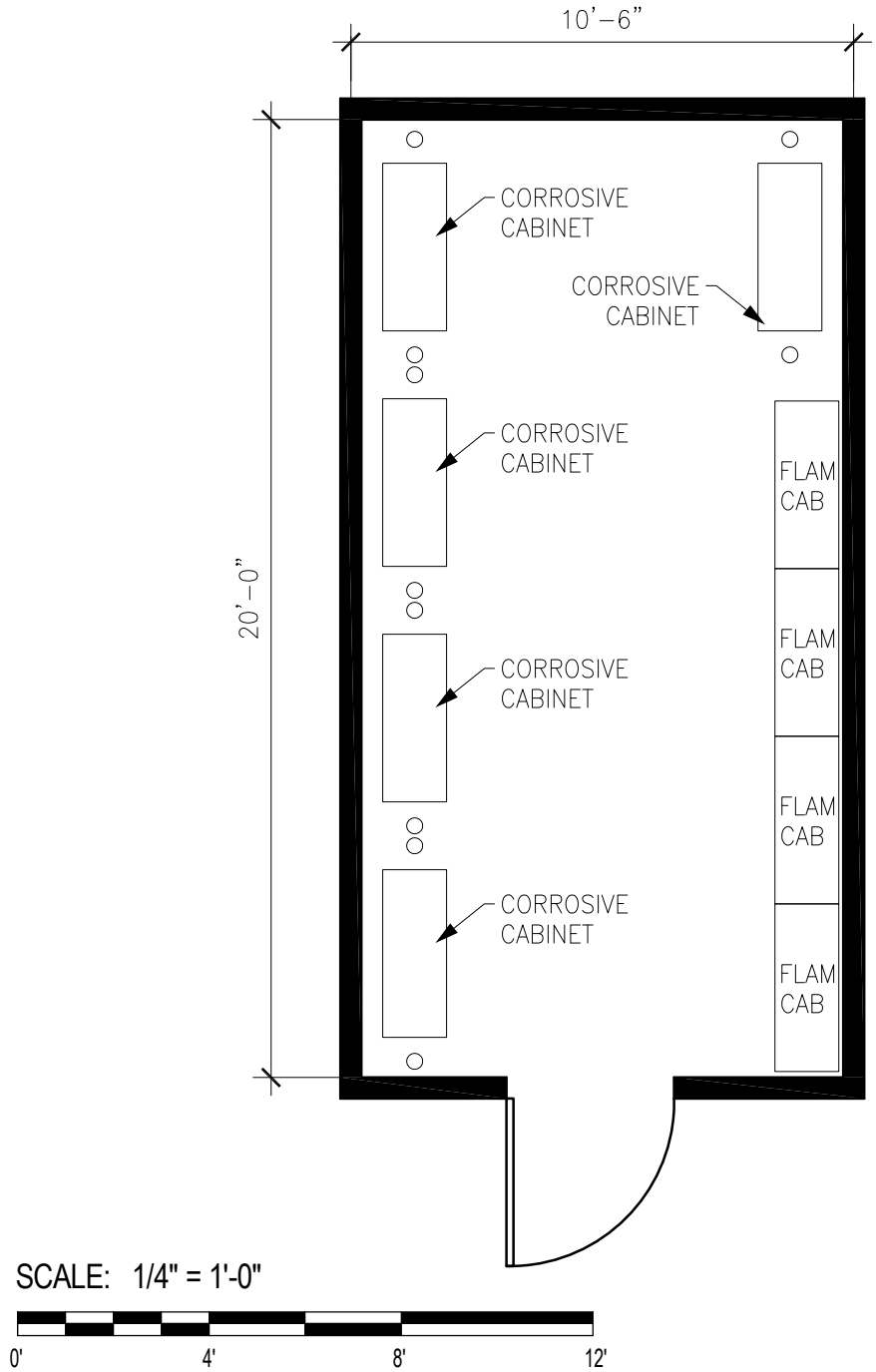
Individual Room Data Sheets / Pre-Schematic Finish Schedule

| DEPARTMENT UNIT | Laboratory |
|---|---|
| Space Name | Hazardous Material Storage |
| Space Number | N/A |

| | |
|---|---|
| **1. SPACE PROGRAM** | |
| General Space Description: | Storage of Hazardous Waste |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 200 SF |
| (Quantity) & Location: | (1) at Level A |
| Purpose of Space: | Storage of Hazardous Waste |
| Number of Occupants: | 0 |
| Hours and Days Used: | 24/7 |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | Loading Dock |
| Must Be Near To: | N/A |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | None |
| Doors: | 42" |
| Floor: | Concrete |
| Wall: | Painted Gypsum Board |
| Ceiling: | None |
| Ceiling Height: | None |
| Acoustics: | N/A |
| General Character of Room: | Storage |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | Proximity Sensor |
| HVAC: | 72 degrees F +/- 4 |
| Plumbing: | None |
| Electrical: | None |
| Lighting: | Recessed Fluorescent |
| Phone / Data: | Alarm monitoring |
| Vibration Criteria: | None |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Chemical Storage Cabinets for storage of Waste Chemicals |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

## ROOM DATA SHEET

### Hazardous Material Storage / 200 SF



# 4 Space Program

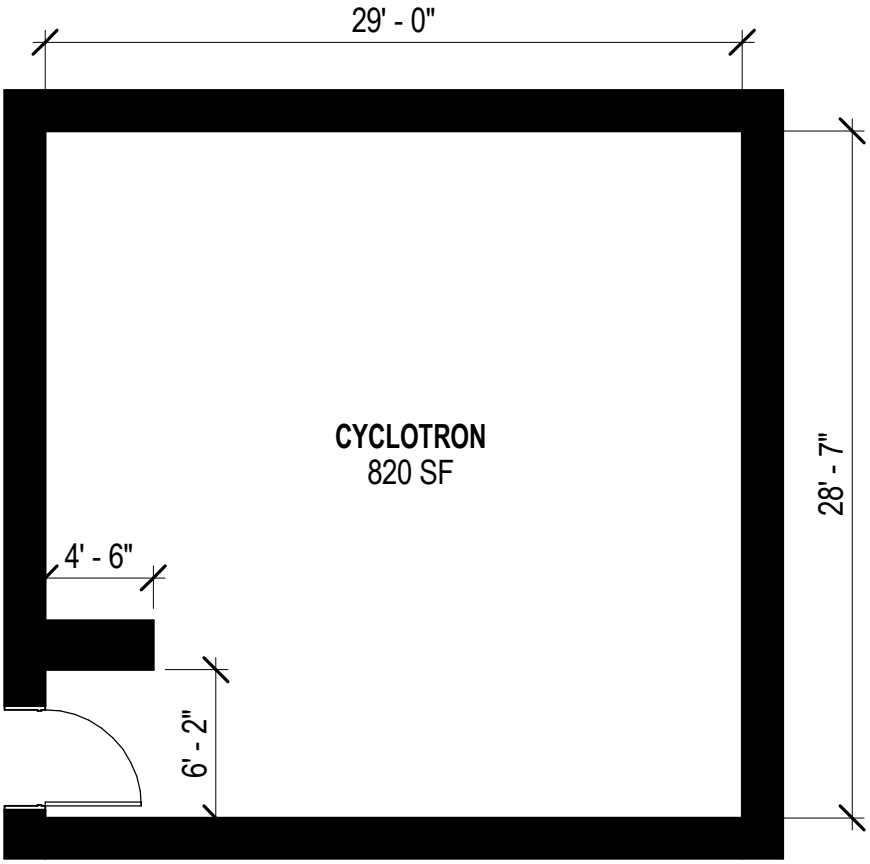
Individual Room Data Sheets / Pre-Schematic Finish Schedule

| DEPARTMENT UNIT | Cyclotron Space |
|---|---|
| Space Name | Cyclotron Room |
| Space Number | N/A |

| | |
|---|---|
| **1. SPACE PROGRAM** | |
| General Space Description: | Cyclotron |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 820 SF |
| (Quantity) & Location: | (1) Level A |
| Purpose of Space: | House the Cyclotron unit and associated shielding |
| Number of Occupants: | 1 |
| Hours and Days Used: | 24/7 |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | Electronics Room / Tank Room |
| Must Be Near To: | Radioactive Decay Storage Room |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | None |
| Doors: | 4'-0" Wide Minimum |
| Floor: | Epoxy & Epoxy Integral Base |
| Wall: | Painted Gypsum Board, Epoxy |
| Ceiling: | T-Bar suspended ceiling tile |
| Ceiling Height: | 11'-0" |
| Acoustics: | N/A |
| General Character of Room: | Cleanable |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | Card Access |
| HVAC: | Cooling |
| Plumbing: | N/A at this time, depends on vendor's drawings |
| Electrical: | Per Unit Requirements |
| Lighting: | Florescent |
| Phone / Data: | Yes |
| Vibration Criteria: | Isolated, Slab on Grade |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Vendor's requirements for Cyclotron unit |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

## ROOM DATA SHEET

### Cyclotron Room / 820 SF




SCALE: 1/8" = 1'-0"

# 4 Space Program

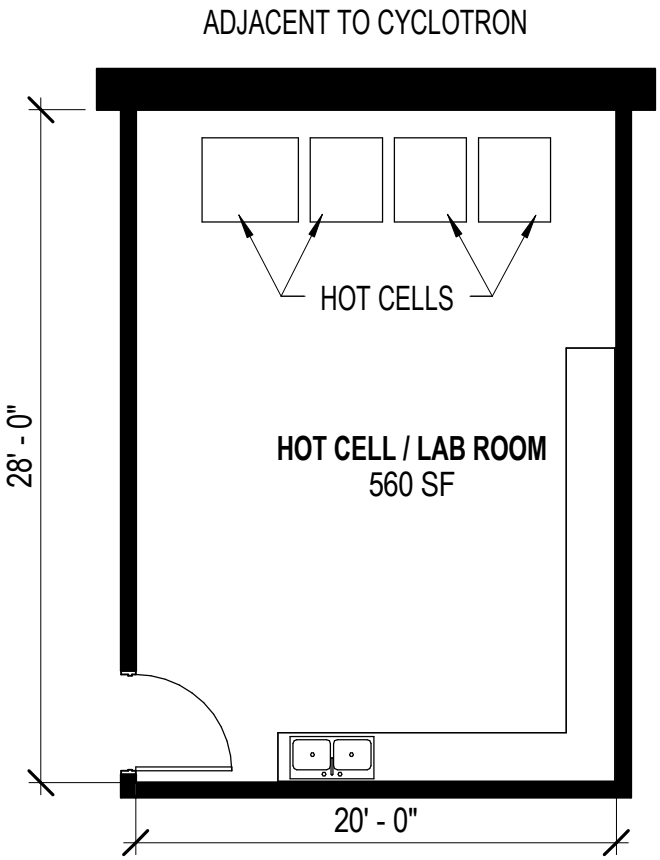
Individual Room Data Sheets / Pre-Schematic Finish Schedule

| DEPARTMENT UNIT | Cyclotron Space |
|---|---|
| Space Name | Hot Cell / Lab Room |
| Space Number | N/A |

| 1. SPACE PROGRAM | |
|---|---|
| General Space Description: | Hot Cells |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 560 SF |
| (Quantity) & Location: | (1) Level A |
| Purpose of Space: | Receive Radioactive Isotopes from Cyclotron |
| Number of Occupants: | 2 |
| Hours and Days Used: | 24/7 |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | Cyclotron |
| Must Be Near To: | QC Lab |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | None |
| Doors: | 4'-0" Wide Minimum |
| Floor: | Sheet Vinyl, Epoxy |
| Wall: | Painted Gypsum Board |
| Ceiling: | Lay-in Tile |
| Ceiling Height: | 9'-0" |
| Acoustics: | N/A |
| General Character of Room: | Lab Space |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | N/A |
| HVAC: | 72 Degrees F +/- 4 |
| Plumbing: | Sink |
| Electrical: | Emergency Power, Underground conduits for hot cells |
| Lighting: | Fluorescent |
| Phone / Data: | Yes |
| Vibration Criteria: | N/A |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Lab Benches, Equipment, Hot Cells by Vendor |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

## ROOM DATA SHEET

### Hot Cell / Lab Room / 560 SF



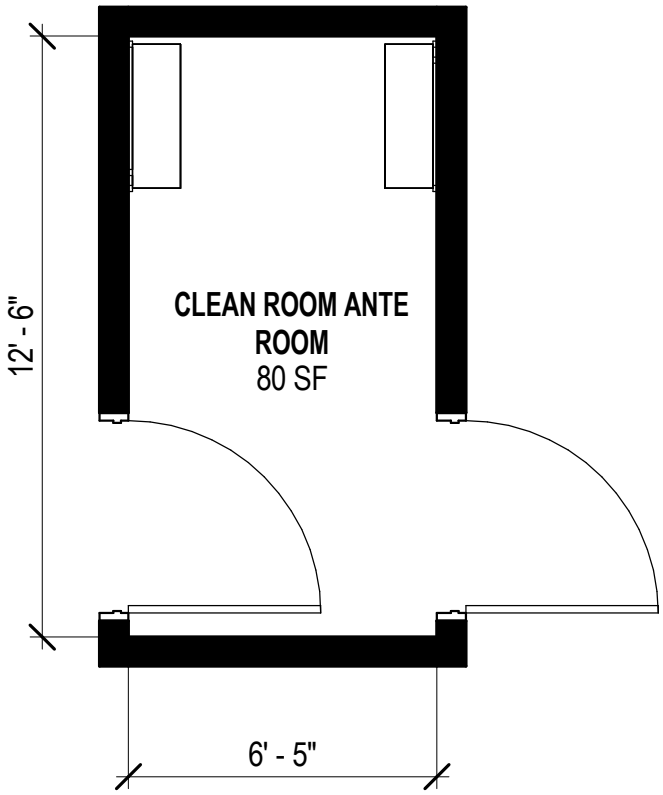

SCALE: 1/8" = 1'-0"

| DEPARTMENT UNIT | Cyclotron Space |
|---|---|
| Space Name | Clean Room Ante Room |
| Space Number | N/A |

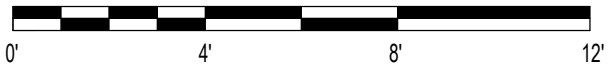
| 1. SPACE PROGRAM | |
|---|---|
| General Space Description: | Entrance to Clean Lab |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 80 SF |
| (Quantity) & Location: | (1) Level A |
| Purpose of Space: | Ante Room |
| Number of Occupants: | 1 |
| Hours and Days Used: | 24/7 |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | Clean Room |
| Must Be Near To: | N/A |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | None |
| Doors: | (2) 4'-0" Minimum |
| Floor: | Sheet Vinyl |
| Wall: | Painted Gypsum Board, Epoxy |
| Ceiling: | Lay-in tile, Washable |
| Ceiling Height: | 9'-0" |
| Acoustics: | N/A |
| General Character of Room: | Gowning Room, Ante Room Positive Pressure |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | N/A |
| HVAC: | 72 Degrees F +/- 4, Positive Pressure |
| Plumbing: | N/A |
| Electrical: | 110V |
| Lighting: | Fluorescent |
| Phone / Data: | N/A |
| Vibration Criteria: | N/A |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Shelving |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

## ROOM DATA SHEET

### Clean Room Ante Room / 80 SF




SCALE: 1/4" = 1'-0"



# 4 Space Program

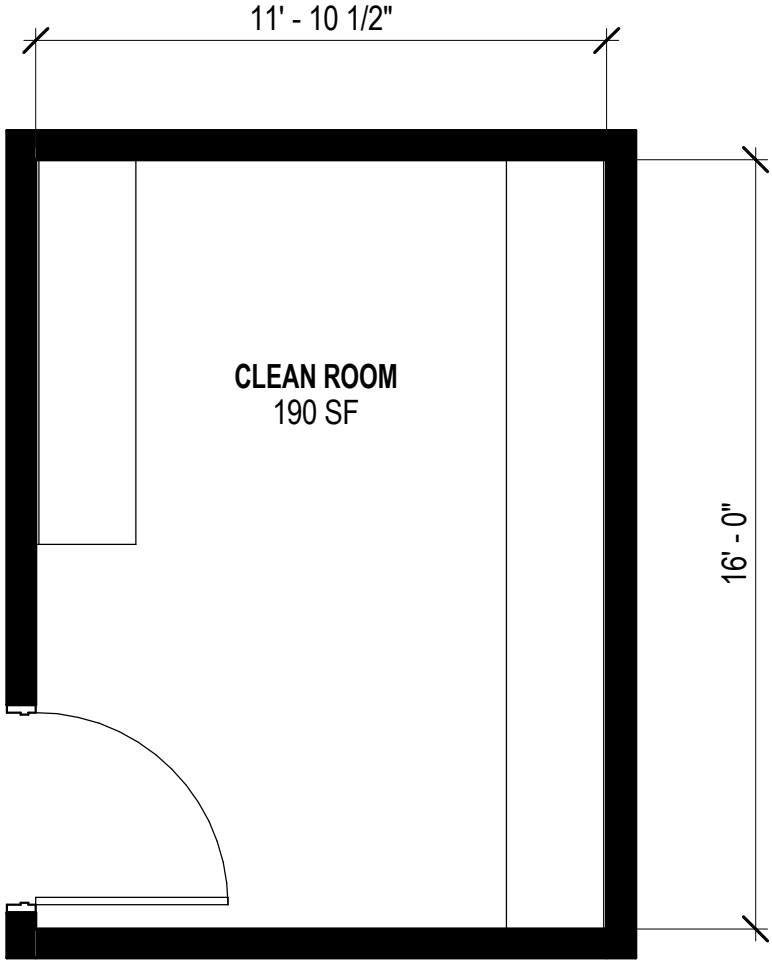
Individual Room Data Sheets / Pre-Schematic Finish Schedule

| DEPARTMENT UNIT | Cyclotron Space |
|---|---|
| Space Name | Clean Room |
| Space Number | N/A |

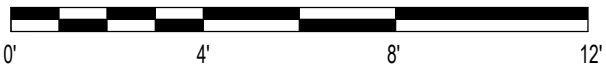
| | |
|---|---|
| **1. SPACE PROGRAM** | |
| General Space Description: | Lab Space |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 190 SF |
| (Quantity) & Location: | (1) Level A |
| Purpose of Space: | Lab |
| Number of Occupants: | 2 |
| Hours and Days Used: | 24/7 |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | Clean Room Ante Room |
| Must Be Near To: | N/A |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | Window to Hot Cell Room |
| Doors: | 4'-0" Minimum |
| Floor: | Sheet Vinyl, Integral Base |
| Wall: | Painted Gypsum Board, Epoxy |
| Ceiling: | Lay-in Tile, Cleanable |
| Ceiling Height: | 9'-0" |
| Acoustics: | N/A |
| General Character of Room: | Lab |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | N/A |
| HVAC: | 72 Degrees F +/- 4 |
| Plumbing: | N/A |
| Electrical: | 110V |
| Lighting: | Fluorescent |
| Phone / Data: | Yes |
| Vibration Criteria: | N/A |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Lab Benches, Class 10,000 Pass-Thru to Hot Cell Room |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

## ROOM DATA SHEET

### Clean Room / 190 SF




SCALE: 1/4" = 1'-0"



# 4 Space Program

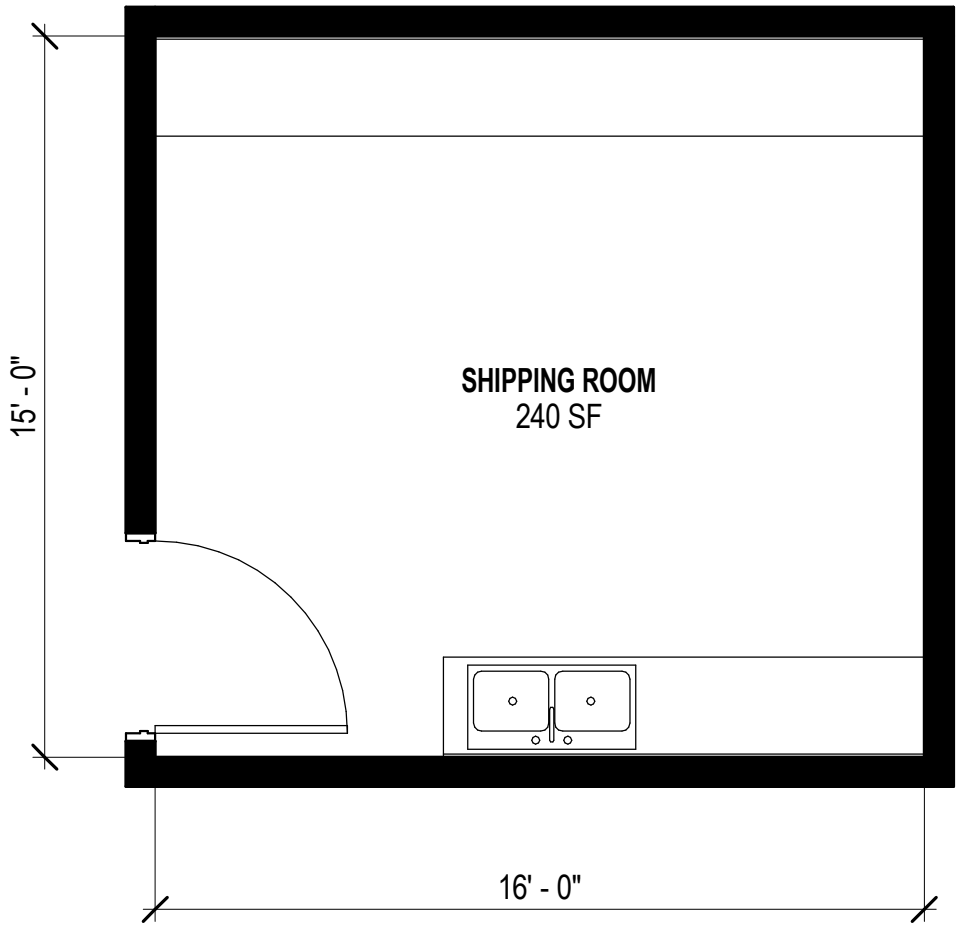
Individual Room Data Sheets / Pre-Schematic Finish Schedule

| DEPARTMENT UNIT | Cyclotron Space |
|---|---|
| Space Name | Shipping Room |
| Space Number | N/A |

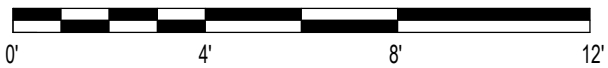
| 1. SPACE PROGRAM | |
|---|---|
| General Space Description: | Packaging Product for Shipping |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 240 SF |
| (Quantity) & Location: | (1) Level A |
| Purpose of Space: | Shipping |
| Number of Occupants: | 1 |
| Hours and Days Used: | 24/7 |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | N/A |
| Must Be Near To: | Near Exit from Cyclotron Area |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | None |
| Doors: | 4'-0" Minimum |
| Floor: | Sheet Vinyl, Integral Base |
| Wall: | Painted Gypsum Board, Epoxy |
| Ceiling: | Lay-in Tile |
| Ceiling Height: | 9'-0" |
| Acoustics: | N/A |
| General Character of Room: | N/A |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | N/A |
| HVAC: | 72 Degrees F +/- 4 |
| Plumbing: | Sink |
| Electrical: | 110V |
| Lighting: | Fluorescent |
| Phone / Data: | Yes |
| Vibration Criteria: | N/A |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Lab Benches, Storage |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

## ROOM DATA SHEET

### Shipping Room / 240 SF




SCALE: 1/4" = 1'-0"



# 4 Space Program

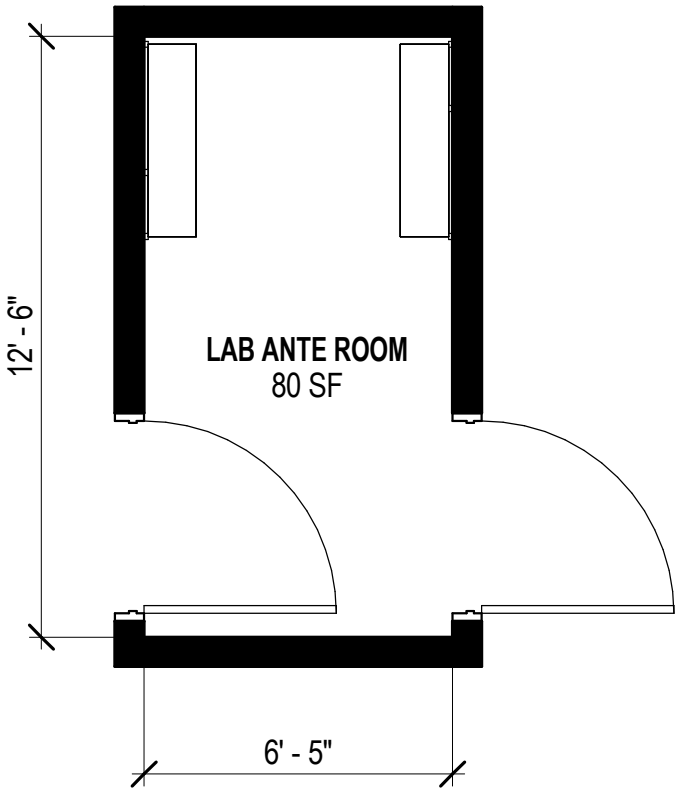
Individual Room Data Sheets / Pre-Schematic Finish Schedule

| DEPARTMENT UNIT | Cyclotron Space |
|---|---|
| Space Name | Lab Ante Room |
| Space Number | N/A |

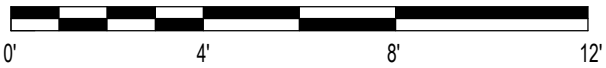
| | |
|---|---|
| **1. SPACE PROGRAM** | |
| General Space Description: | Ante Room to Lab |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 80 SF |
| (Quantity) & Location: | (1) Level A |
| Purpose of Space: | Ante Room |
| Number of Occupants: | 1 |
| Hours and Days Used: | 24/7 |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | Hot Cell Lab |
| Must Be Near To: | Entrance to Cyclotron Area |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | In door 1/2 glass |
| Doors: | 4'-0" Minimum |
| Floor: | Sheet Vinyl, Integral Base |
| Wall: | Painted Gypsum Board, Epoxy |
| Ceiling: | Lay-in Tile |
| Ceiling Height: | 9'-0" |
| Acoustics: | N/A |
| General Character of Room: | Gowning Space |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | Card Access |
| HVAC: | 72 Degree F +/- 4, Positive Pressure |
| Plumbing: | N/A |
| Electrical: | 110V |
| Lighting: | Fluorescent |
| Phone / Data: | N/A |
| Vibration Criteria: | N/A |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Shelving for Supplies, Gowning, Coat Hooks |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

## ROOM DATA SHEET

### Lab Ante Room / 80 SF




SCALE: 1/4" = 1'-0"



# 4 Space Program

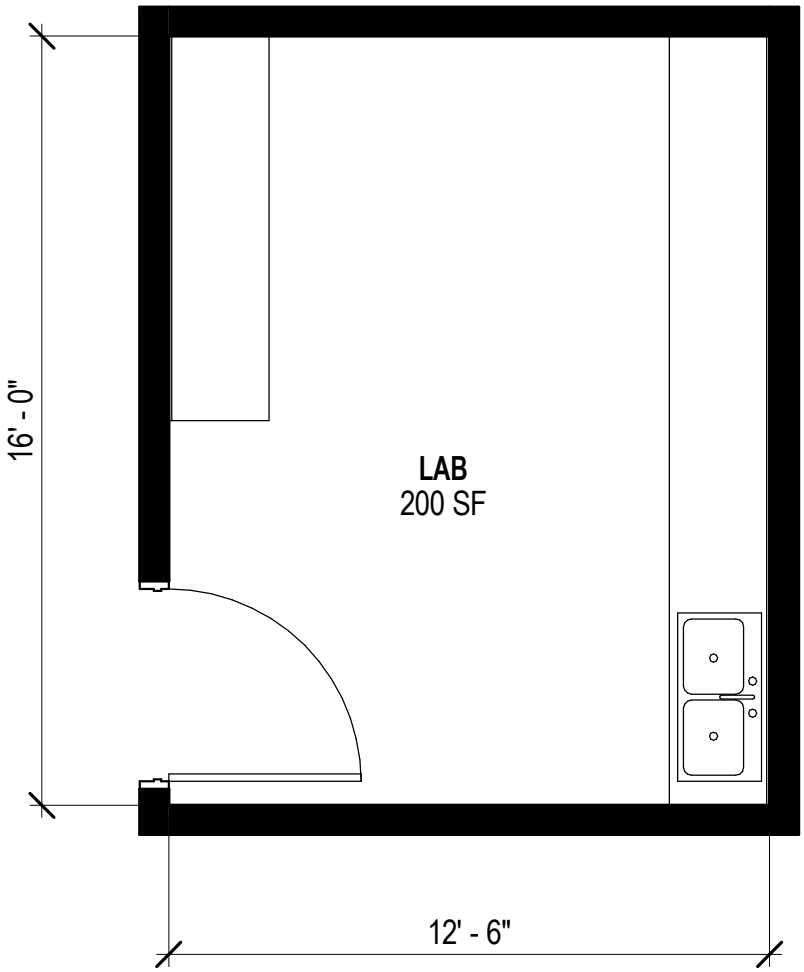
Individual Room Data Sheets / Pre-Schematic Finish Schedule

| DEPARTMENT UNIT | Cyclotron Space |
|---|---|
| Space Name | Lab |
| Space Number | N/A |

| 1. SPACE PROGRAM | |
|---|---|
| General Space Description: | Lab |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 200 SF |
| (Quantity) & Location: | (1) Level A |
| Purpose of Space: | Lab |
| Number of Occupants: | 2 |
| Hours and Days Used: | 24/7 |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | Clean Lab Ante Room |
| Must Be Near To: | N/A |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | None |
| Doors: | 4'-0" Minimum |
| Floor: | Sheet Vinyl, Integral Base |
| Wall: | Painted Gypsum Board |
| Ceiling: | Lay-in Tile |
| Ceiling Height: | 9'-0" |
| Acoustics: | N/A |
| General Character of Room: | General Lab Space |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | None |
| HVAC: | 72 Degrees F +/- 4 |
| Plumbing: | Sink |
| Electrical: | 110V, Emergency |
| Lighting: | Fluorescent |
| Phone / Data: | Yes |
| Vibration Criteria: | N/A |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Lab Benches, Storage |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

## ROOM DATA SHEET

**Lab / 200 SF**



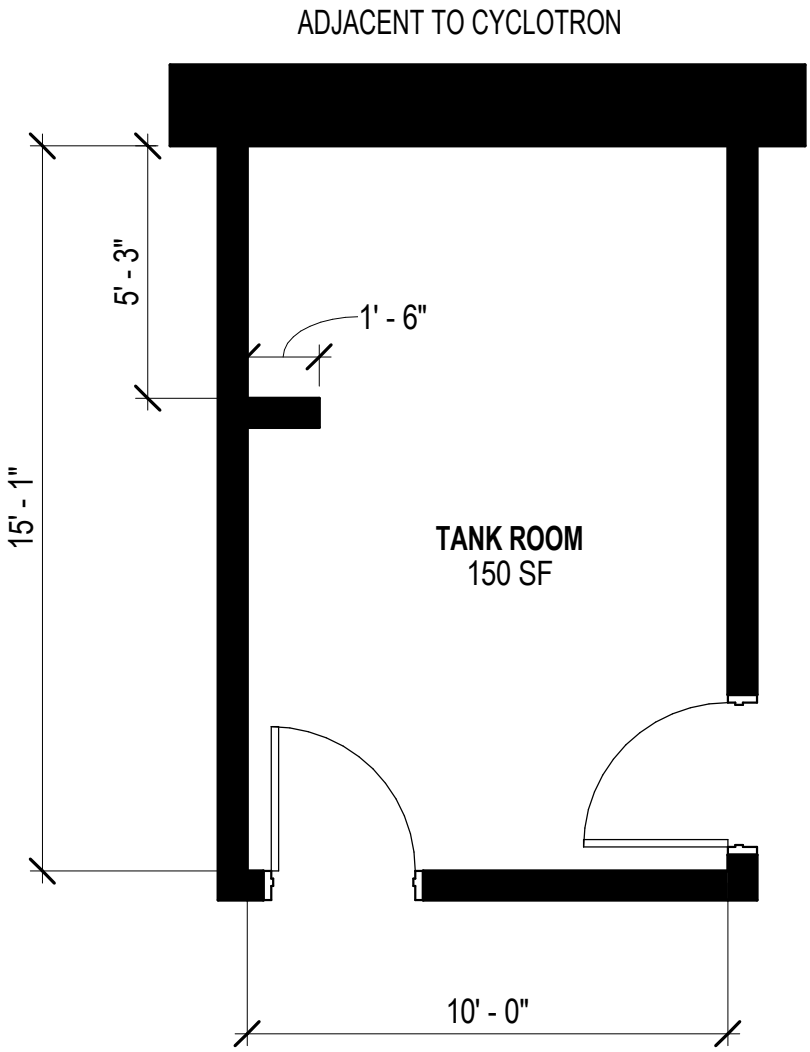

SCALE: 1/4" = 1'-0"

| DEPARTMENT UNIT | Cyclotron Space |
|---|---|
| Space Name | Tank Room |
| Space Number | N/A |

| 1. SPACE PROGRAM | |
|---|---|
| General Space Description: | Gas Tank Storage |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 150 SF |
| (Quantity) & Location: | (1) Level A |
| Purpose of Space: | Storage |
| Number of Occupants: | 1 |
| Hours and Days Used: | N/A |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | Electronics Room |
| Must Be Near To: | Cyclotron |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | None |
| Doors: | (2) 3'-0" Minimum |
| Floor: | Sheet Vinyl, Integral Base |
| Wall: | Painted Gypsum Board, Epoxy |
| Ceiling: | Lay-in Tile |
| Ceiling Height: | 9'-0" |
| Acoustics: | N/A |
| General Character of Room: | Tank Storage & Manifold Room |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | Card Reader to Exterior of Suite |
| HVAC: | 72 Degrees F +/- 4 |
| Plumbing: | Plumbing for tank manifolds |
| Electrical: | 110V |
| Lighting: | Fluorescent |
| Phone / Data: | Yes |
| Vibration Criteria: | N/A |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Brackets for tanks |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | Provide backing in walls to secure tanks to walls |

## ROOM DATA SHEET

### Tank Room / 150 SF



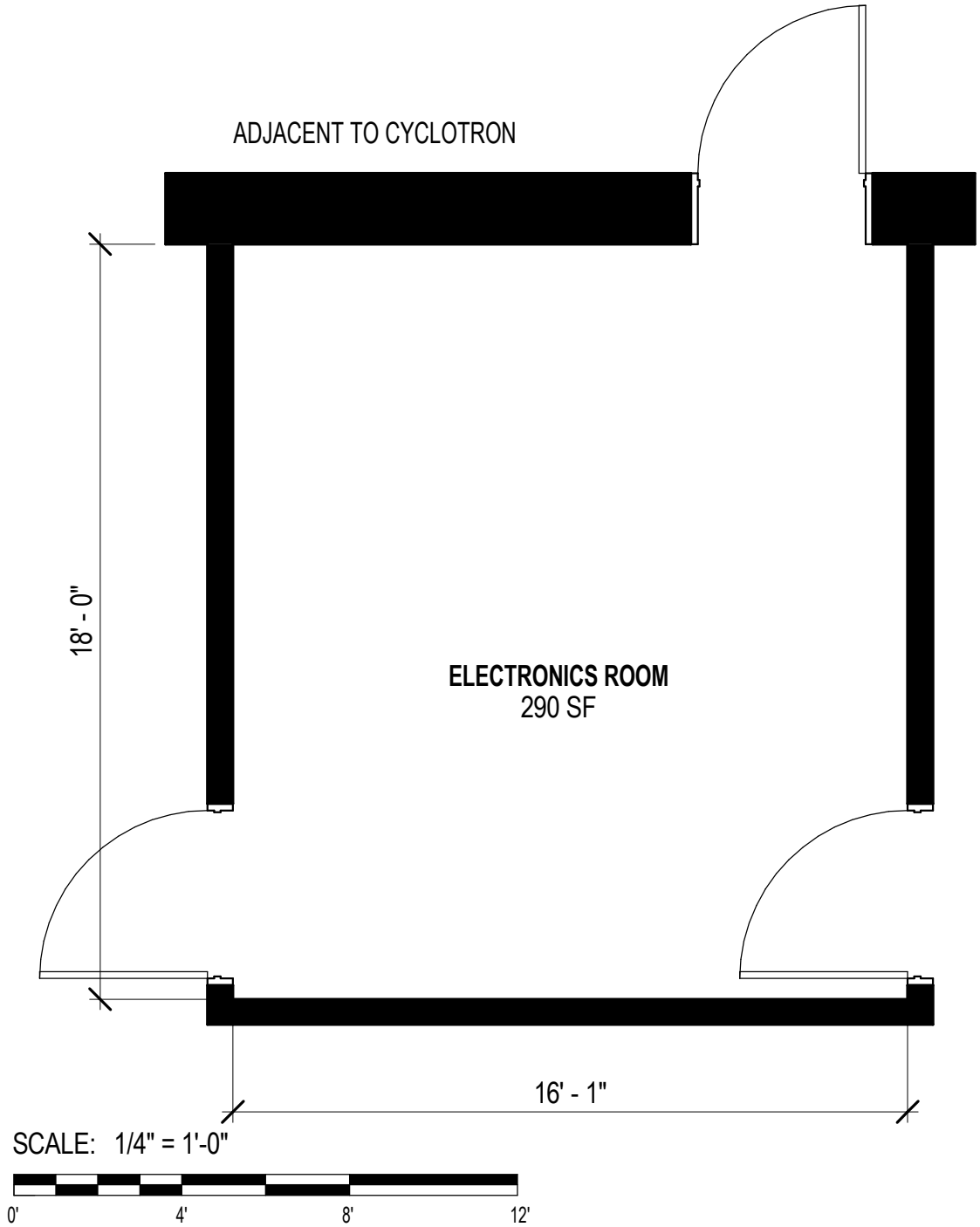

SCALE: 1/4" = 1'-0"

| DEPARTMENT UNIT | Cyclotron Space |
|---|---|
| Space Name | Electronics Room |
| Space Number | N/A |

| 1. SPACE PROGRAM | |
|---|---|
| General Space Description: | Electronic Equipment Room |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 290 SF |
| (Quantity) & Location: | (1) Level A |
| Purpose of Space: | Storage |
| Number of Occupants: | 1 |
| Hours and Days Used: | N/A |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | Cyclotron |
| Must Be Near To: | Tank Room |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | 1/2 glass in door |
| Doors: | 4'-0" to Cyclotron, 3'-0" to Tank Room, 4'-0" to Labs |
| Floor: | Sheet Vinyl |
| Wall: | Painted Gypsum Board, Epoxy |
| Ceiling: | Lay-in Tile |
| Ceiling Height: | 9'-0" |
| Acoustics: | N/A |
| General Character of Room: | Equipment room for Cyclotron |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | N/A |
| HVAC: | 72 Degrees F +/- 4 |
| Plumbing: | N/A |
| Electrical: | 110V & 208V power, Emergency |
| Lighting: | Fluorescent |
| Phone / Data: | Yes |
| Vibration Criteria: | N/A |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Cyclotron Equipment by Vendor |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | N/A |

## ROOM DATA SHEET

### Electronics Room / 290 SF



# 4 Space Program

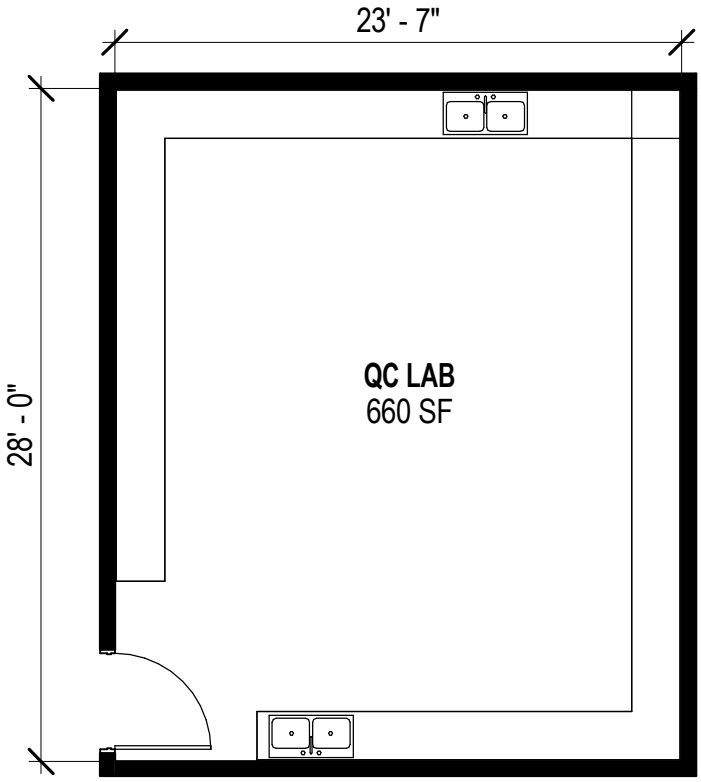
Individual Room Data Sheets / Pre-Schematic Finish Schedule

| DEPARTMENT UNIT | Cyclotron Space |
|---|---|
| Space Name | QC Lab |
| Space Number | N/A |

| | |
|---|---|
| **1. SPACE PROGRAM** | |
| General Space Description: | Quality Control Lab |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 660 SF |
| (Quantity) & Location: | (1) Level A |
| Purpose of Space: | Lab |
| Number of Occupants: | 2 |
| Hours and Days Used: | 24/7 |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | Cyclotron |
| Must Be Near To: | Shipping |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | None |
| Doors: | 3'-0" |
| Floor: | Sheet Vinyl, integral Base |
| Wall: | Painted Gypsum Board, Epoxy |
| Ceiling: | Lay-in Tile |
| Ceiling Height: | 9'-0" |
| Acoustics: | N/A |
| General Character of Room: | General Lab Space |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | N/A |
| HVAC: | 72 Degrees F +/- 4 |
| Plumbing: | Yes |
| Electrical: | 110V |
| Lighting: | Fluorescent |
| Phone / Data: | Yes |
| Vibration Criteria: | N/A |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Lab Benches, Equipment, Sink |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

## ROOM DATA SHEET

### QC Lab / 660 SF



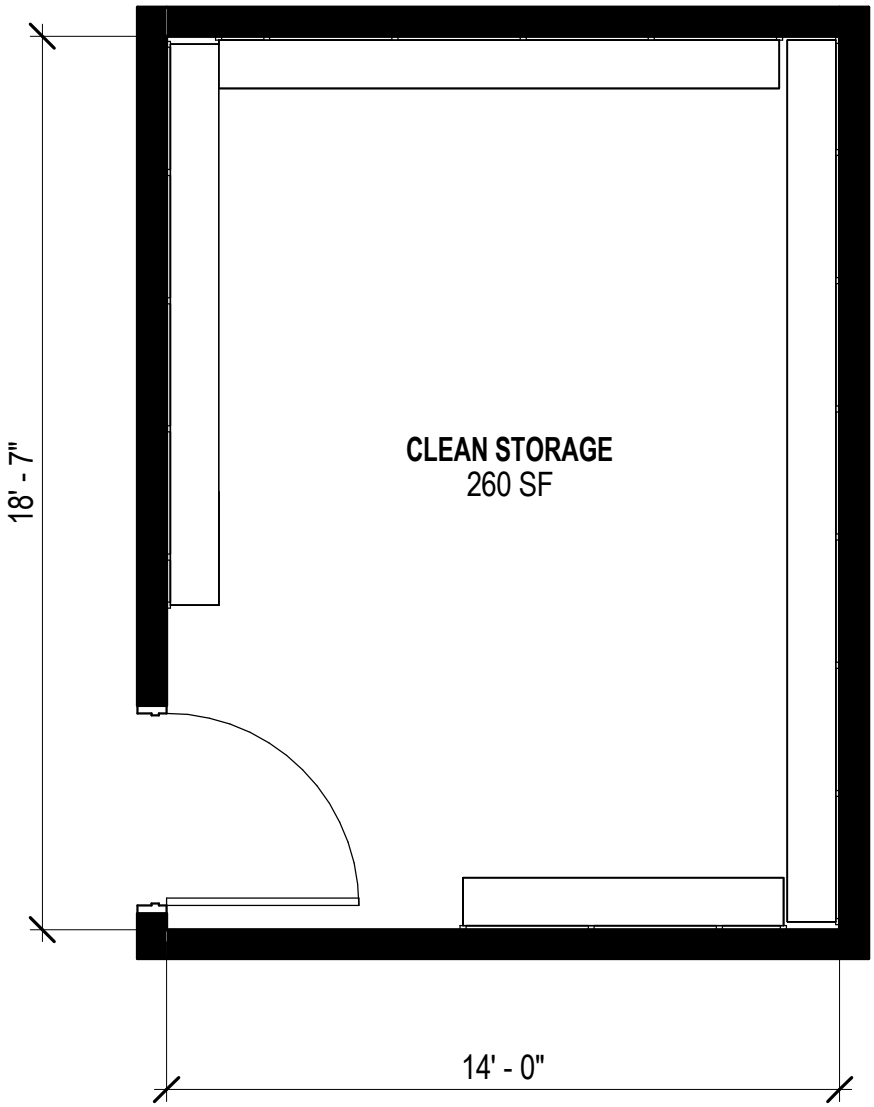

SCALE: 1/8" = 1'-0"

| DEPARTMENT UNIT | Cyclotron Space |
|---|---|
| Space Name | Clean Storage |
| Space Number | N/A |

| 1. SPACE PROGRAM | |
|---|---|
| General Space Description: | Storage |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 260 SF |
| (Quantity) & Location: | (1) Level A |
| Purpose of Space: | Storage |
| Number of Occupants: | 1 |
| Hours and Days Used: | N/A |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | Labs |
| Must Be Near To: | Suite Entry |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | None |
| Doors: | 4'-0" Minimum |
| Floor: | Sheet Vinyl, Inegral Base |
| Wall: | Painted Gypsum Board, Epoxy |
| Ceiling: | Lay-in Tile |
| Ceiling Height: | 9'-0" |
| Acoustics: | N/A |
| General Character of Room: | Storage Room with shelving |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | N/A |
| HVAC: | 72 Degrees F +/- 4 |
| Plumbing: | N/A |
| Electrical: | 110V |
| Lighting: | Fluorescent |
| Phone / Data: | N/A |
| Vibration Criteria: | N/A |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Shelving |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

## ROOM DATA SHEET

### Clean Storage / 260 SF




SCALE: 1/4" = 1'-0"

# 4 Space Program

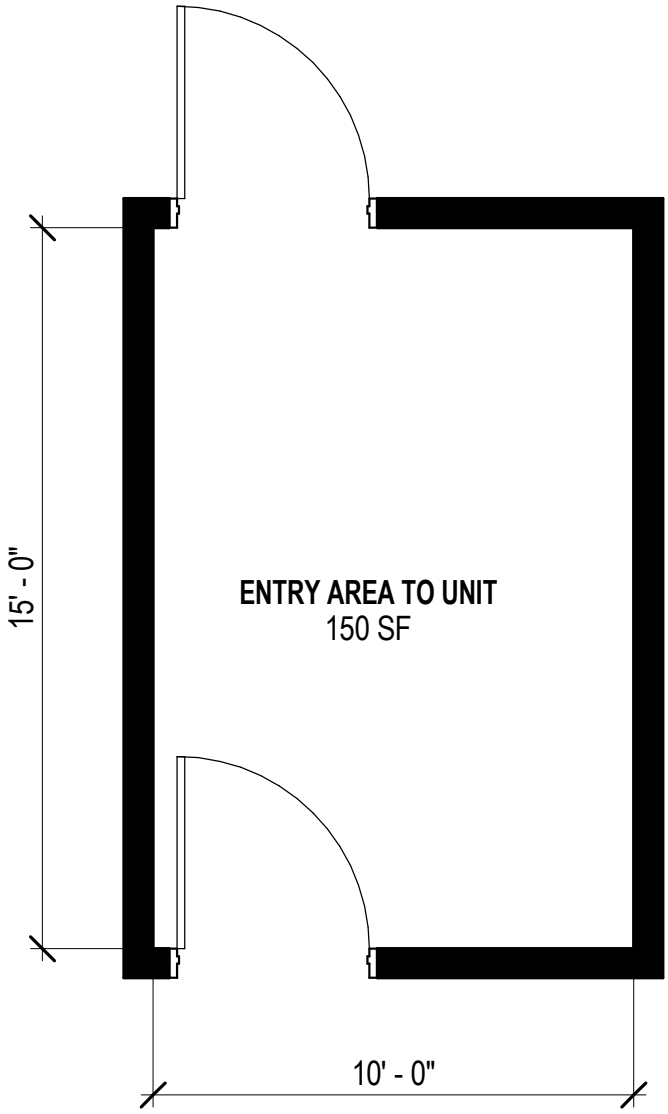
Individual Room Data Sheets / Pre-Schematic Finish Schedule

| DEPARTMENT UNIT | Cyclotron Space |
|---|---|
| Space Name | Entry Area to Unit |
| Space Number | N/A |

| 1. SPACE PROGRAM | |
|---|---|
| General Space Description: | Entry |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 150 SF |
| (Quantity) & Location: | (1) Level A |
| Purpose of Space: | Entry |
| Number of Occupants: | 0 |
| Hours and Days Used: | N/A |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | Public Corridor |
| Must Be Near To: | Public Corridor |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | N/A |
| Doors: | 4'-0" Minimum |
| Floor: | Sheet Vinyl, Integral Base |
| Wall: | Painted Gypsum Board, Epoxy |
| Ceiling: | Lay-in Tile |
| Ceiling Height: | 9'-0" |
| Acoustics: | N/A |
| General Character of Room: | N/A |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | Card Reader to exterior & access to Cyclotron |
| HVAC: | 72 Degrees F +/- 4 |
| Plumbing: | N/A |
| Electrical: | 110V |
| Lighting: | Fluorescent |
| Phone / Data: | N/A |
| Vibration Criteria: | N/A |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Coat Hooks |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

## ROOM DATA SHEET

### Entry Area to Unit / 150 SF




SCALE: 1/4" = 1'-0"

# 4 Space Program

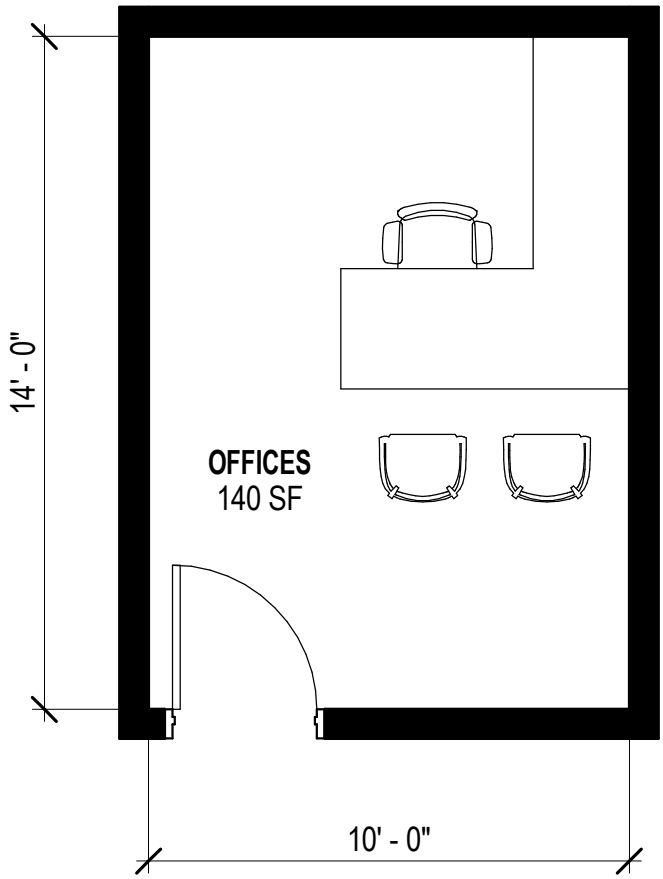
Individual Room Data Sheets / Pre-Schematic Finish Schedule

| DEPARTMENT UNIT | Cyclotron Space |
|---|---|
| Space Name | Offices |
| Space Number | N/A |

| 1. SPACE PROGRAM | |
|---|---|
| General Space Description: | Office |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 140 SF |
| (Quantity) & Location: | (2) Level A |
| Purpose of Space: | Office |
| Number of Occupants: | 1 |
| Hours and Days Used: | 24/7 |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | Entry |
| Must Be Near To: | Labs |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | None |
| Doors: | 3'-0" |
| Floor: | Carpet & Carpet Base |
| Wall: | Painted Gypsum Board |
| Ceiling: | Lay-in Tile |
| Ceiling Height: | 9'-0" |
| Acoustics: | N/A |
| General Character of Room: | Office |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | N/A |
| HVAC: | 72 Degrees F +/- 4 |
| Plumbing: | N/A |
| Electrical: | 110V |
| Lighting: | Fluorescent |
| Phone / Data: | Yes |
| Vibration Criteria: | N/A |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Desk, Chairs, Lockset on Door |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

## ROOM DATA SHEET

### Offices / 140 SF




SCALE: 1/4" = 1'-0"

# 4 Space Program

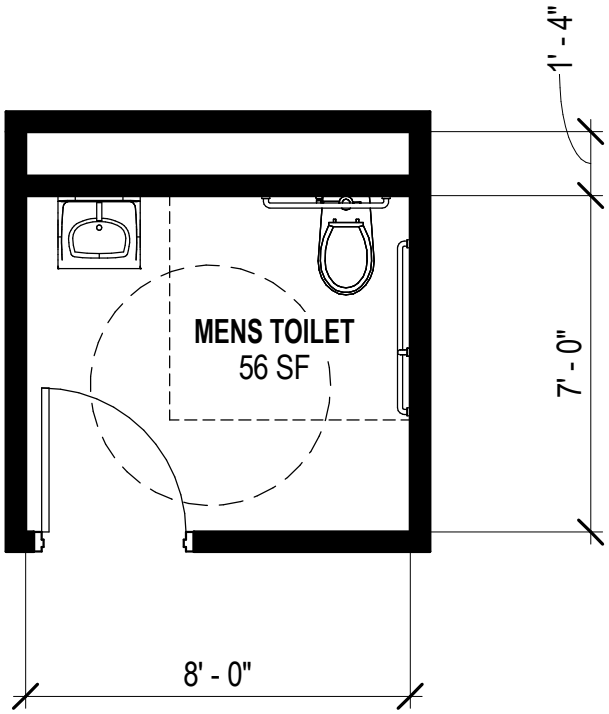
Individual Room Data Sheets / Pre-Schematic Finish Schedule

| DEPARTMENT UNIT | Cyclotron Space |
|---|---|
| Space Name | Men's Toilet |
| Space Number | N/A |

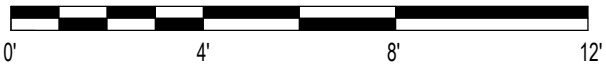
| 1. SPACE PROGRAM | |
|---|---|
| General Space Description: | Restroom |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 80 SF |
| (Quantity) & Location: | (1) Level A |
| Purpose of Space: | Restroom |
| Number of Occupants: | 0 |
| Hours and Days Used: | 24/7 |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | Office/Lab |
| Must Be Near To: | Front of suite by entry |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | N/A |
| Doors: | 3'-0" |
| Floor: | Tile |
| Wall: | Painted Gypsum Board, Epoxy / Tile |
| Ceiling: | Painted Gypsum Board, Epoxy |
| Ceiling Height: | 8'-0" |
| Acoustics: | N/A |
| General Character of Room: | Toilet Room |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | None |
| HVAC: | 72 Degrees F +/- 4 |
| Plumbing: | Sink, Water Closet, Floor Drain |
| Electrical: | 110V |
| Lighting: | Fluorescent |
| Phone / Data: | N/A |
| Vibration Criteria: | N/A |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Sink, Grab Bars, Toilet Paper Dispenser, Mirror, Soap Dispenser, Paper Towel Dispenser, Privacy Lockset |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

## ROOM DATA SHEET

### Men's Toilet / 80 SF




SCALE: 1/4" = 1'-0"



# 4 Space Program

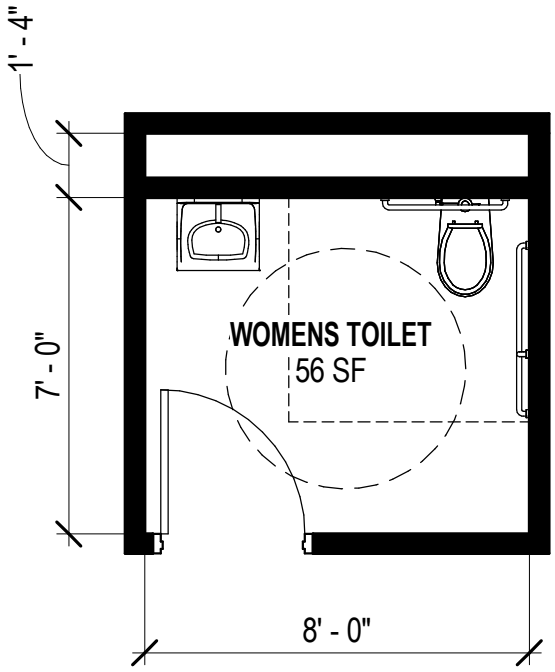
Individual Room Data Sheets / Pre-Schematic Finish Schedule

| DEPARTMENT UNIT | Cyclotron Space |
|---|---|
| Space Name | Women's Toilet |
| Space Number | N/A |

| 1. SPACE PROGRAM | |
|---|---|
| General Space Description: | Restroom |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 80 SF |
| (Quantity) & Location: | (1) Level A |
| Purpose of Space: | Restroom |
| Number of Occupants: | 0 |
| Hours and Days Used: | 24/7 |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | Office/Lab |
| Must Be Near To: | Front of suite by entry |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | N/A |
| Doors: | 3'-0" |
| Floor: | Tile |
| Wall: | Painted Gypsum Board, Epoxy / Tile |
| Ceiling: | Painted Gypsum Board, Epoxy |
| Ceiling Height: | 8'-0" |
| Acoustics: | N/A |
| General Character of Room: | Toilet Room |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | N/A |
| HVAC: | 72 Degrees F +/- 4 |
| Plumbing: | Sink, Water Closet, Floor Drain |
| Electrical: | 110V |
| Lighting: | Fluorescent |
| Phone / Data: | N/A |
| Vibration Criteria: | N/A |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Sink, Grab Bars, Toilet Paper Dispenser, Mirror, Soap Dispenser, Paper Towel Dispenser, Privacy Lockset |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

## ROOM DATA SHEET

### Women's Toilet / 80 SF




SCALE: 1/4" = 1'-0"

# 4 Space Program

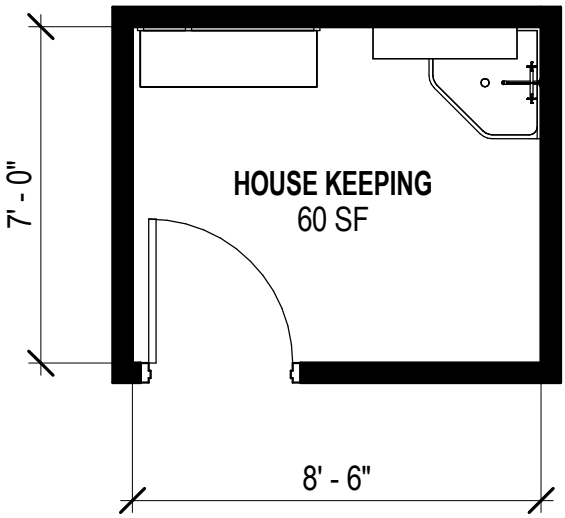
Individual Room Data Sheets / Pre-Schematic Finish Schedule

| DEPARTMENT UNIT | Cyclotron Space |
|---|---|
| Space Name | House Keeping |
| Space Number | N/A |

| | |
|---|---|
| **1. SPACE PROGRAM** | |
| General Space Description: | House Keeping Closet |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 60 SF |
| (Quantity) & Location: | (1) Level A |
| Purpose of Space: | Storage |
| Number of Occupants: | 0 |
| Hours and Days Used: | 24/7 |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | Office/Labs |
| Must Be Near To: | N/A |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | N/A |
| Doors: | 3'-0" |
| Floor: | Sheet Vinyl & Tile Base |
| Wall: | Painted Gypsum Board, Epoxy / Tile |
| Ceiling: | Painted Gypsum Board, Epoxy |
| Ceiling Height: | 8'-0" |
| Acoustics: | N/A |
| General Character of Room: | House Keeping |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | N/A |
| HVAC: | 72 Degrees F +/- 4 |
| Plumbing: | Mop Sink |
| Electrical: | 110V |
| Lighting: | Fluorescent |
| Phone / Data: | N/A |
| Vibration Criteria: | N/A |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Mop Sink, Mop Rack, Shelving, Cleaning Solution Dispenser |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

## ROOM DATA SHEET

### House Keeping / 60 SF




SCALE: 1/4" = 1'-0"

# 4 Space Program

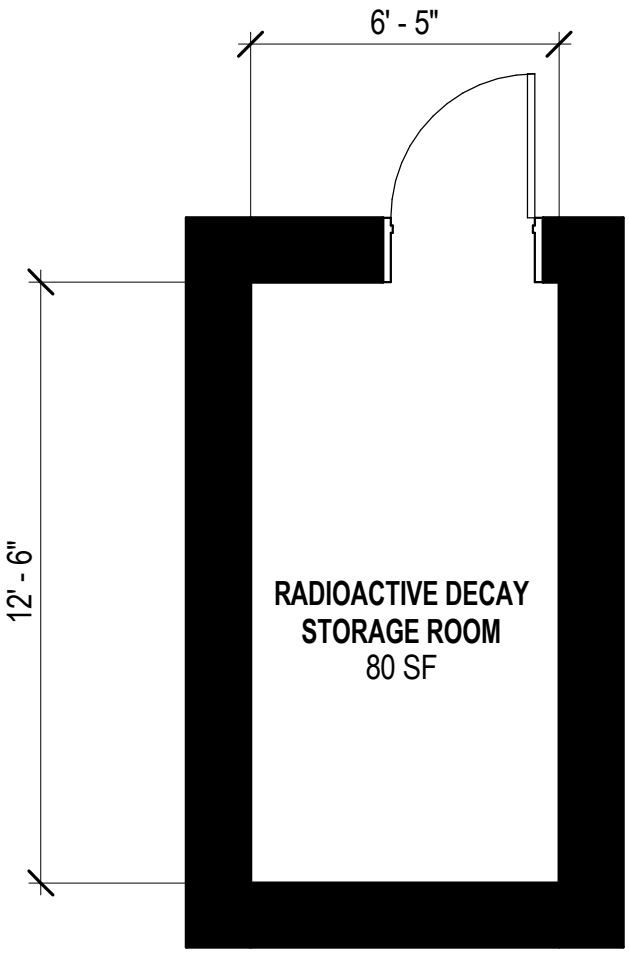
Individual Room Data Sheets / Pre-Schematic Finish Schedule

| | |
|---|---|
| **DEPARTMENT UNIT** | **Cyclotron Space** |
| **Space Name** | Radioactive Decay Storage Room |
| **Space Number** | N/A |

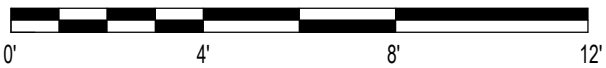
| | |
|---|---|
| **1. SPACE PROGRAM** | |
| General Space Description: | Storage |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 80 SF |
| (Quantity) & Location: | (1) Level A |
| Purpose of Space: | Storage of Radioactive Material |
| Number of Occupants: | 0 |
| Hours and Days Used: | N/A |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | Cyclotron |
| Must Be Near To: | Labs |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | N/A |
| Doors: | 3'-0", Hollow Metal |
| Floor: | Sealed Concrete |
| Wall: | Sealed Concrete |
| Ceiling: | Exposed Structure |
| Ceiling Height: | N/A |
| Acoustics: | N/A |
| General Character of Room: | Storage |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | Card Reader |
| HVAC: | Vent to roof (independent) |
| Plumbing: | N/A |
| Electrical: | N/A |
| Lighting: | Fluorescent |
| Phone / Data: | N/A |
| Vibration Criteria: | N/A |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | N/A |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | Radiation Detectors on roof by exhaust stack |

## ROOM DATA SHEET

### Radioactive Decay Storage Room / 80 SF




SCALE: 1/4" = 1'-0"



# 4 Space Program

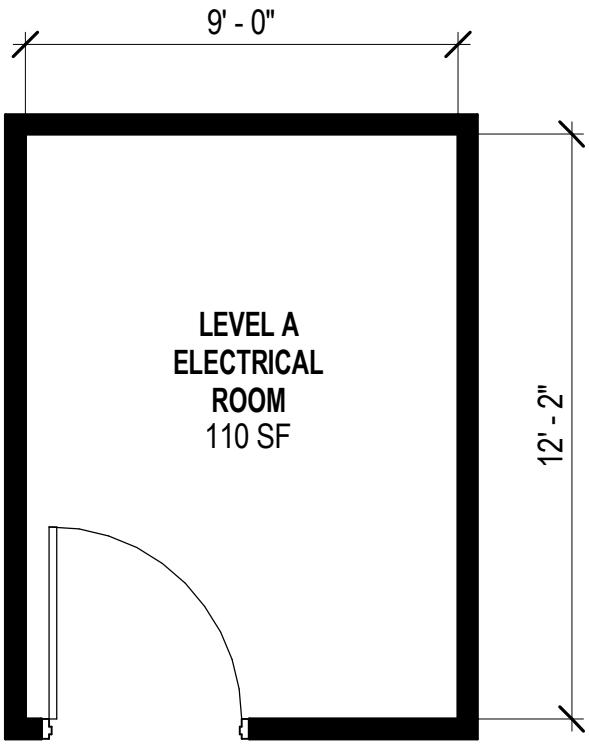
Individual Room Data Sheets / Pre-Schematic Finish Schedule

| DEPARTMENT UNIT | Electrical |
|---|---|
| Space Name | Electrical Room |
| Space Number | N/A |

| 1. SPACE PROGRAM | |
|---|---|
| General Space Description: | Electrical Room |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 110 SF |
| (Quantity) & Location: | (1) at Level A |
| Purpose of Space: | Electrical Room |
| Number of Occupants: | 1 |
| Hours and Days Used: | 12am - 12am, Su-Sa |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | N/A |
| Must Be Near To: | N/A |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | None |
| Doors: | 4'-0" Wide Minimum |
| Floor: | Sealed Concrete |
| Wall: | Painted Gypsum Board, Fire-Rated Plywood Sheathing to 7'-0" A.F.F. |
| Ceiling: | None |
| Ceiling Height: | N/A |
| Acoustics: | N/A |
| General Character of Room: | Electrical Room |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | Card Access |
| HVAC: | 72 Degrees F +/- 4 |
| Plumbing: | Not Allowed to Intersect Space |
| Electrical: | 120 V Service Outlet |
| Lighting: | Fluorescent/LED |
| Phone / Data: | Cat-6 Voice & Data |
| Vibration Criteria: | N/A |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | N/A |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | Stack Floor to Floor |

## ROOM DATA SHEET

### Electrical Room / 110 SF




SCALE: 1/4" = 1'-0"

# 4 Space Program

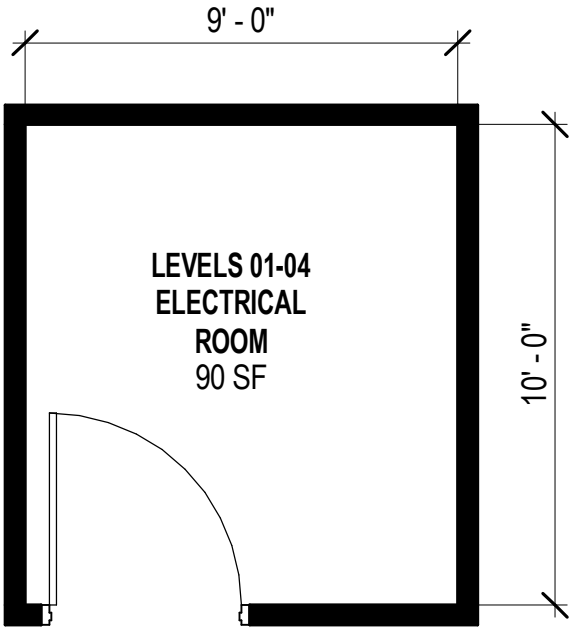
Individual Room Data Sheets / Pre-Schematic Finish Schedule

| DEPARTMENT UNIT | Electrical |
|---|---|
| Space Name | Electrical Room |
| Space Number | N/A |

| 1. SPACE PROGRAM | |
|---|---|
| General Space Description: | Electrical Room |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 90 SF |
| (Quantity) & Location: | (2) at Levels 01, 02, 03, 04 |
| Purpose of Space: | Electrical Room |
| Number of Occupants: | 1 |
| Hours and Days Used: | 12am - 12am, Su-Sa |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | N/A |
| Must Be Near To: | N/A |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | None |
| Doors: | 4'-0" Wide Minimum |
| Floor: | Sealed Concrete |
| Wall: | Painted Gypsum Board, Fire-Rated Plywood Sheathing to 7'-0" A.F.F. |
| Ceiling: | None |
| Ceiling Height: | N/A |
| Acoustics: | N/A |
| General Character of Room: | Electrical Room |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | Card Access |
| HVAC: | 72 Degrees F +/- 4 |
| Plumbing: | Not Allowed to Intersect Space |
| Electrical: | 120 V Service Outlet |
| Lighting: | Fluorescent/LED |
| Phone / Data: | Cat-6 Voice & Data |
| Vibration Criteria: | N/A |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | N/A |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | Stack Floor to Floor |

## ROOM DATA SHEET

### Electrical Room / 90 SF




SCALE: 1/4" = 1'-0"

# 4 Space Program

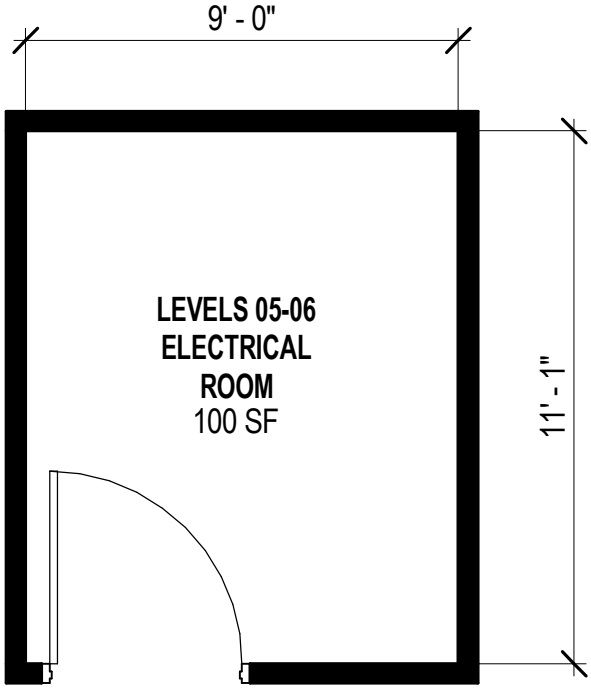
Individual Room Data Sheets / Pre-Schematic Finish Schedule

| DEPARTMENT UNIT | Electrical |
|---|---|
| Space Name | Electrical Room |
| Space Number | N/A |

| 1. SPACE PROGRAM | |
|---|---|
| General Space Description: | Electrical Room |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 100 SF |
| (Quantity) & Location: | (2) at Levels 05, 06 |
| Purpose of Space: | Electrical Room |
| Number of Occupants: | 1 |
| Hours and Days Used: | 12am - 12am, Su-Sa |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | N/A |
| Must Be Near To: | N/A |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | None |
| Doors: | 4'-0" Wide Minimum |
| Floor: | Sealed Concrete |
| Wall: | Painted Gypsum Board, Fire-Rated Plywood Sheathing to 7'-0" A.F.F. |
| Ceiling: | None |
| Ceiling Height: | N/A |
| Acoustics: | N/A |
| General Character of Room: | Electrical Room |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | Card Access |
| HVAC: | 72 Degrees F +/- 4 |
| Plumbing: | Not Allowed to Intersect Space |
| Electrical: | 120 V Service Outlet |
| Lighting: | Fluorescent/LED |
| Phone / Data: | Cat-6 Voice & Data |
| Vibration Criteria: | N/A |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | N/A |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | Stack Floor to Floor |

## ROOM DATA SHEET

### Electrical Room / 100 SF



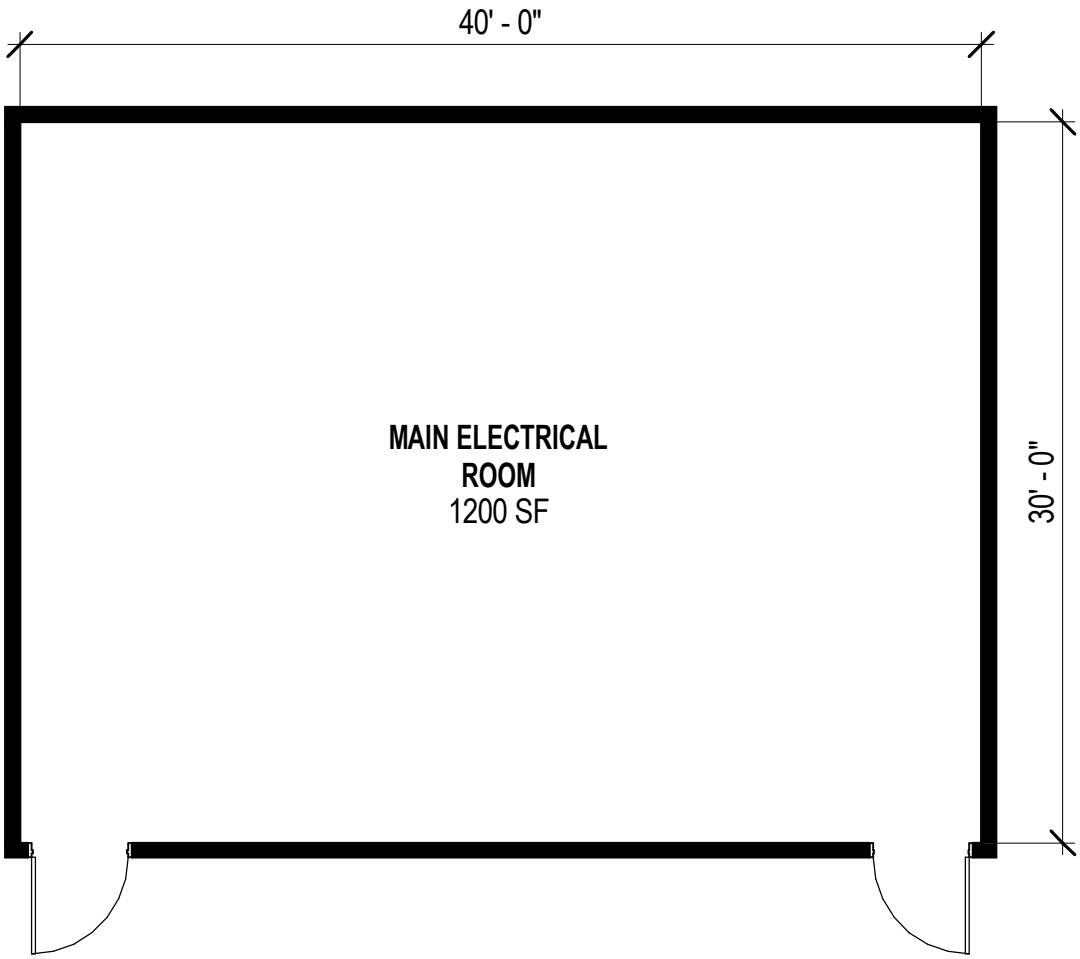

SCALE: 1/4" = 1'-0"

| DEPARTMENT UNIT | Electrical |
|---|---|
| Space Name | Main Electrical Room |
| Space Number | N/A |

| 1. SPACE PROGRAM | |
|---|---|
| General Space Description: | Electrical Room |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 1,200 SF |
| (Quantity) & Location: | (1) at Level A |
| Purpose of Space: | Electrical Room |
| Number of Occupants: | 2 |
| Hours and Days Used: | 12am - 12am, Su-Sa |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | N/A |
| Must Be Near To: | N/A |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | None |
| Doors: | (2) 4'-0" Wide Minimum, Outswinging, Exit Hardware |
| Floor: | Sealed Concrete |
| Wall: | Painted Gypsum Board, Fire-Rated Plywood Sheathing to 7'-0" A.F.F. |
| Ceiling: | None |
| Ceiling Height: | N/A |
| Acoustics: | N/A |
| General Character of Room: | Electrical Room |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | Card Access |
| HVAC: | 72 Degrees F +/- 4 |
| Plumbing: | Not Allowed to Intersect Space |
| Electrical: | 120 V Service Outlet |
| Lighting: | Fluorescent/LED |
| Phone / Data: | Cat-6 Voice & Data |
| Vibration Criteria: | N/A |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | N/A |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | Stack Floor to Floor |

## ROOM DATA SHEET

**Main Electrical Room / 1,200 SF**




SCALE: 1/8" = 1'-0"

# 4 Space Program

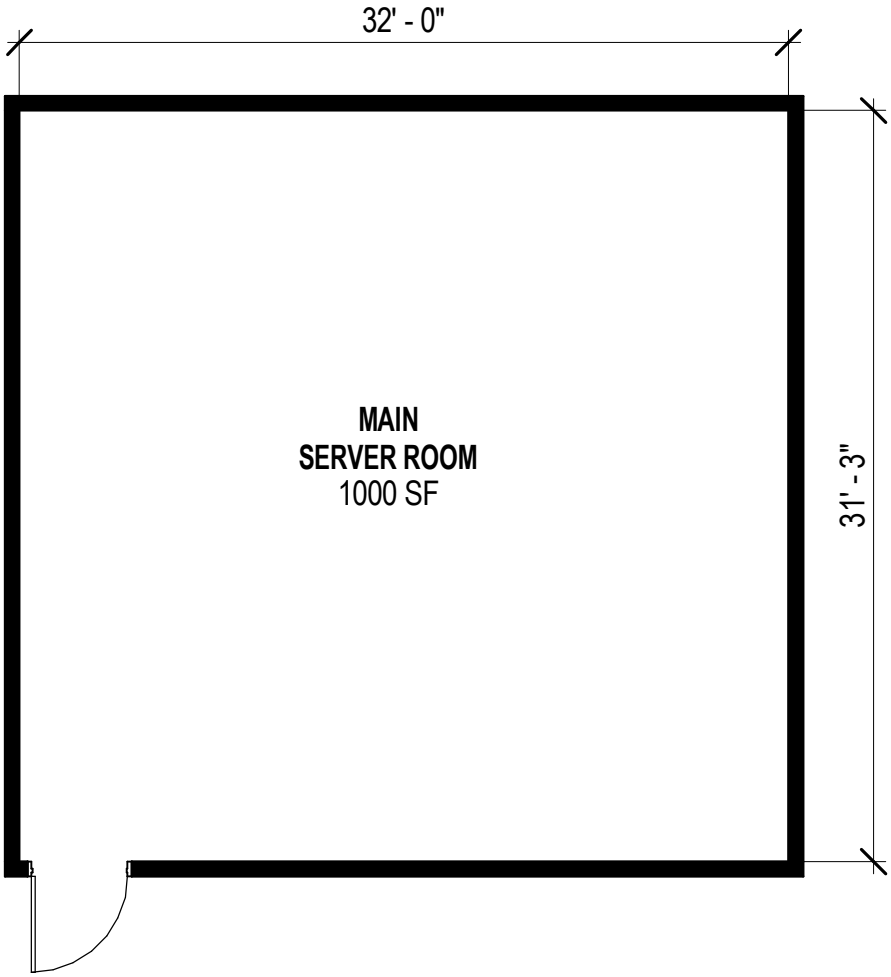
Individual Room Data Sheets / Pre-Schematic Finish Schedule

| | |
|---|---|
| **DEPARTMENT UNIT** | **Information Technology** |
| **Space Name** | Main Server Room |
| **Space Number** | N/A |

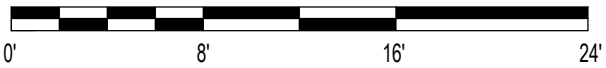
| | |
|---|---|
| **1. SPACE PROGRAM** | |
| General Space Description: | Server Room |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 1,000 SF |
| (Quantity) & Location: | (1) at Level 01 |
| Purpose of Space: | Server Room |
| Number of Occupants: | 4 |
| Hours and Days Used: | 12am - 12am, Su-Sa |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | Adjacent to IT Offices / Workspace |
| Must Be Near To: | N/A |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | None |
| Doors: | 4'-0" Wide Minimum, Outswinging, Exit Hardware |
| Floor: | Sealed Concrete |
| Wall: | Painted Gypsum Board |
| Ceiling: | None |
| Ceiling Height: | N/A |
| Acoustics: | N/A |
| General Character of Room: | Server Room |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | Card Access |
| HVAC: | 72 Degrees F +/- 4 (includes secondary room and AC units) |
| Plumbing: | Not Allowed to Intersect Space |
| Electrical: | 120 V Outlets & 208 V Outlets, Per I.T. Equipment |
| Lighting: | Fluorescent/LED |
| Phone / Data: | Cat-6 Voice & Data |
| Vibration Criteria: | N/A |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Access Flooring |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | Stack Floor to Floor |

## ROOM DATA SHEET

### Main Server Room / 1,000 SF




SCALE: 1/8" = 1'-0"



# 4 Space Program

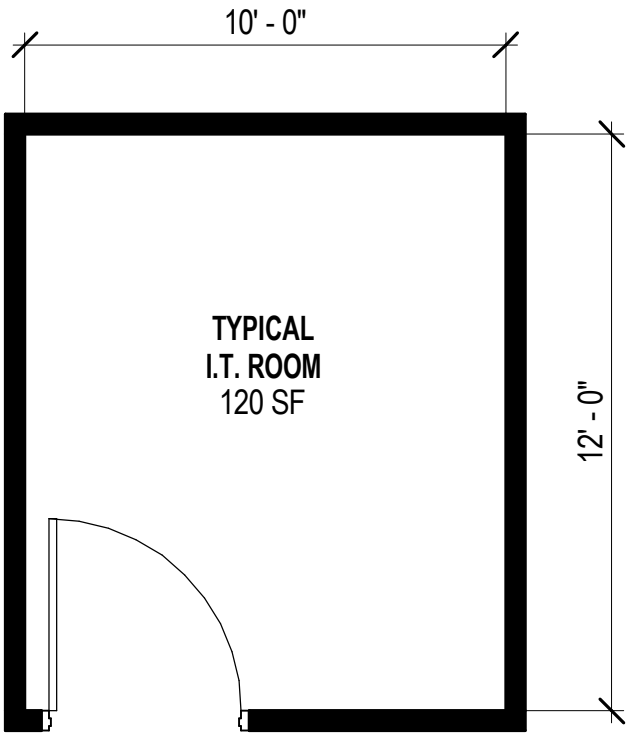
Individual Room Data Sheets / Pre-Schematic Finish Schedule

| | |
|---|---|
| **DEPARTMENT UNIT** | **Information Technology** |
| **Space Name** | I.T. Room |
| **Space Number** | N/A |

| | |
|---|---|
| **1. SPACE PROGRAM** | |
| General Space Description: | I.T. Room |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 120 SF |
| (Quantity) & Location: | (2) at Levels 01, 02, 03, 04; (1) at Levels A, 05, 06 |
| Purpose of Space: | I.T. Room |
| Number of Occupants: | 1 |
| Hours and Days Used: | 12am - 12am, Su-Sa |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | N/A |
| Must Be Near To: | N/A |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | None |
| Doors: | 4'-0" Wide Minimum |
| Floor: | Sealed Concrete |
| Wall: | Painted Gypsum Board |
| Ceiling: | None |
| Ceiling Height: | N/A |
| Acoustics: | N/A |
| General Character of Room: | I.T. Room |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | Card Access |
| HVAC: | 72 Degrees F +/- 4 |
| Plumbing: | Not Allowed to Intersect Space |
| Electrical: | 120 V Service Outlet, Per I.T. Equipment |
| Lighting: | Fluorescent/LED |
| Phone / Data: | Cat-6 Voice & Data |
| Vibration Criteria: | N/A |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | N/A |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | Stack Floor to Floor |

## ROOM DATA SHEET

### I.T. Room / 120 SF




SCALE: 1/4" = 1'-0"

# 4 Space Program

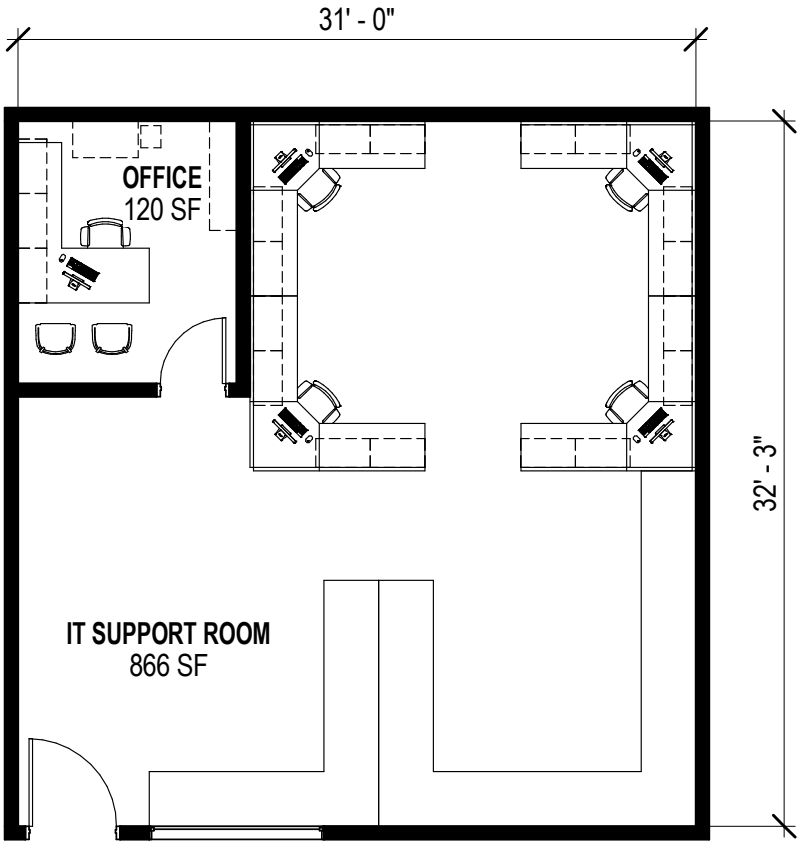
Individual Room Data Sheets / Pre-Schematic Finish Schedule

| | |
|---|---|
| **DEPARTMENT UNIT** | **Information Technology** |
| **Space Name** | I.T. Support Room |
| **Space Number** | N/A |

| | |
|---|---|
| **1. SPACE PROGRAM** | |
| General Space Description: | Office/Tech Area |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 1,000 SF |
| (Quantity) & Location: | (1) at Level 01 |
| Purpose of Space: | Office/Tech Area |
| Number of Occupants: | 5 |
| Hours and Days Used: | 8am - 5pm, M-F |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | N/A |
| Must Be Near To: | N/A |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | To Main Server Room |
| Doors: | 3'-0" Wide Minimum |
| Floor: | Sealed Concrete |
| Wall: | Painted Gypsum Board |
| Ceiling: | Acoustical Tile |
| Ceiling Height: | 9'-0" |
| Acoustics: | STC 45 |
| General Character of Room: | Office/Tech Area |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | Card Access |
| HVAC: | 72 Degrees F +/- 4 |
| Plumbing: | Not Allowed to Intersect Space |
| Electrical: | 120 V Outlets |
| Lighting: | Fluorescent/LED |
| Phone / Data: | Cat-6 Voice & Data |
| Vibration Criteria: | N/A |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Work Benches, Storage Area, 4 Cubicles and One Office |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

## ROOM DATA SHEET

### I.T. Support Room / 1,000 SF

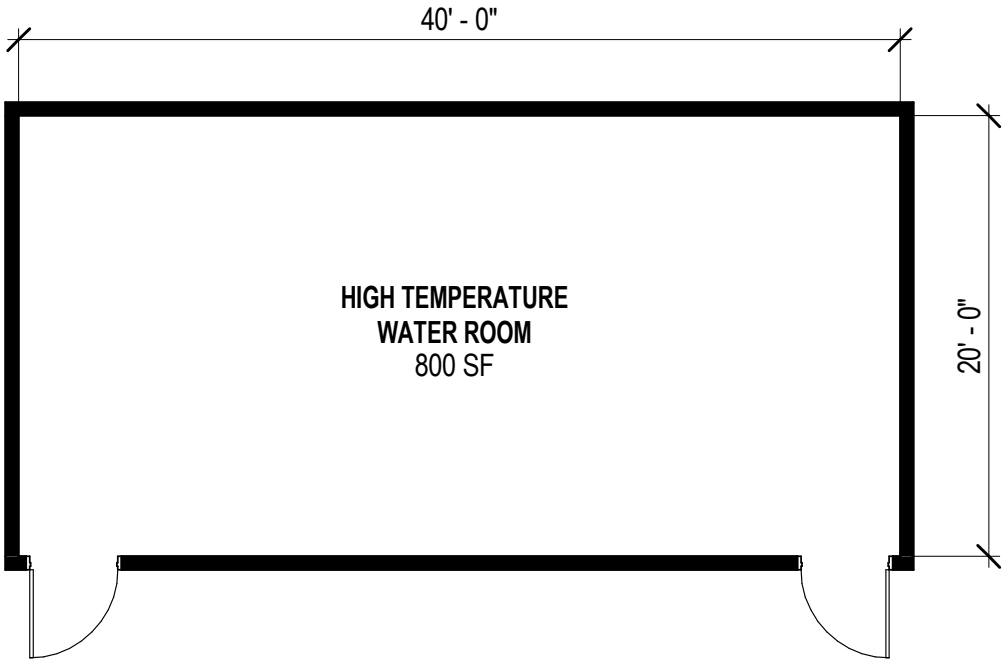


| DEPARTMENT UNIT | Mechanical |
|---|---|
| Space Name | High Temperature Water Room |
| Space Number | N/A |

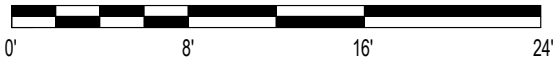
| 1. SPACE PROGRAM | |
|---|---|
| General Space Description: | High Temperature Water Room |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 800 SF |
| (Quantity) & Location: | (1) at Level A |
| Purpose of Space: | High Temperature Water Room |
| Number of Occupants: | 3 |
| Hours and Days Used: | 12am - 12am, Su-Sa |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | N/A |
| Must Be Near To: | N/A |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | None |
| Doors: | 4'-0" Wide Minimum, (2) Means of Egress Opposite Sides / Exit Devices |
| Floor: | Sealed Concrete |
| Wall: | Painted Gypsum Board (2 Hour Separation) |
| Ceiling: | None |
| Ceiling Height: | N/A |
| Acoustics: | N/A |
| General Character of Room: | Mechanical Room |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | Card Access |
| HVAC: | 72 Degrees F +/- 4 |
| Plumbing: | Per Mechanical Equipment |
| Electrical: | 120 V Service Outlets, Per Mechanical Equipment |
| Lighting: | Fluorescent/LED |
| Phone / Data: | Cat-6 Voice & Data Service Outlets |
| Vibration Criteria: | N/A |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Mechanical Equipment |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

## ROOM DATA SHEET

### High Temperature Water Room / 800 SF




SCALE: 1/8" = 1'-0"



| DEPARTMENT UNIT | Mechanical |
|---|---|
| Space Name | Mechanical Room |
| Space Number | N/A |

| 1. SPACE PROGRAM | |
|---|---|
| General Space Description: | Mechanical Room |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 8,000 SF |
| (Quantity) & Location: | (1) at Level A |
| Purpose of Space: | Water Room |
| Number of Occupants: | 27 |
| Hours and Days Used: | 12am - 12am, Su-Sa |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | N/A |
| Must Be Near To: | N/A |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | None |
| Doors: | 8'-0" Wide Minimum (Pair), (2) Means of Egress Opposite Sides |
| Floor: | Sealed Concrete |
| Wall: | Painted Gypsum Board |
| Ceiling: | None |
| Ceiling Height: | N/A |
| Acoustics: | N/A |
| General Character of Room: | Mechanical Room |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | Card Access |
| HVAC: | 72 Degrees F +/- 4 |
| Plumbing: | Per Mechanical Equipment |
| Electrical: | 120 V Service Outlets, Per Mechanical Equipment |
| Lighting: | Fluorescent/LED |
| Phone / Data: | Cat-6 Voice & Data Service Outlets |
| Vibration Criteria: | N/A |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Pumps, Heat Exchangers, Plate & Frame Exchangers, Pure Water Systems |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

| DEPARTMENT UNIT | Mechanical |
|---|---|
| Space Name | Penthouse Fan Room |
| Space Number | N/A |

| 1. SPACE PROGRAM | |
|---|---|
| General Space Description: | Fan Room |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 21,648 SF |
| (Quantity) & Location: | (1) at Level 06 |
| Purpose of Space: | Fan Room |
| Number of Occupants: | 73 |
| Hours and Days Used: | 12am - 12am, Su-Sa |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | N/A |
| Must Be Near To: | N/A |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | None |
| Doors: | 8'-0" Wide Minimum (Pair), (2) Means of Egress Opposite Sides |
| Floor: | Sealed Concrete |
| Wall: | Painted Gypsum Board |
| Ceiling: | None |
| Ceiling Height: | N/A |
| Acoustics: | N/A |
| General Character of Room: | Mechanical Room |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | Card Access |
| HVAC: | 72 Degrees F +/- 4 |
| Plumbing: | Per Mechanical Equipment |
| Electrical: | 120 V Service Outlets, Per Mechanical Equipment |
| Lighting: | Fluorescent/LED |
| Phone / Data: | Cat-6 Voice & Data Service Outlets |
| Vibration Criteria: | N/A |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Air Handling Units |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

# 4 Space Program

Individual Room Data Sheets / Pre-Schematic Finish Schedule

| DEPARTMENT UNIT | **Mechanical** |
|---|---|
| Space Name | Mechanical Shafts |
| Space Number | None |

| **1. SPACE PROGRAM** | |
|---|---|
| General Space Description: | Mechanical Shafts |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 129 SF |
| (Quantity) & Location: | (Various) at Level 01 |
| Purpose of Space: | Mechanical Shafts |
| Number of Occupants: | 0 |
| Hours and Days Used: | 12am - 12am, Su-Sa |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | N/A |
| Must Be Near To: | N/A |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | N/A |
| Doors: | N/A |
| Floor: | N/A |
| Wall: | Shaft Liner (2 Hour Rated) |
| Ceiling: | N/A |
| Ceiling Height: | N/A |
| Acoustics: | N/A |
| General Character of Room: | Mechanical Shafts |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | N/A |
| HVAC: | N/A |
| Plumbing: | N/A |
| Electrical: | N/A |
| Lighting: | N/A |
| Phone / Data: | N/A |
| Vibration Criteria: | N/A |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | N/A |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

| | |
|---|---|
| **DEPARTMENT UNIT** | **Mechanical** |
| **Space Name** | Mechanical Shafts |
| **Space Number** | N/A |

| | |
|---|---|
| **1. SPACE PROGRAM** | |
| General Space Description: | Mechanical Shafts |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 403 SF |
| (Quantity) & Location: | (Various) at Level 02 |
| Purpose of Space: | Mechanical Shafts |
| Number of Occupants: | 0 |
| Hours and Days Used: | 12am - 12am, Su-Sa |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | N/A |
| Must Be Near To: | N/A |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | N/A |
| Doors: | N/A |
| Floor: | N/A |
| Wall: | Shaft Liner (2 Hour Rated) |
| Ceiling: | N/A |
| Ceiling Height: | N/A |
| Acoustics: | N/A |
| General Character of Room: | Mechanical Shafts |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | N/A |
| HVAC: | N/A |
| Plumbing: | N/A |
| Electrical: | N/A |
| Lighting: | N/A |
| Phone / Data: | N/A |
| Vibration Criteria: | N/A |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | N/A |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

# 4 Space Program

Individual Room Data Sheets / Pre-Schematic Finish Schedule

| DEPARTMENT UNIT | Mechanical |
|---|---|
| Space Name | Mechanical Shafts |
| Space Number | N/A |

| 1. SPACE PROGRAM | |
|---|---|
| General Space Description: | Mechanical Shafts |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 543 SF |
| (Quantity) & Location: | (Various) at Level 03 |
| Purpose of Space: | Mechanical Shafts |
| Number of Occupants: | 0 |
| Hours and Days Used: | 12am - 12am, Su-Sa |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | N/A |
| Must Be Near To: | N/A |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | N/A |
| Doors: | N/A |
| Floor: | N/A |
| Wall: | Shaft Liner (2 Hour Rated) |
| Ceiling: | N/A |
| Ceiling Height: | N/A |
| Acoustics: | N/A |
| General Character of Room: | Mechanical Shafts |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | N/A |
| HVAC: | N/A |
| Plumbing: | N/A |
| Electrical: | N/A |
| Lighting: | N/A |
| Phone / Data: | N/A |
| Vibration Criteria: | N/A |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | N/A |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

| | |
|---|---|
| **DEPARTMENT UNIT** | **Mechanical** |
| **Space Name** | Mechanical Shafts |
| **Space Number** | N/A |

| | |
|---|---|
| **1. SPACE PROGRAM** | |
| General Space Description: | Mechanical Shafts |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 677 SF |
| (Quantity) & Location: | (Various) at Level 04 |
| Purpose of Space: | Mechanical Shafts |
| Number of Occupants: | 0 |
| Hours and Days Used: | 12am - 12am, Su-Sa |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | N/A |
| Must Be Near To: | N/A |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | N/A |
| Doors: | N/A |
| Floor: | N/A |
| Wall: | Shaft Liner (2 Hour Rated) |
| Ceiling: | N/A |
| Ceiling Height: | N/A |
| Acoustics: | N/A |
| General Character of Room: | Mechanical Shafts |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | N/A |
| HVAC: | N/A |
| Plumbing: | N/A |
| Electrical: | N/A |
| Lighting: | N/A |
| Phone / Data: | N/A |
| Vibration Criteria: | N/A |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | N/A |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

| DEPARTMENT UNIT | Mechanical |
|---|---|
| Space Name | Mechanical Shafts |
| Space Number | N/A |

| 1. SPACE PROGRAM | |
|---|---|
| General Space Description: | Mechanical Shafts |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 821 SF |
| (Quantity) & Location: | (Various) at Level 05 |
| Purpose of Space: | Mechanical Shafts |
| Number of Occupants: | 0 |
| Hours and Days Used: | 12am - 12am, Su-Sa |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | N/A |
| Must Be Near To: | N/A |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | N/A |
| Doors: | N/A |
| Floor: | N/A |
| Wall: | Shaft Liner (2 Hour Rated) |
| Ceiling: | N/A |
| Ceiling Height: | N/A |
| Acoustics: | N/A |
| General Character of Room: | Mechanical Shafts |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | N/A |
| HVAC: | N/A |
| Plumbing: | N/A |
| Electrical: | N/A |
| Lighting: | N/A |
| Phone / Data: | N/A |
| Vibration Criteria: | N/A |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | N/A |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

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# 4 Space Program

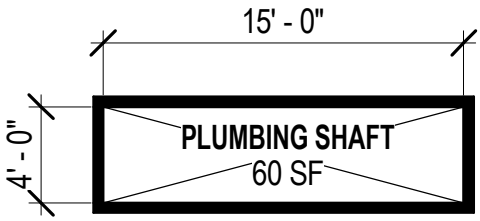
Individual Room Data Sheets / Pre-Schematic Finish Schedule

| DEPARTMENT UNIT | Mechanical |
|---|---|
| Space Name | Plumbing Shafts |
| Space Number | N/A |

| 1. SPACE PROGRAM | |
|---|---|
| General Space Description: | Plumbing Shafts |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 60 SF |
| (Quantity) & Location: | (2) at Levels 01, 02, 03, 04, 05 |
| Purpose of Space: | Plumbing Shafts |
| Number of Occupants: | 0 |
| Hours and Days Used: | 12am - 12am, Su-Sa |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | N/A |
| Must Be Near To: | N/A |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | N/A |
| Doors: | N/A |
| Floor: | N/A |
| Wall: | Shaft Liner (2 Hour Rated) |
| Ceiling: | N/A |
| Ceiling Height: | N/A |
| Acoustics: | N/A |
| General Character of Room: | Plumbing Shafts |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | N/A |
| HVAC: | N/A |
| Plumbing: | N/A |
| Electrical: | N/A |
| Lighting: | N/A |
| Phone / Data: | N/A |
| Vibration Criteria: | N/A |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | N/A |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

## ROOM DATA SHEET

### Plumbing Shafts / 60 SF




SCALE: 1/8" = 1'-0"

# 4 Space Program

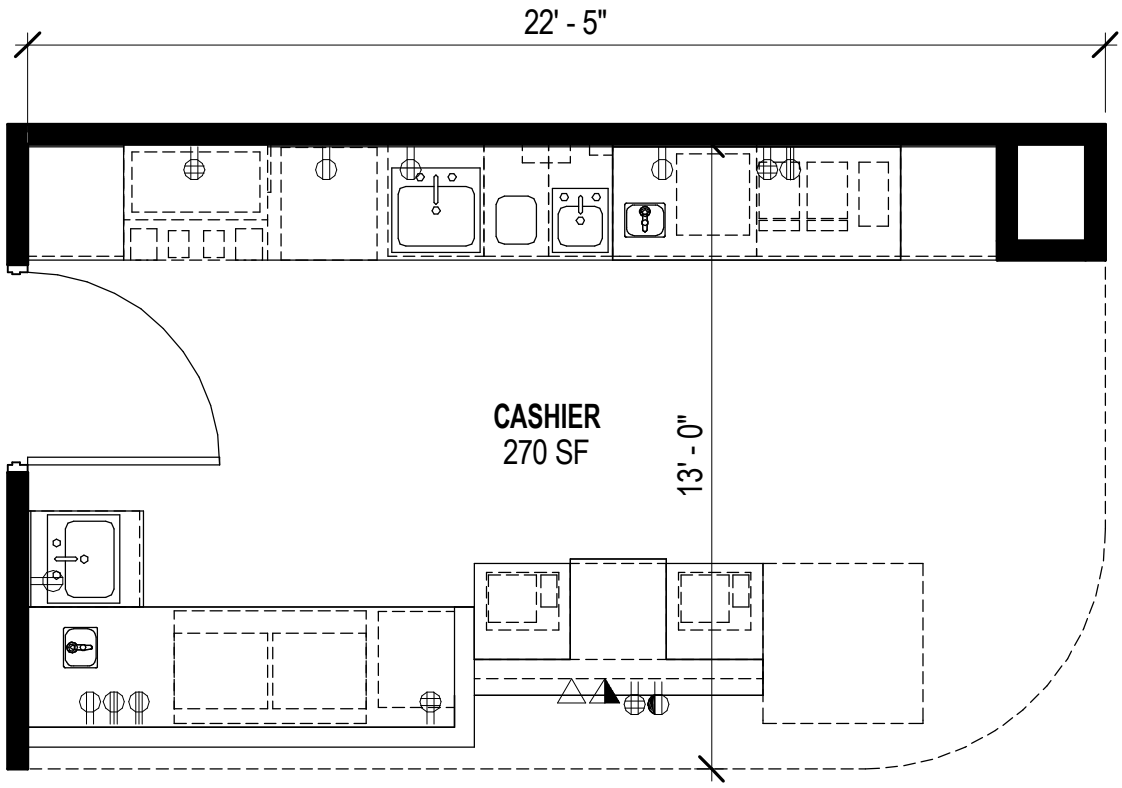
Individual Room Data Sheets / Pre-Schematic Finish Schedule

| | |
|---|---|
| **DEPARTMENT UNIT** | **Food Services** |
| **Space Name** | Coffee Shop Backbar Counter Area / Cashier Stand |
| **Space Number** | N/A |

| | |
|---|---|
| **1. SPACE PROGRAM** | |
| General Space Description: | Coffee Shop Cashier, Prep Area |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 270 SF |
| (Quantity) & Location: | (1) at Level 01 |
| Purpose of Space: | Transactions, Beverage Preparation |
| Number of Occupants: | 3 |
| Hours and Days Used: | 8am - 5pm, M-F |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | Coffee Shop Seating, Coffee Shop Workroom |
| Must Be Near To: | Main Lobby |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | None |
| Doors: | 4'-0" Wide Minimum, Traffic Door, Security Grille |
| Floor: | Tile |
| Wall: | Painted Gypsum Board / Wall Protection |
| Ceiling: | Acoustical Tile |
| Ceiling Height: | 9'-0" Minimum |
| Acoustics: | N/A |
| General Character of Room: | Food Services |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | N/A |
| HVAC: | 72 degrees F +/- 4 |
| Plumbing: | Prep Sink, Handwash Sink, Water Station, Floor Sinks Dipper Well/Faucet, Hot Water Dispenser, Floor Drain |
| Electrical: | 120 V Outlets, 220 V Outlets |
| Lighting: | Incandescent |
| Phone / Data: | Cat-6 Data & Voice |
| Vibration Criteria: | N/A |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Espresso Machines, Coffee Brewers, Coffee Warmers, Coffee Grinder, Undercounter Refrigerators, Ice Bins, Blenders, Cash Drawers/POS, Paper Towel Dispenser, Soap Dispenser, Mocha Pump, Cup Holders, Food Case, Trash Receptacle, Undercounter Safes, Telephone, Storage Cabinets, SS Countertops & Backsplash, Receipt Printer |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

## ROOM DATA SHEET

**Coffee Shop Backbar Counter Area / Cashier Stand / 270 SF**

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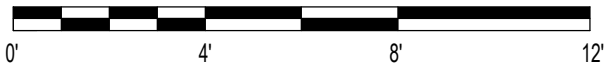


# 4 Space Program

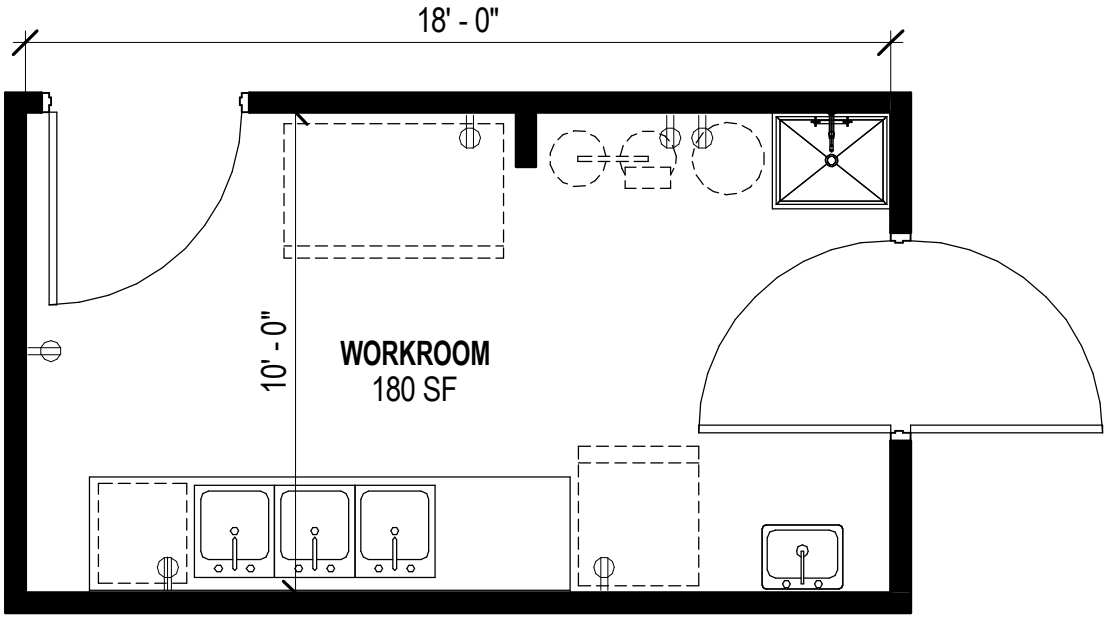
Individual Room Data Sheets / Pre-Schematic Finish Schedule

| | |
|---|---|
| **DEPARTMENT UNIT** | **Food Services** |
| **Space Name** | Coffee Shop Workroom |
| **Space Number** | N/A |

| | |
|---|---|
| **1. SPACE PROGRAM** | |
| General Space Description: | Workroom |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 180 SF |
| (Quantity) & Location: | (1) at Level 01 |
| Purpose of Space: | Food Preparation |
| Number of Occupants: | 2 |
| Hours and Days Used: | 8am - 5pm, M-F |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | Coffee Shop Cashier, Coffee Shop Storage |
| Must Be Near To: | Main Lobby |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | None |
| Doors: | 4'-0" Wide Minimum, Traffic Door |
| Floor: | Tile |
| Wall: | Painted Gypsum Board, Wall Protection |
| Ceiling: | Acoustical Tile |
| Ceiling Height: | 9'-0" Minimum |
| Acoustics: | N/A |
| General Character of Room: | Food Preparation & Work Space |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | N/A |
| HVAC: | 72 Degrees F +/- 4 |
| Plumbing: | Mop Sink, Hand Wash Sink, 3 Compartment Prep Sink, Dishwasher, Water Softener |
| Electrical: | 120 V outlets, 220 V outlets |
| Lighting: | Fluorescent/LED |
| Phone / Data: | Cat-6 Voice & Data |
| Vibration Criteria: | N/A |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | SS Countertop & Backsplash, Ice Maker, Refrigerator |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

## ROOM DATA SHEET

### Coffee Shop Work Room / 180 SF




SCALE: 1/4" = 1'-0"

# 4 Space Program

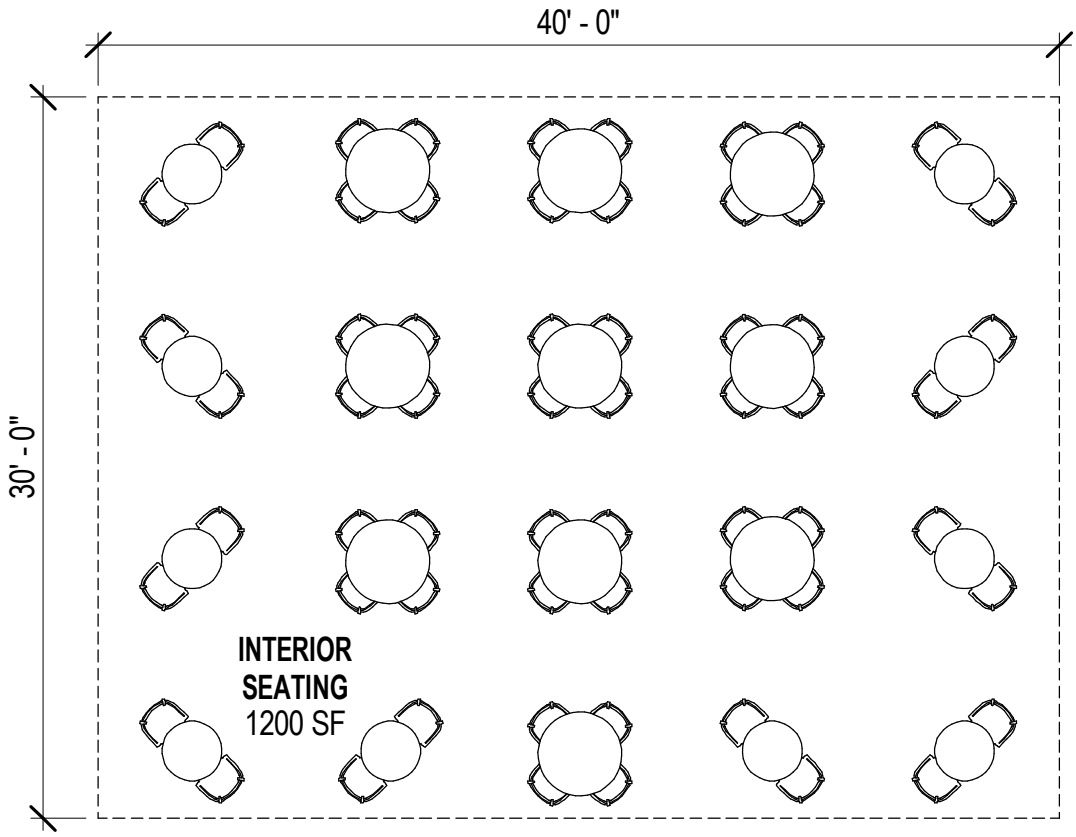
Individual Room Data Sheets / Pre-Schematic Finish Schedule

| | |
|---|---|
| **DEPARTMENT UNIT** | **Food Services** |
| **Space Name** | Coffee Shop Interior Seating |
| **Space Number** | N/A |

| | |
|---|---|
| **1. SPACE PROGRAM** | |
| General Space Description: | Seating Area |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 1,200 SF |
| (Quantity) & Location: | (1) at Level 01 |
| Purpose of Space: | Patron Seating |
| Number of Occupants: | 60 |
| Hours and Days Used: | 8am - 5pm, M-F |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | Grab & Go, Coffee Shop Cashier |
| Must Be Near To: | Main Lobby |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | Desirable |
| Doors: | Not Required |
| Floor: | Tile |
| Wall: | Painted Gypsum Board |
| Ceiling: | Acoustical Tile |
| Ceiling Height: | 9'-0" Minimum |
| Acoustics: | N/A |
| General Character of Room: | Food Services Seating |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | N/A |
| HVAC: | 72 Degrees F +/- 4 |
| Plumbing: | N/A |
| Electrical: | 120 V Outlets |
| Lighting: | LED |
| Phone / Data: | Wifi |
| Vibration Criteria: | N/A |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Tables, Chairs |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

## ROOM DATA SHEET

### Coffee Shop Interior Seating / 1,200 SF

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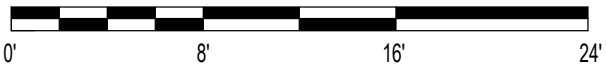


# 4 Space Program

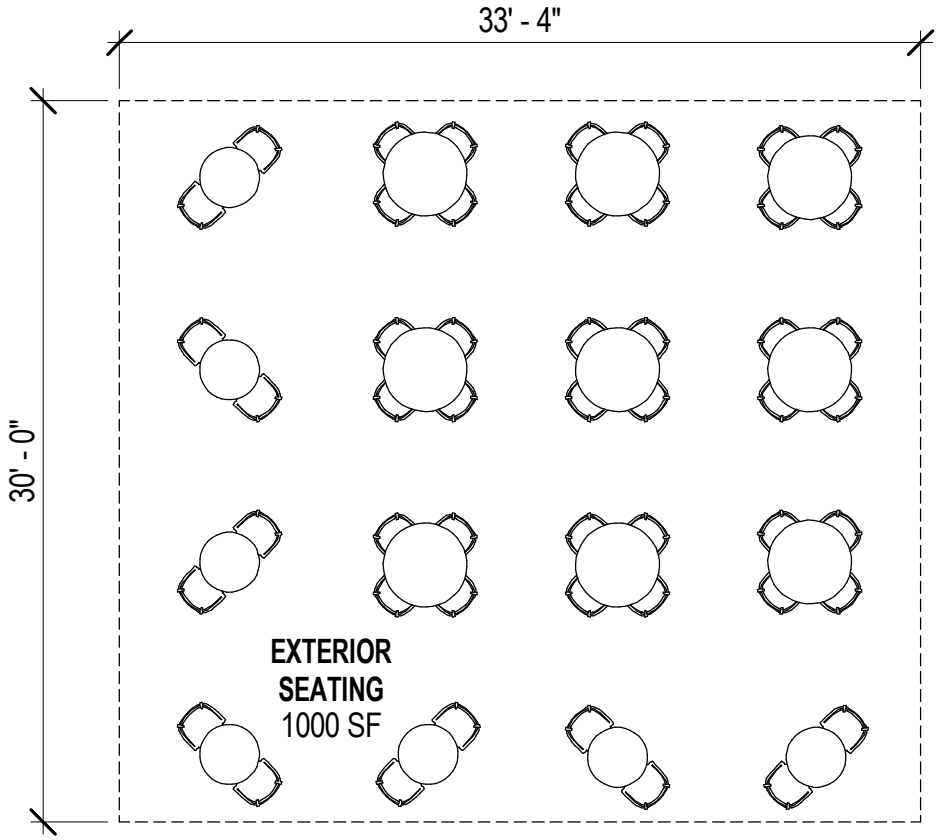
Individual Room Data Sheets / Pre-Schematic Finish Schedule

| | |
|---|---|
| **DEPARTMENT UNIT** | **Food Services** |
| **Space Name** | Coffee Shop Exterior Seating |
| **Space Number** | N/A |

| | |
|---|---|
| **1. SPACE PROGRAM** | |
| General Space Description: | Seating Area |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 1,000 SF |
| (Quantity) & Location: | (1) at Level 01 |
| Purpose of Space: | Patron Seating |
| Number of Occupants: | 50 |
| Hours and Days Used: | 8am - 5pm, M-F |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | Interior Seating |
| Must Be Near To: | Main Lobby |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | N/A |
| Doors: | N/A |
| Floor: | N/A |
| Wall: | N/A |
| Ceiling: | N/A |
| Ceiling Height: | N/A |
| Acoustics: | N/A |
| General Character of Room: | Food Services Seating |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | N/A |
| HVAC: | N/A |
| Plumbing: | N/A |
| Electrical: | N/A |
| Lighting: | N/A |
| Phone / Data: | Wifi |
| Vibration Criteria: | N/A |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Tables, Chairs |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

## ROOM DATA SHEET

### Coffee Shop Interior Seating / 1,000 SF

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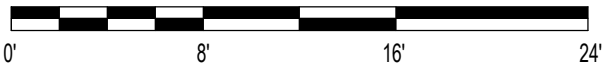


# 4 Space Program

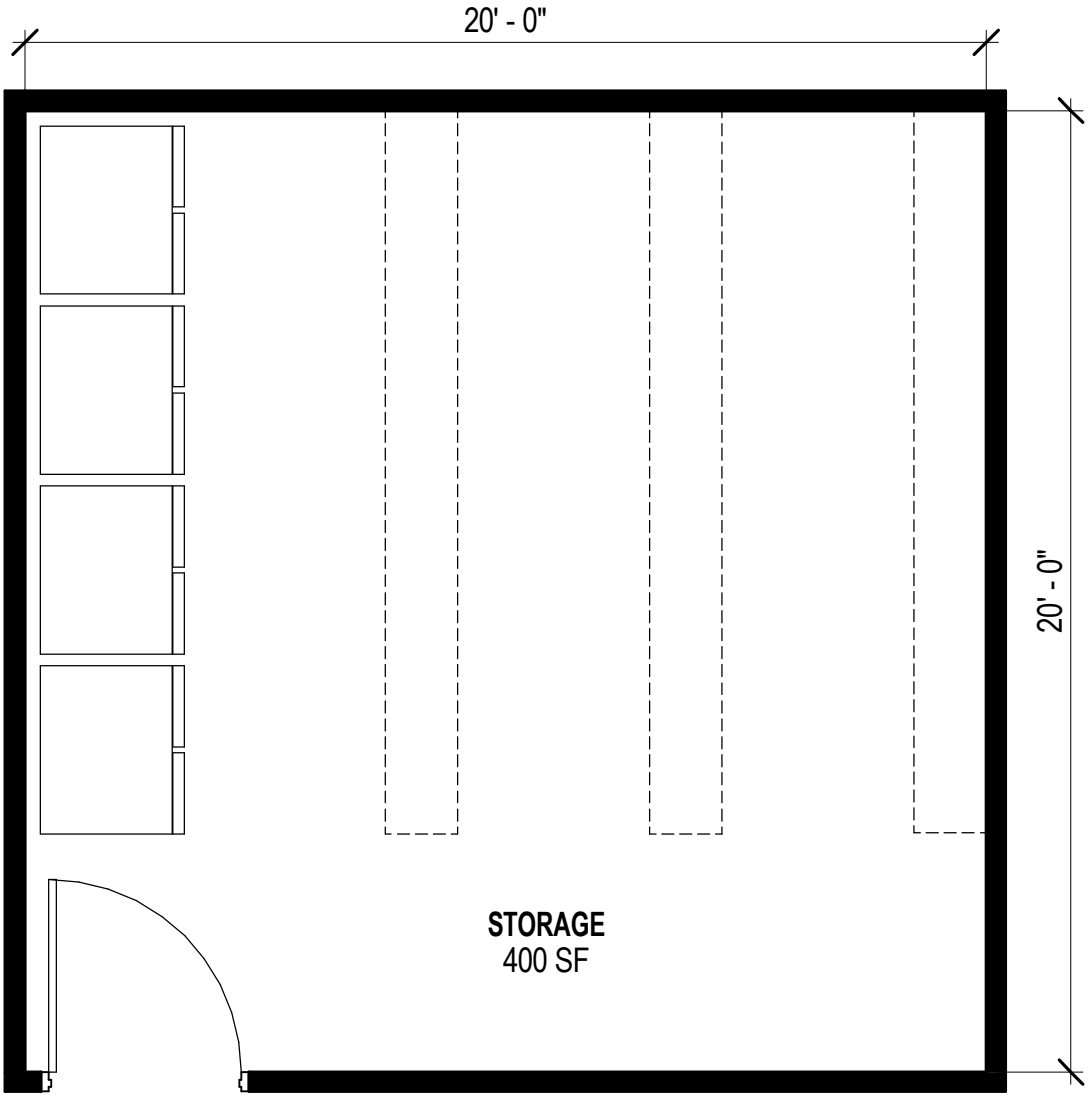
Individual Room Data Sheets / Pre-Schematic Finish Schedule

| | |
|---|---|
| **DEPARTMENT UNIT** | **Food Services** |
| **Space Name** | Coffee Shop Storage |
| **Space Number** | N/A |

| | |
|---|---|
| **1. SPACE PROGRAM** | |
| General Space Description: | Tables |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 400 SF |
| (Quantity) & Location: | (1) at Level 01 |
| Purpose of Space: | Food Services Storage |
| Number of Occupants: | 0 |
| Hours and Days Used: | 8am - 5pm, M-F |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | Coffee Shop Workroom |
| Must Be Near To: | Main Lobby |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | None |
| Doors: | 4'-0" Wide Minimum Traffic Door |
| Floor: | Tile |
| Wall: | Painted Gypsum Board, Wall Protection |
| Ceiling: | Acoustical Tile |
| Ceiling Height: | 9'-0" Minimum |
| Acoustics: | None |
| General Character of Room: | Storage Room |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | N/A |
| HVAC: | 72 Degrees F +/- 4 |
| Plumbing: | N/A |
| Electrical: | 120 V Outlets |
| Lighting: | Fluorescent/LED |
| Phone / Data: | N/A |
| Vibration Criteria: | None |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Shelving Units, Commercial Refrigerators |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

## ROOM DATA SHEET

### Coffee Shop Storage / 400 SF




SCALE: 1/4" = 1'-0"

# 4 Space Program

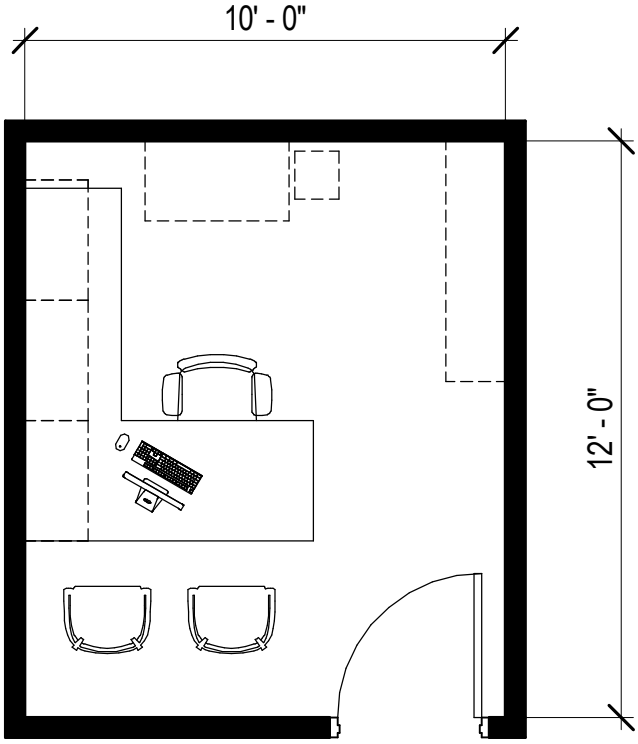
Individual Room Data Sheets / Pre-Schematic Finish Schedule

| | |
|---|---|
| **DEPARTMENT UNIT** | **Food Services** |
| **Space Name** | Coffee Shop Office |
| **Space Number** | N/A |

| | |
|---|---|
| **1. SPACE PROGRAM** | |
| General Space Description: | Office Space |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 120 SF |
| (Quantity) & Location: | (1) at Level 01 |
| Purpose of Space: | Coffee Shop Manager's Office |
| Number of Occupants: | 2 |
| Hours and Days Used: | 8am - 5pm, M-F |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | Coffee Shop Cashier |
| Must Be Near To: | Main Lobby |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | Desirable |
| Doors: | 3'-0" Wide Minimum |
| Floor: | Carpet |
| Wall: | Painted Gypsum Board |
| Ceiling: | Acoustical Tile |
| Ceiling Height: | 9'-0" minimum |
| Acoustics: | STC 45 |
| General Character of Room: | Office Space |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | N/A |
| HVAC: | 72 Degrees F +/- 4 |
| Plumbing: | N/A |
| Electrical: | 120 V Outlets |
| Lighting: | LED |
| Phone / Data: | Cat-6 Voice & Data |
| Vibration Criteria: | N/A |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Office Desk, Task Chair, Shelving, Guest Chairs, Storage Bins |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

## ROOM DATA SHEET

### Coffee Shop Office / 120 SF




SCALE: 1/4" = 1'-0"

# 4 Space Program

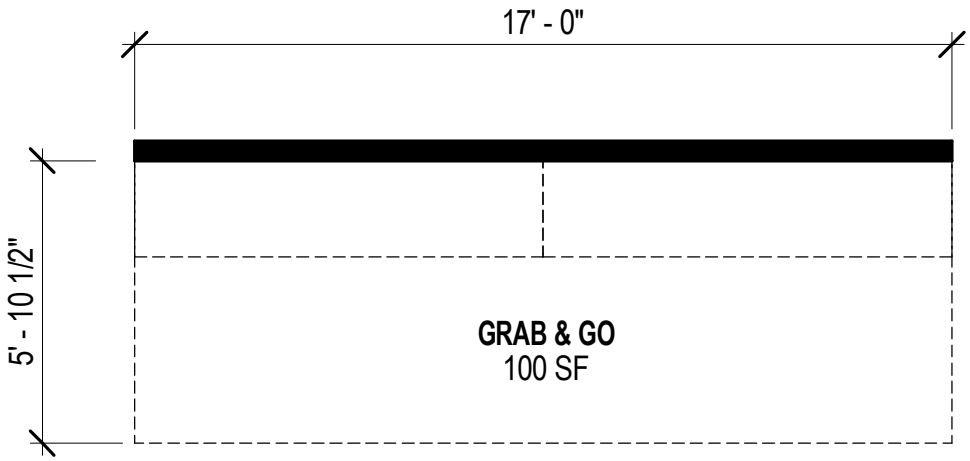
Individual Room Data Sheets / Pre-Schematic Finish Schedule

| | |
|---|---|
| **DEPARTMENT UNIT** | **Food Services** |
| **Space Name** | Grab & Go |
| **Space Number** | N/A |

| | |
|---|---|
| **1. SPACE PROGRAM** | |
| General Space Description: | Retail Display Space |
| Existing Net SF Area of Space: | N/A |
| (Quantity) & Location: | 100 SF |
| Total New SF Area: | (1) at Level 01 |
| Purpose of Space: | Grab & Go Food Display Cases |
| Number of Occupants: | 1 |
| Hours and Days Used: | 8am - 5pm, M-F |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | Coffee Shop Seating, Coffee Shop Cashier |
| Must Be Near To: | Main Lobby |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | Desirable |
| Doors: | Security Grille |
| Floor: | Tile |
| Wall: | Painted Gypsum Board |
| Ceiling: | Acoustical Tile |
| Ceiling Height: | 9'-0" Minimum |
| Acoustics: | N/A |
| General Character of Room: | Retail Display Space |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | N/A |
| HVAC: | 72 Degrees F +/- 4 |
| Plumbing: | N/A |
| Electrical: | 120 V Outlets |
| Lighting: | Fluorescent/LED |
| Phone / Data: | N/A |
| Vibration Criteria: | N/A |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Refrigerated Food Cases |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

## ROOM DATA SHEET

### Grab & Go / 100 SF




SCALE: 1/4" = 1'-0"

# 4 Space Program

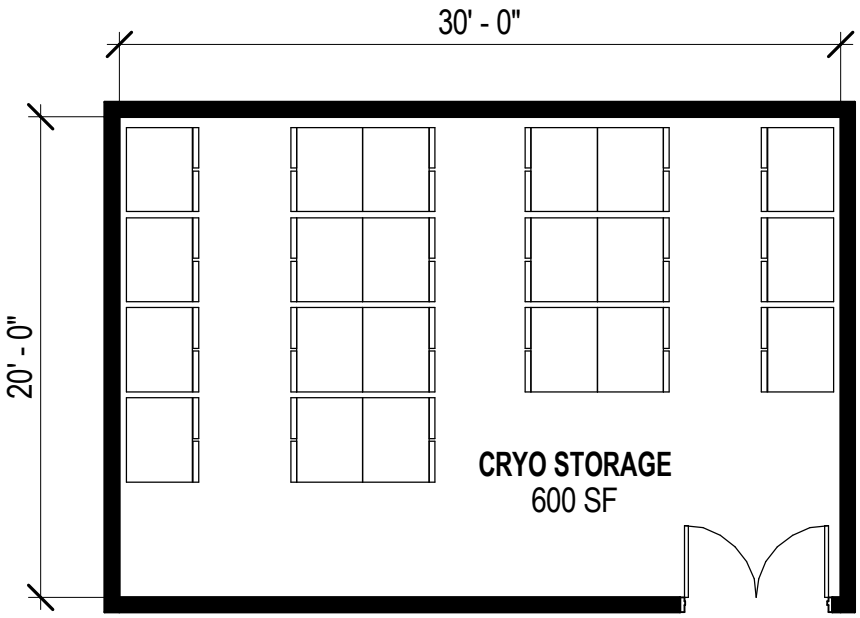
Individual Room Data Sheets / Pre-Schematic Finish Schedule

| DEPARTMENT UNIT | Dock Areas |
|---|---|
| Space Name | Cryo Storage |
| Space Number | N/A |

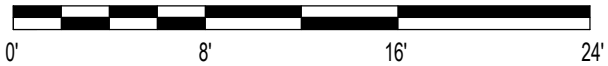
| 1. SPACE PROGRAM | |
|---|---|
| General Space Description: | Freezer Room, Misc Supplies |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 600 SF |
| (Quantity) & Location: | (1) at Level A |
| Purpose of Space: | Low Temperature Storage |
| Number of Occupants: | 2 |
| Hours and Days Used: | 12am - 12am, Su-Sa |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | N/A |
| Must Be Near To: | Upper Dock, Receiving Area |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | None |
| Doors: | 6'-0" Wide Minimum (Pair) |
| Floor: | Sealed Concrete |
| Wall: | Painted Gypsum Board, Wall Protection |
| Ceiling: | Open to Structure |
| Ceiling Height: | N/A |
| Acoustics: | N/A |
| General Character of Room: | Storage |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | Card Access |
| HVAC: | 72 Degrees F +/- 4, High Capacity Cooling, Backup Nitrogen Cooling Capacity |
| Plumbing: | Floor Drain |
| Electrical: | Dedicated 30 Amp Circuit @ Ea. Freezer, 120 V Outlets |
| Lighting: | Fluorescent/LED |
| Phone / Data: | Cat-6 Data @ Ea. Freezer (Data Alarms) |
| Vibration Criteria: | N/A |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Low Temperature Freezers, Shelving. May use Liquid Nitrogen for low temperature freezer cooling. |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | N/A |

## ROOM DATA SHEET

### Cryo Storage / 600 SF




SCALE: 1/8" = 1'-0"



# 4 Space Program

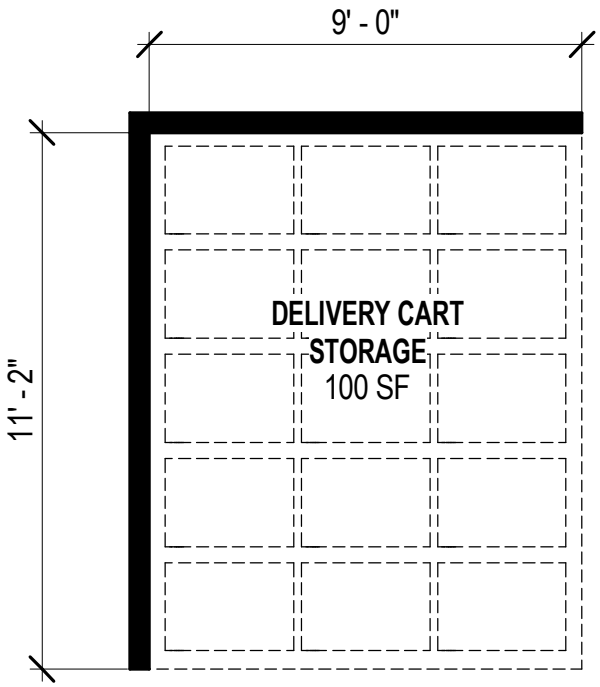
Individual Room Data Sheets / Pre-Schematic Finish Schedule

| DEPARTMENT UNIT | Dock Areas |
|---|---|
| Space Name | Delivery Cart Storage Area |
| Space Number | N/A |

| | |
|---|---|
| **1. SPACE PROGRAM** | |
| General Space Description: | Dock Storage |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 100 SF |
| (Quantity) & Location: | (1) at Level A |
| Purpose of Space: | Dock Storage |
| Number of Occupants: | 1 |
| Hours and Days Used: | 12am - 12am, Su-Sa |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | N/A |
| Must Be Near To: | Upper Dock |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | None |
| Doors: | None |
| Floor: | Sealed Concrete |
| Wall: | Painted Gypsum Board, Wall Protection |
| Ceiling: | Open to Structure |
| Ceiling Height: | N/A |
| Acoustics: | N/A |
| General Character of Room: | Storage |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | N/A |
| HVAC: | 72 Degrees F +/- 4 |
| Plumbing: | N/A |
| Electrical: | 120 V Outlets |
| Lighting: | Fluorescent/LED |
| Phone / Data: | N/A |
| Vibration Criteria: | N/A |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Delivery Carts |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

## ROOM DATA SHEET

### Delivery Cart Storage Area / 100 SF




SCALE: 1/4" = 1'-0"

# 4 Space Program

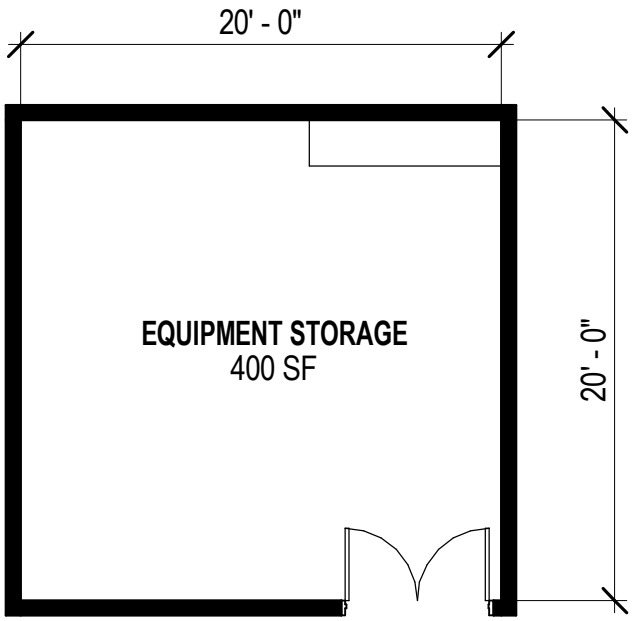
Individual Room Data Sheets / Pre-Schematic Finish Schedule

| | |
|---|---|
| **DEPARTMENT UNIT** | **Dock Areas** |
| **Space Name** | Equipment Storage Area |
| **Space Number** | N/A |

| | |
|---|---|
| **1. SPACE PROGRAM** | |
| General Space Description: | Misc Equipment Storage, Shipping Assembly, Repair Area |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 400 SF |
| (Quantity) & Location: | (1) at Level A |
| Purpose of Space: | Storage |
| Number of Occupants: | 2 |
| Hours and Days Used: | 12am - 12am, Su-Sa |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | N/A |
| Must Be Near To: | Upper Dock |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | Card Access |
| Doors: | 6'-0" Wide Minimum (Pair) |
| Floor: | Sealed Concrete |
| Wall: | Painted Gypsum Board, Wall Protection |
| Ceiling: | Open to Structure |
| Ceiling Height: | N/A |
| Acoustics: | N/A |
| General Character of Room: | General Storage, Maintenance Space |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | Card Access |
| HVAC: | 72 Degrees F +/- 4 |
| Plumbing: | N/A |
| Electrical: | 120 V Outlets |
| Lighting: | Fluorescent/LED |
| Phone / Data: | Cat-6 Voice & Data |
| Vibration Criteria: | N/A |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Small Workstation |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

## ROOM DATA SHEET

### Equipment Storage Area / 400 SF



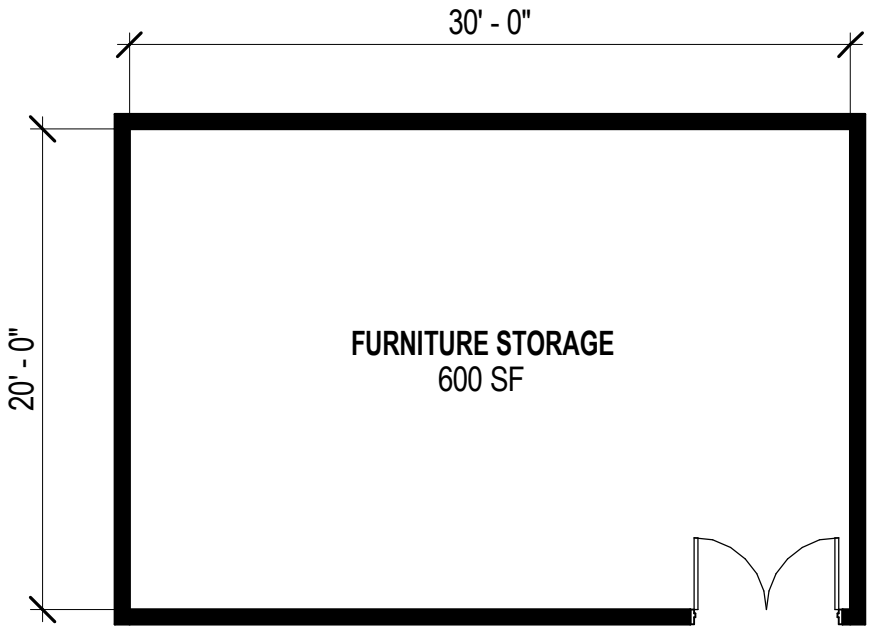

SCALE: 1/8" = 1'-0"

| DEPARTMENT UNIT | Dock Areas |
|---|---|
| Space Name | Furniture Storage |
| Space Number | N/A |

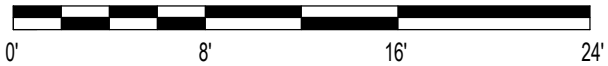
| 1. SPACE PROGRAM | |
|---|---|
| General Space Description: | Misc Furniture & Equipment Storage |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 600 SF |
| (Quantity) & Location: | (1) at Level A |
| Purpose of Space: | Storage |
| Number of Occupants: | 2 |
| Hours and Days Used: | 12am - 12am, Su-Sa |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | N/A |
| Must Be Near To: | Upper Dock |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | None |
| Doors: | 6'-0" Wide Minimum (Pair) |
| Floor: | Sealed Concrete |
| Wall: | Painted Gypsum Board, Wall Protection |
| Ceiling: | Open to Structure |
| Ceiling Height: | N/A |
| Acoustics: | N/A |
| General Character of Room: | General Storage |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | Card Access |
| HVAC: | 72 Degrees F +/- 4 |
| Plumbing: | N/A |
| Electrical: | 120 V Outlets |
| Lighting: | Fluorescent/LED |
| Phone / Data: | N/A |
| Vibration Criteria: | N/A |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | N/A |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

## ROOM DATA SHEET

### Furniture Storage / 600 SF




SCALE: 1/8" = 1'-0"

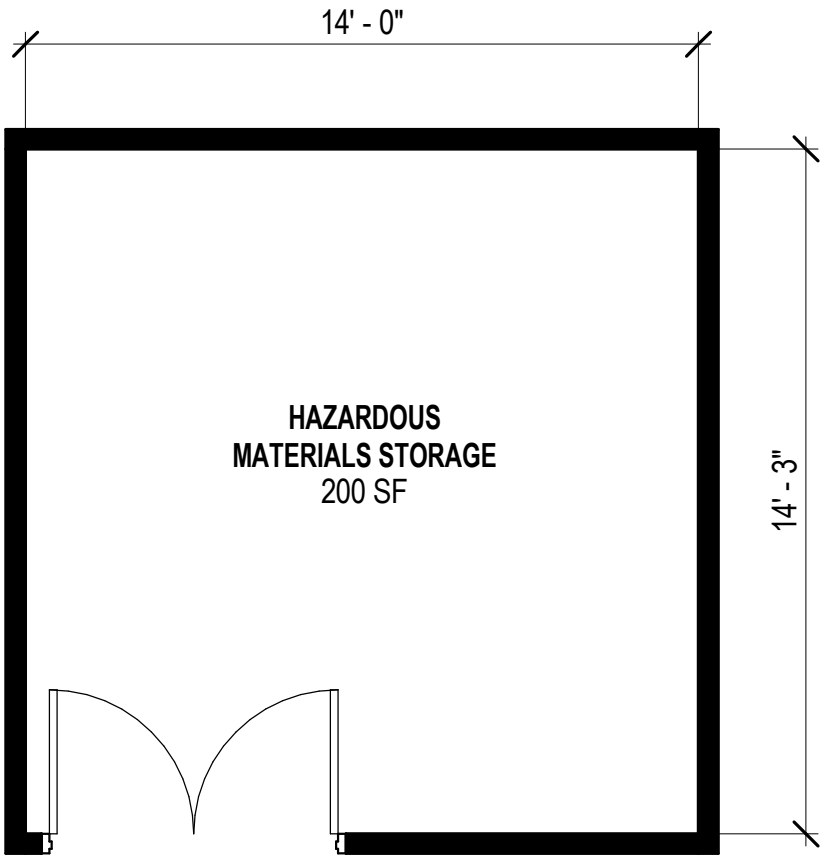


| DEPARTMENT UNIT | Dock Areas |
|---|---|
| Space Name | Hazardous Materials Storage |
| Space Number | N/A |

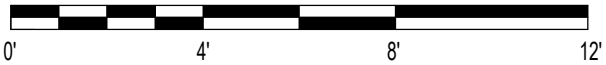
| 1. SPACE PROGRAM | |
|---|---|
| General Space Description: | Storage |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 200 SF |
| (Quantity) & Location: | (1) at Level A |
| Purpose of Space: | Storage |
| Number of Occupants: | 1 |
| Hours and Days Used: | 12am - 12am, Su-Sa |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | N/A |
| Must Be Near To: | Upper Dock |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | Card Access |
| Doors: | 6'-0" Wide Minimum (Pair) |
| Floor: | Sealed Concrete |
| Wall: | Painted Gypsum Board, Wall Protection |
| Ceiling: | Open to Structure |
| Ceiling Height: | N/A |
| Acoustics: | N/A |
| General Character of Room: | General Storage, Maintenance Space |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | Card Access |
| HVAC: | 72 Degrees F +/- 4, Exhaust |
| Plumbing: | N/A |
| Electrical: | 120 V Outlets |
| Lighting: | Fluorescent/LED |
| Phone / Data: | Cat-6 Voice & Data |
| Vibration Criteria: | N/A |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | N/A |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

## ROOM DATA SHEET

### Hazardous Materials Storage / 200 SF




SCALE: 1/4" = 1'-0"



# 4 Space Program

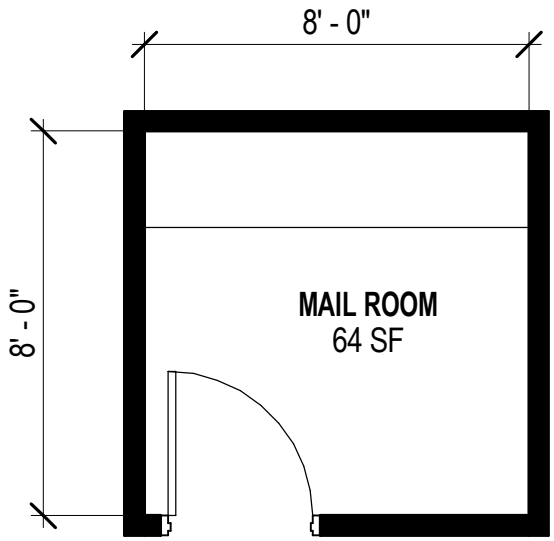
Individual Room Data Sheets / Pre-Schematic Finish Schedule

| DEPARTMENT UNIT | Dock Areas |
|---|---|
| Space Name | Mail Room |
| Space Number | N/A |

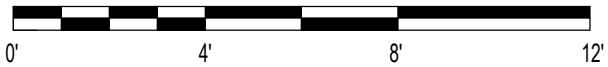
| 1. SPACE PROGRAM | |
|---|---|
| General Space Description: | Mail Room |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 64 SF |
| (Quantity) & Location: | (1) at Level A |
| Purpose of Space: | Drop Off Space For Mail & Sort |
| Number of Occupants: | 1 |
| Hours and Days Used: | 12am - 12am, Su-Sa |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | N/A |
| Must Be Near To: | Upper Dock |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | None |
| Doors: | 3'-0" Wide Minimum |
| Floor: | Sealed Concrete |
| Wall: | Painted Gypsum Board, Wall Protection |
| Ceiling: | Acoustical Tile |
| Ceiling Height: | 9'-0" Minimum |
| Acoustics: | N/A |
| General Character of Room: | Mail Room |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | Card Access |
| HVAC: | 72 Degrees F +/- 4 |
| Plumbing: | N/A |
| Electrical: | 120 V Outlets |
| Lighting: | Fluorescent/LED |
| Phone / Data: | Cat-6 Data & Voice |
| Vibration Criteria: | N/A |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Casework, Countertop |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

## ROOM DATA SHEET

### Mail Room / 64 SF




SCALE: 1/4" = 1'-0"

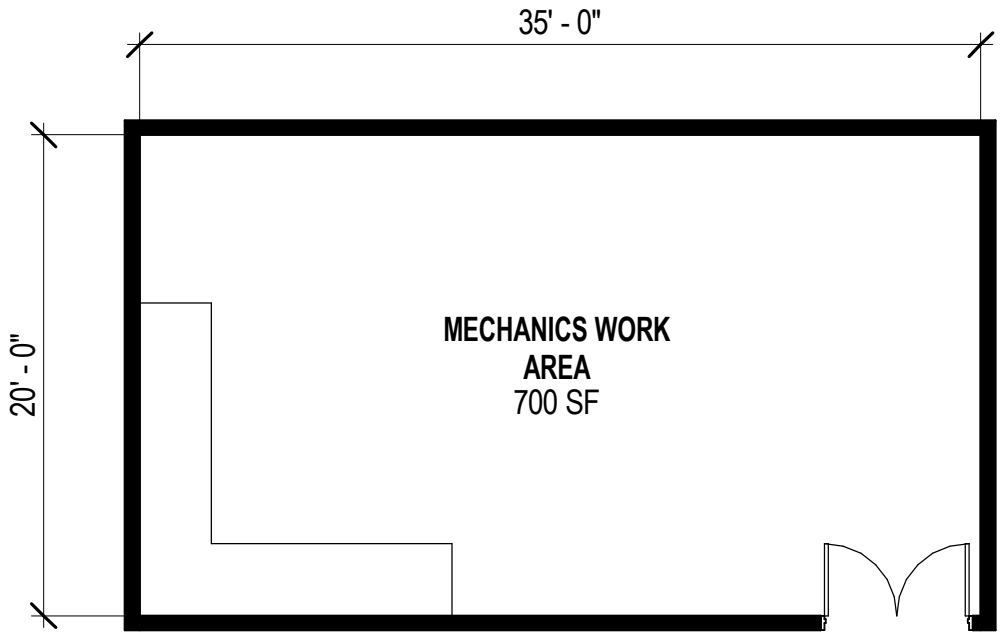


| DEPARTMENT UNIT | Dock Areas |
|---|---|
| Space Name | Mechanics Work Area |
| Space Number | N/A |

| 1. SPACE PROGRAM | |
|---|---|
| General Space Description: | Work Area For F&E, Tool Storage |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 700 SF |
| (Quantity) & Location: | (1) at Level A |
| Purpose of Space: | Maintenance |
| Number of Occupants: | 3 |
| Hours and Days Used: | 12am - 12am, Su-Sa |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | N/A |
| Must Be Near To: | Upper Dock |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | None |
| Doors: | 6'-0" Wide Minimum (Pair) |
| Floor: | Sealed Concrete |
| Wall: | Painted Gypsum Board, Wall Protection |
| Ceiling: | Open to Structure |
| Ceiling Height: | N/A |
| Acoustics: | N/A |
| General Character of Room: | Maintenance |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | Card Access |
| HVAC: | 72 Degrees F +/- 4 |
| Plumbing: | Floor Drain |
| Electrical: | 120 V Outlets, 208 V Outlets |
| Lighting: | Fluorescent/LED |
| Phone / Data: | Cat-6 Data & Voice |
| Vibration Criteria: | N/A |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | (2) Workstations |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

## ROOM DATA SHEET

### Mechanics Work Area / 700 SF




SCALE: 1/8" = 1'-0"

# 4 Space Program

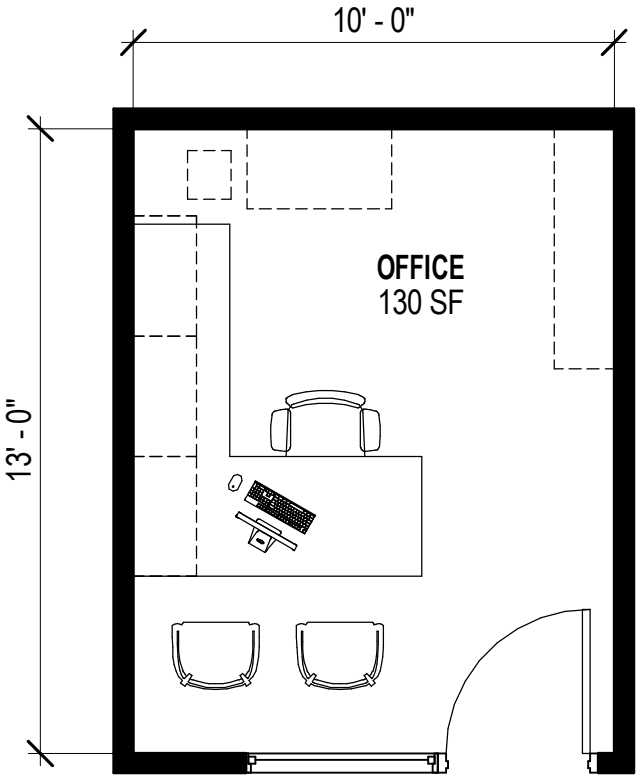
Individual Room Data Sheets / Pre-Schematic Finish Schedule

| DEPARTMENT UNIT | Dock Areas |
|---|---|
| Space Name | Office |
| Space Number | N/A |

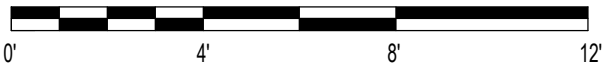
| 1. SPACE PROGRAM | |
|---|---|
| General Space Description: | Dock Office |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 130 SF |
| (Quantity) & Location: | (1) at Level A |
| Purpose of Space: | Staff Office |
| Number of Occupants: | 2 |
| Hours and Days Used: | 12am - 12am, Su-Sa |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | Upper Dock |
| Must Be Near To: | N/A |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | To Dock |
| Doors: | 3'-0" Wide Minimum |
| Floor: | Tile |
| Wall: | Painted Gypsum Board |
| Ceiling: | Acoustical Tile |
| Ceiling Height: | 9'-0" Minimum |
| Acoustics: | STC 45 |
| General Character of Room: | Office |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | N/A |
| HVAC: | 72 Degrees F +/- 4 |
| Plumbing: | N/A |
| Electrical: | 120 V Outlets |
| Lighting: | Fluorescent/LED |
| Phone / Data: | Cat-6 Data & Voice |
| Vibration Criteria: | N/A |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Office Desk, Task Chair, Shelving, Guest Chairs |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

## ROOM DATA SHEET

### Office / 130 SF




SCALE: 1/4" = 1'-0"



# 4 Space Program

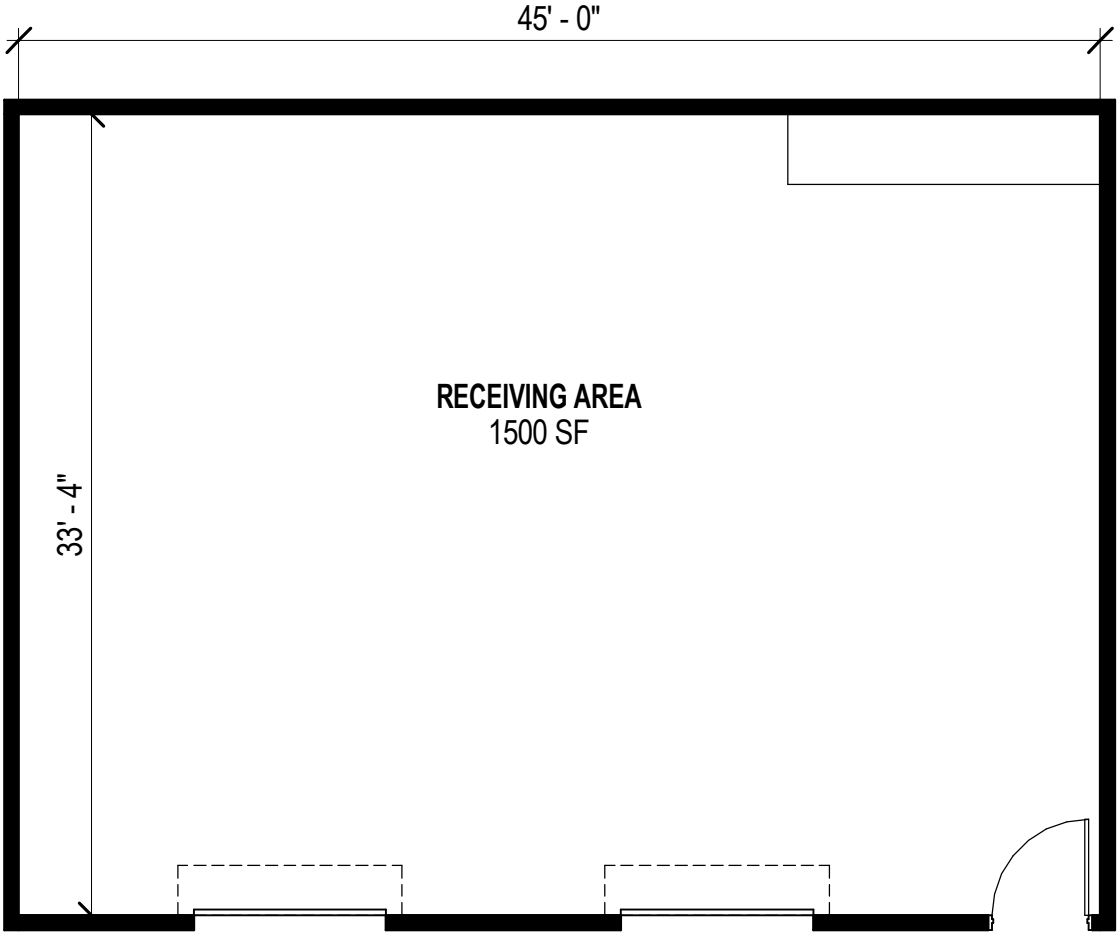
Individual Room Data Sheets / Pre-Schematic Finish Schedule

| DEPARTMENT UNIT | Dock Areas |
|---|---|
| Space Name | Receiving Areas |
| Space Number | N/A |

| | |
|---|---|
| **1. SPACE PROGRAM** | |
| General Space Description: | Pallet & Equipment Space Unloading |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 1,500 SF |
| (Quantity) & Location: | (1) at Level A |
| Purpose of Space: | Shipping Unloading |
| Number of Occupants: | 5 |
| Hours and Days Used: | 12am - 12am, Su-Sa |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | Service Corridor |
| Must Be Near To: | Upper Dock, Cyclotron, Vivarium |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | None |
| Doors: | 4'-0" Wide Minimum, (2) Dock Doors |
| Floor: | Sealed Concrete |
| Wall: | Painted Gypsum Board, Wall Protection |
| Ceiling: | Open to Structure |
| Ceiling Height: | N/A |
| Acoustics: | N/A |
| General Character of Room: | Shipping Unloading |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | Card Access |
| HVAC: | 72 Degrees F +/- 4 |
| Plumbing: | N/A |
| Electrical: | 120 V Outlets |
| Lighting: | Fluorescent/LED |
| Phone / Data: | Cat-6 Data & Voice |
| Vibration Criteria: | N/A |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Workstation, Dock Levelers |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

## ROOM DATA SHEET

### Receiving Areas / 1,500 SF



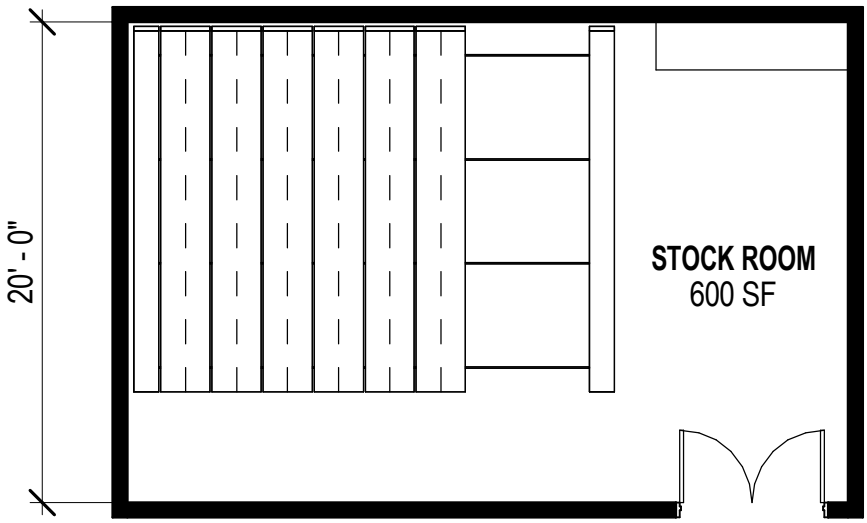

SCALE: 1/8" = 1'-0"

| DEPARTMENT UNIT | Dock Areas |
|---|---|
| Space Name | Stock Room |
| Space Number | N/A |

| 1. SPACE PROGRAM | |
|---|---|
| General Space Description: | Supply Room For Distribution |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 600 SF |
| (Quantity) & Location: | (1) at Level A |
| Purpose of Space: | Storage |
| Number of Occupants: | 2 |
| Hours and Days Used: | 12am - 12am, Su-Sa |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | N/A |
| Must Be Near To: | Upper Dock |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | None |
| Doors: | 6'-0" Wide Minimum (Pair) |
| Floor: | Sealed Concrete |
| Wall: | Painted Gypsum Board, Wall Protection |
| Ceiling: | Open to Structure |
| Ceiling Height: | N/A |
| Acoustics: | N/A |
| General Character of Room: | Distribution |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | Card Access |
| HVAC: | 72 Degrees F +/- 4 |
| Plumbing: | N/A |
| Electrical: | 120 V Outlets |
| Lighting: | Fluorescent/LED |
| Phone / Data: | Cat-6 Data & Voice |
| Vibration Criteria: | N/A |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Mobile Shelving System w/ Recessed Track System, Small Workstation |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

## ROOM DATA SHEET

### Stock Room / 600 SF



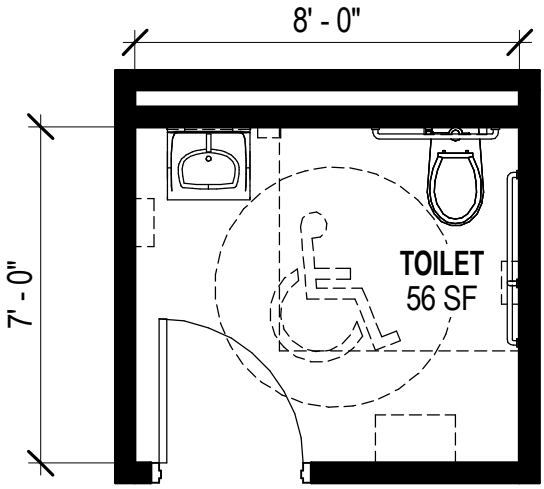

SCALE: 1/8" = 1'-0"

| DEPARTMENT UNIT | Dock Areas |
|---|---|
| Space Name | Toilet |
| Space Number | N/A |

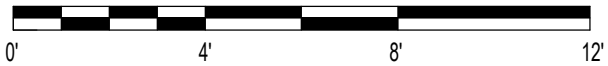
| 1. SPACE PROGRAM | |
|---|---|
| General Space Description: | Single Water Closet Toilet Room |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 56 SF |
| (Quantity) & Location: | (1) at Level A |
| Purpose of Space: | Toilet |
| Number of Occupants: | 0 |
| Hours and Days Used: | 12am - 12am, Su-Sa |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | N/A |
| Must Be Near To: | Upper Dock |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | None |
| Doors: | 3'-0" Wide Minimum |
| Floor: | Sealed Concrete |
| Wall: | Painted Gypsum Board, Rubber Base |
| Ceiling: | Painted Gypsum Board |
| Ceiling Height: | 8'-0" Minimum |
| Acoustics: | STC 45 |
| General Character of Room: | Toilet Room |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | N/A |
| HVAC: | 72 Degrees F +/- 4, Exhaust |
| Plumbing: | Wall-Hung Water Closet, Wall-Hung Handwash Sink |
| Electrical: | 120 V GFCI Outlets |
| Lighting: | Fluorescent/LED |
| Phone / Data: | N/A |
| Vibration Criteria: | N/A |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Mirror, Soap Dispenser, Toilet Paper Dispenser, Seat Cover Dispenser, Paper Towel Dispenser, Grab Bars, Trash Receptacle |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

## ROOM DATA SHEET

### Toilet / 56 SF




SCALE: 1/4" = 1'-0"

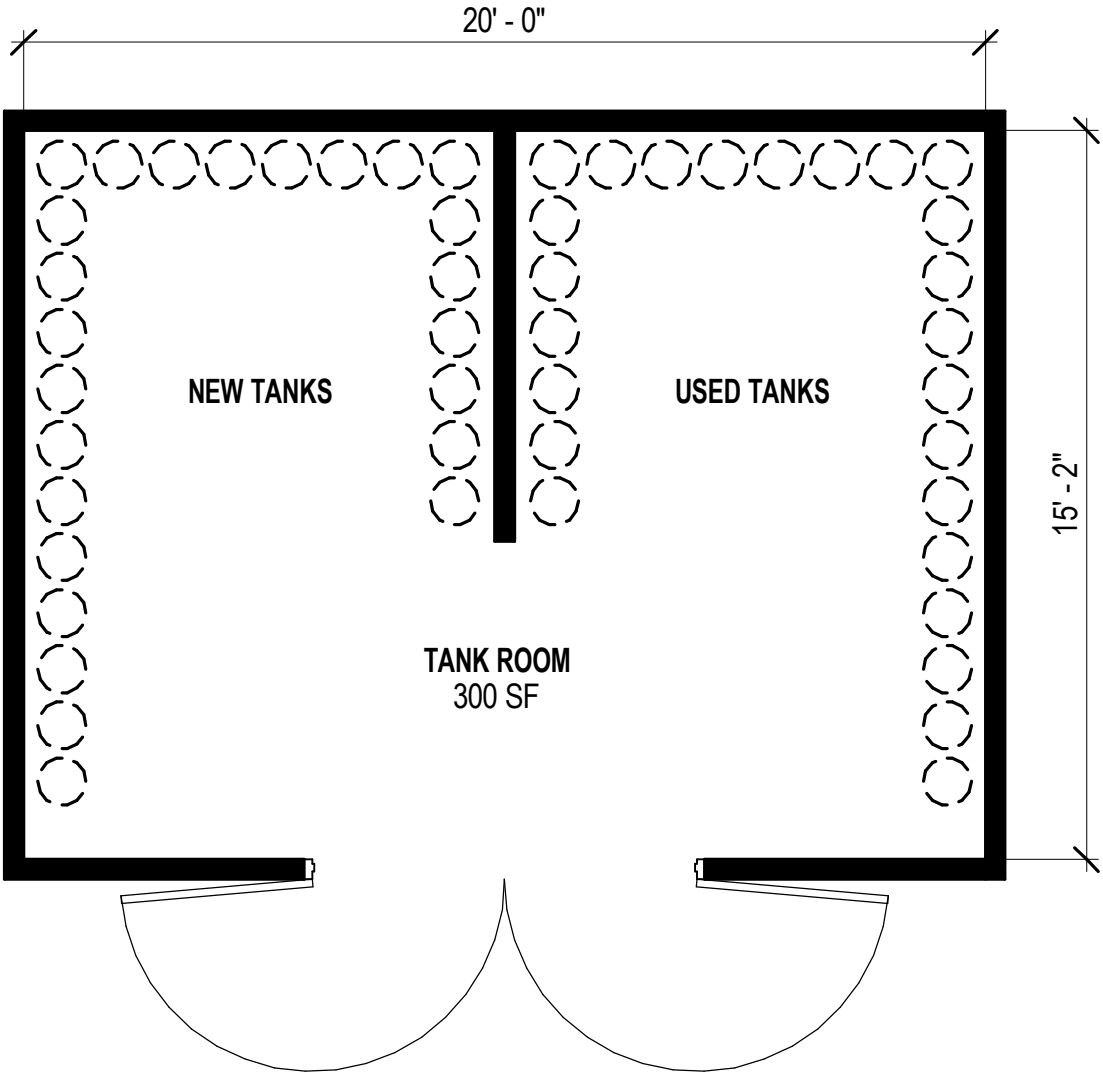


| DEPARTMENT UNIT | Dock Areas |
|---|---|
| Space Name | Tank Room |
| Space Number | N/A |

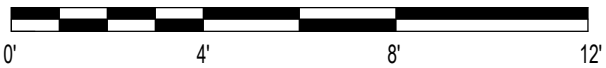
| 1. SPACE PROGRAM | |
|---|---|
| General Space Description: | Storage Room |
| Existing Net SF Area of Space: | N/A |
| Total New SF Area: | 300 SF |
| (Quantity) & Location: | (1) at Level A |
| Purpose of Space: | Storage Room For Tanks Containing Lab Gases |
| Number of Occupants: | 1 |
| Hours and Days Used: | 12am - 12am, Su-Sa |
| **2. PROXIMITY AND ACCESS REQUIREMENTS** | |
| Must Be Adjacent To: | N/A |
| Must Be Near To: | Upper Dock |
| **3. ARCHITECTURAL CHARACTERISTICS** | |
| Windows: | None |
| Doors: | 8'-0" Wide Minimum (Pair) |
| Floor: | Sealed Concrete |
| Wall: | Painted Gypsum Board, Wall Protection |
| Ceiling: | Open to Structure |
| Ceiling Height: | N/A |
| Acoustics: | N/A |
| General Character of Room: | Storage Room |
| **4. ENGINEERING SYSTEM** | |
| Security Electronics: | Card Access |
| HVAC: | 72 Degrees F +/- 4, Independent Exhaust |
| Plumbing: | N/A |
| Electrical: | 120 V Outlets |
| Lighting: | Fluorescent/LED |
| Phone / Data: | N/A |
| Vibration Criteria: | N/A |
| **5. EQUIPMENT, FURNITURE AND ACCESSORIES** | |
| | Nitrogen, CO2 & Oxygen Storage Tanks. Liquid Nitrogen may be a stand alone tank filled on site. |
| **6. OTHER COMMENTS AND SPECIAL NOTES** | |
| | None |

## ROOM DATA SHEET

### Tank / 300 SF




SCALE: 1/4" = 1'-0"



## 4.4 BUILDING SPACE UTILIZATION EFFICIENCY

To provide an accurate net to GSF building utilization efficiency the following areas are removed from the individual space programming and added to the building gross square footage calculations:

- Mechanical spaces/shafts
- General circulation
- Lobby spaces
- Elevators
- Stairways
- Housekeeping

| Building Efficiency Rate | | Phase IV New Construction | | | Renovation of Phase I | | | |
|---|---|---|---|---|---|---|---|---|
| No. | Unit | NSF | Eff. Rate | GSF | NSF | Eff. Rate | GSF | Comments |
| 1 | Level A | 16,908 | 46% | 36,434 | 3,632 | | 4,080 | |
| 2 | Level 01 | 19,253 | 63% | 30,223 | 5,592 | | 7,130 | |
| 3 | Level 02 | 21,086 | 68% | 30,977 | 5,285 | | 6,469 | |
| 4 | Level 03 | 21,766 | 68% | 32,201 | 600 | | 673 | |
| 5 | Level 04 | 21,766 | 68% | 32,130 | - | | - | |
| 6 | Level 05 | 22,680 | 73% | 31,089 | - | | - | |
| 7 | Level 06 | 5,646 | 18% | 31,202 | 600 | | 673 | |
| | | NSF | | DGSF | NSF | | DGSF | |
| | **TOTALS** | **129,105** | **57.5%** | **224,256** | **15,709** | | **19,025** | |
| | | | | | | | | |

## 5.0 PROJECT COST ESTIMATE

Parametrix, Inc.

The current CBE construction budget is $78,227,964. This present preliminary estimate is slightly over the budget. A CM/GC selection process has commenced. Upon selection, the CM/GC will verify the construction budget. If the budget is still over at that time value engineering will occur.

**Notes:**
- Costs are for construction only
- Costs are based on an open competitive bid basis
- Costs are based upon construction start of May 2014
- Costs include contractor mark-ups
- Costs DO NOT include contingency

**Master Summary**

| SECTION | | | COST / SF | COST |
|---|---|---|---|---|
| Building and Site | 222,130 | GSF | 361.00 | $80,166,000 |
| | | | | |
| Additional Scope Cyclotron Shell | 5,043 | GSF | 314.00 | $1,583,000 |
| | | | | |
| Additional Scope Renovation of Phase I | | To Be Determined | | |

**Cost Summary**

| SECTION | | | COST / SF | COST |
|---|---|---|---|---|
| **Building** | | | | |
| Level A | 30,775 | GSF | 352.00 | $10,819,000 |
| Level 1 | 29,630 | GSF | 349.00 | $10,345,000 |
| Level 2 | 30,370 | GSF | 388.00 | $11,771,000 |
| Level 3 | 31,570 | GSF | 386.00 | $12,184,000 |
| Level 4 | 31,500 | GSF | 385.00 | $12,136,000 |
| Level 5 | 30,480 | GSF | 299.00 | $9,111,000 |
| Level 6 | 30,590 | GSF | 181.00 | $5,548,000 |
| Connections to Phase I | 2,860 | GSF | 362.00 | $1,034,000 |
| Circulation | 4,355 | GSF | 265.00 | $1,154,000 |
| | | | | |
| **TOTAL (Building)** | **222,130** | **GSF** | **334.00** | **$74,102,000** |
| | | | | |
| **Site** | | | | |
| Site Improvements | 130,000 | SF | 38.00 | $4,964,000 |
| Site Utilities | 130,000 | SF | 8.00 | $1,100,000 |
| | | | | |
| **TOTAL (Site)** | **130,000** | **SF** | **47.00** | **$6,064,000** |
| | | | | |
| **TOTAL (Site and Building)** | **222,130** | **GSF** | **361.00** | **$80,166,000** |

# 5 Project Cost Estimate

**Construction Cost Estimate**

| BUILDING | | | | |
|---|---|---|---|---|
| SECTION | | UNIT | UNIT COST | COST |
| **Level A** | | | | |
| Mechanical / Electrical / IT | 10,460 | NSF | 225.00 | $2,354,000 |
| Dock (Interior) | 6,070 | NSF | 275.00 | $1,669,000 |
| Vivarium | 7,308 | NSF | 650.00 | $4,750,000 |
| Cyclotron Shell | | | | In other budget |
| Common Area | 1,808 | NSF | 380.00 | $687,000 |
| | | | | |
| Sub-Total | 25,646 | NSF | 369.00 | $9,460,000 |
| | | | | |
| Net to Gross Ratio - 20% | 5,129 | GSF | 265.00 | $1,359,000 |
| | | | | |
| **Sub-Total** | **30,775** | **GSF** | **352.00** | **$10,819,000** |
| | | | | |
| | | | | |
| | | | | |
| **Level 1** | | | | |
| Lab Support | 2,840 | NSF | 520.00 | $1,477,000 |
| Coffee Shop / Grab and Go Station | 2,250 | NSF | 335.00 | $754,000 |
| Mechanical / Electrical / IT | 3,275 | NSF | 240.00 | $786,000 |
| Common Area (Includes auditorium) | 10,571 | NSF | 415.00 | $4,387,000 |
| Offices / Dry Lab | 5,352 | NSF | 285.00 | $1,525,000 |
| | | | | |
| Sub-Total | 24,288 | NSF | 368.00 | $8,929,000 |
| | | | | |
| Net to Gross Ratio - 22% | 5,342 | GSF | 265.00 | $1,416,000 |
| | | | | |
| **Sub-Total** | **29,630** | **GSF** | **349.00** | **$10,345,000** |
| | | | | |
| | | | | |
| | | | | |

| BUILDING | | | | |
|---|---|---|---|---|
| SECTION | | UNIT | UNIT COST | COST |
| **Level 2** | | | | |
| Mechanical (shafts) | 501 | NSF | 225.00 | $113,000 |
| Electrical / IT | 420 | NSF | 225.00 | $95,000 |
| Laboratories | 14,800 | NSF | 465.00 | $6,882,000 |
| Open Offices | 3,062 | NSF | 265.00 | $811,000 |
| Common Area | 6,952 | NSF | 380.00 | $2,642,000 |
| | | | | |
| Sub-Total | 25,735 | NSF | 410.00 | $10,543,000 |
| | | | | |
| Net to Gross Ratio - 18% | 4,635 | GSF | 265.00 | $1,228,000 |
| | | | | |
| **Sub-Total** | **30,370** | **GSF** | **388.00** | **$11,771,000** |
| | | | | |
| | | | | |
| | | | | |
| **Level 3** | | | | |
| Mechanical / Electrical / IT | 1,057 | NSF | 225.00 | $238,000 |
| Laboratories | 14,800 | NSF | 465.00 | $6,882,000 |
| Offices | 3,062 | NSF | 265.00 | $811,000 |
| Common Area | 7,832 | | 380.00 | $2,976,000 |
| | | | | |
| Sub-Total | 26,751 | NSF | 408.00 | $10,907,000 |
| | | | | |
| Net to Gross Ratio - 18% | 4,819 | GSF | 265.00 | $1,277,000 |
| | | | | |
| **Sub-Total** | **31,570** | **GSF** | **386.00** | **$12,184,000** |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

# 5 Project Cost Estimate

| BUILDING | | | | |
|---|---|---|---|---|
| SECTION | | UNIT | UNIT COST | COST |
| **Level 4** | | | | |
| Mechanical / Electrical / IT | 1,197 | NSF | 225.00 | $269,000 |
| Laboratories | 14,800 | NSF | 465.00 | $6,882,000 |
| Open Offices | 3,062 | NSF | 265.00 | $811,000 |
| Common Area | 7,632 | NSF | 380.00 | $2,900,000 |
| | | | | |
| Sub-Total | 26,691 | NSF | 407.00 | $10,862,000 |
| | | | | |
| Net to Gross Ratio - 18% | 4,809 | GSF | 265.00 | $1,274,000 |
| | | | | |
| **Sub-Total** | **31,500** | **GSF** | **385.00** | **$12,136,000** |
| | | | | |
| | | | | |
| | | | | |
| **Level 5** | | | | |
| Mechanical / Electrical / IT | 1,491 | NSF | 225.00 | $335,000 |
| Offices / Dry Laboratory | 18,768 | NSF | 285.00 | $5,349,000 |
| Common Area | 6,248 | | 380.00 | $2,374,000 |
| | | | | |
| Sub-Total | 26,507 | NSF | **304.00** | $8,058,000 |
| | | | | |
| Net to Gross Ratio - 15% | 3,973 | GSF | **265.00** | $1,053,000 |
| | | | | |
| **Sub-Total** | **30,480** | **GSF** | **299.00** | **$9,111,000** |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

| BUILDING | | | | |
|---|---|---|---|---|
| SECTION | | UNIT | UNIT COST | COST |
| **Level 6** | | | | |
| Mechanical / Electrical / IT (penthouse) | 20,904 | NSF | 125.00 | $2,613,000 |
| Offices | 4,480 | NSF | 285.00 | $1,277,000 |
| Common Area | 2,422 | NSF | 380.00 | $920,000 |
| | | | | |
| Sub-Total | 27,806 | NSF | 173.00 | $4,810,000 |
| | | | | |
| Net to Gross Ratio - 10% | 2,784 | GSF | 265.00 | $738,000 |
| | | | | |
| **Sub-Total** | **30,590** | **GSF** | **181.00** | **$5,548,000** |
| | | | | |
| | | | | |
| | | | | |
| **Connections to Phase I** | | | | |
| Connecting Tunnel - Level A | 2,000 | NSF | 290.00 | $580,000 |
| Bridge Connection - Level 3 | 600 | NSF | 600.00 | $360,000 |
| | | | | |
| Sub-Total | 2,600 | NSF | 362.00 | $940,000 |
| | | | | |
| Net to Gross Ratio - 10% | 260 | GSF | 362.00 | $94,000 |
| | | | | |
| **Sub-Total** | **2,860** | **GSF** | **362.00** | **$1,034,000** |
| | | | | |
| | | | | |
| **SUB - TOTAL (LEVELS A - 6)** | **217,775** | **GSF** | **335.00** | **$72,948,000** |
| | | | | |
| **CIRCULATION** | | | | |
| Circulation (main corridors only) 2% | **4,355** | **GSF** | **265.00** | **$1,154,000** |
| | | | | |
| **TOTAL (BUILDING)** | **222,130** | **GSF** | **334.00** | **$74,102,000** |

# 5 Project Cost Estimate

| SITE | | | | |
|---|---|---|---|---|
| SECTION | | UNIT | UNIT COST | COST |
| **Site Improvements** | | | | |
| Earthwork | 130,000 | SF | 12.00 | $1,560,000 |
| Rooftop Garden / Plaza | 5,500 | SF | 60.00 | $330,000 |
| Paving / Walks (included exterior dock) | 68,000 | SF | 18.00 | $1,224,000 |
| Retaining / Screen Walls | 27,000 | SF | 50.00 | $1,350,000 |
| Landscaping | 30,000 | SF | 10.00 | $300,000 |
| Specialties / Miscellaneous Items | 1 | LS | 200,000 | $200,000 |
| | | | | |
| **Sub-Total** | **130,000** | **SF** | **38.00** | **$4,964,000** |
| | | | | |
| | | | | |
| | | | | |
| **Site Utilities** | | | | |
| Civil Utilities, Allowance | 1 | LS | 500,000 | $500,000 |
| Mechanical Infrastructure, Allowance | 1 | LS | 250,000 | $250,000 |
| Electrical Infrastructure, Allowance | 1 | LS | 350,000 | $350,000 |
| | | | | |
| **Sub-Total** | **130,000** | **SF** | **8.00** | **$1,100,000** |
| | | | | |
| **TOTAL (SITE)** | **130,000** | **SF** | **47.00** | **$6,064,000** |
| | | | | |
| **TOTAL BUILDING AND SITE** | **222,130** | **GSF** | **361.00** | **$80,166,000** |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

| ADDITIONAL SCOPE | | | | |
|---|---|---|---|---|
| SECTION | | UNIT | UNIT COST | COST |
| **Cyclotron Shell** | | | | |
| Cyclotron Shell | 4,120 | NSF | 325.00 | $1,339,000 |
| | | | | |
| Sub-Total | 4,120 | NSF | 325.00 | $1,339,000 |
| | | | | |
| Net to Gross Ratio - 25% | 824 | GSF | 265.00 | $218,000 |
| | | | | |
| **Sub-Total** | **4,944** | **GSF** | **315.00** | **$1,557,000** |
| | | | | |
| **CIRCULATION** | | | | |
| Circulation (main corridors only) 2% | **99** | **GSF** | **265.00** | **$26,000** |
| | | | | |
| **TOTAL (CYCLOTRON SHELL)** | **5,043** | **GSF** | **314.00** | **$1,583,000** |
| | | | | |
| | | | | |
| | | | | |
| **Renovation of Phase I** | | | | |
| Renovation of Phase I | | | | To be determined |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

## 6.0 PROPOSED SCHEDULE

We propose completing the schematic design and then immediately moving into construction documents for the site package as we start the design development phase of the project. This will require that special attention to be paid during schematics to any and all site implications. Putting out the site package phase one cooling tower movement bid package along with the underground utility package would allow us to start construction by May 1, 2014. A complete core and shell building package including the structure would be completed by June 24, 2014 allowing the construction to not be delayed. The final bid package would be completed by September 30, 2014. This puts more pressure on the Architectural / Engineering Team to coordinate all issues early on in the project. The team assembled for this project used this scenario successfully on the last two Huntsman Phases which had greater complexities due to the site conditions.

It should be noted that the goal is to have the project completed and occupied by December 1, 2016 to align with the movement of Huntsman spaces out of the present School of Medicine. The Bid Packages allows this to occur without creating time issues for the CMGC.

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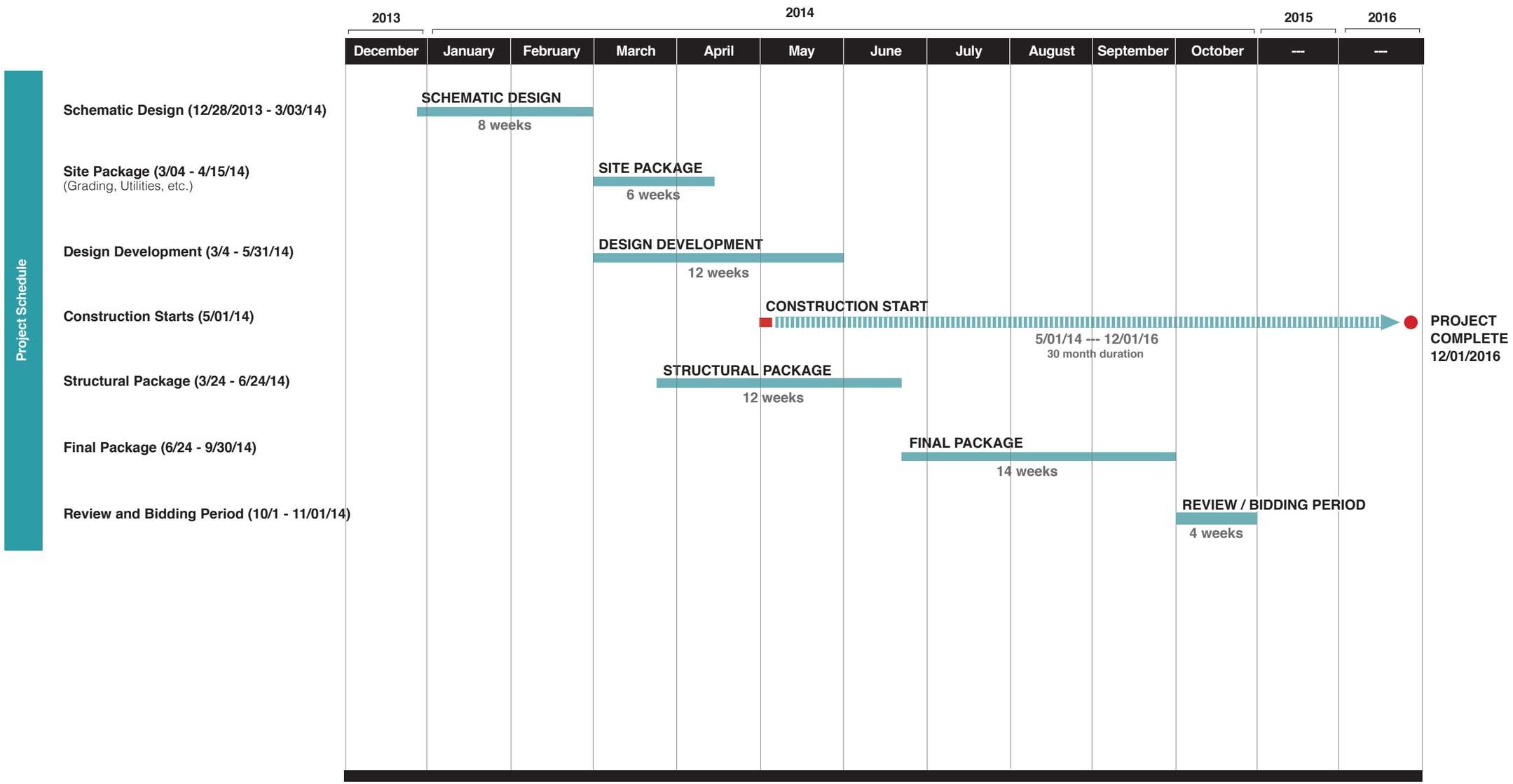
## Proposed Design & Construction Schedule



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## 7.1 GEOSEISMIC FAULT STUDY / GEOTECHNICAL REPORT

The Geotechnical Fault Study and Geotechnical Report will be issued as an addendum to the program document upon completion.

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## 7.2 TOPOGRAPHIC SURVEY

The following Topographic Survey was completed by Dominion Engineering Associates.

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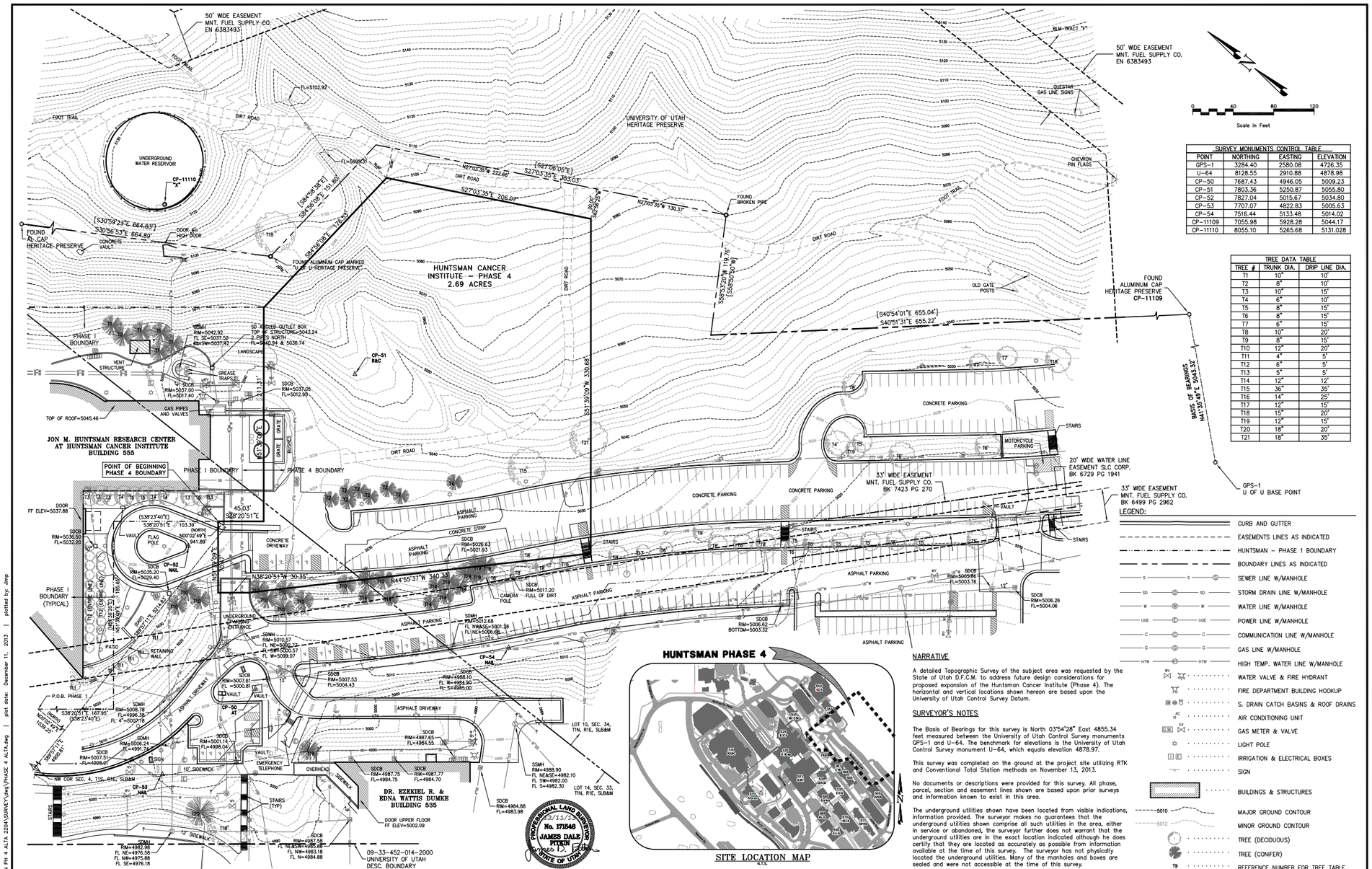
# Topographic Survey




| SURVEY MONUMENTS CONTROL TABLE | | | |
|---|---|---|---|
| POINT | NORTHING | EASTING | ELEVATION |
| GPS-1 | 3284.40 | 2580.08 | 4726.35 |
| U-64 | 8128.55 | 2910.88 | 4878.98 |
| CP-50 | 7687.43 | 4946.05 | 5009.23 |
| CP-51 | 7803.36 | 5250.87 | 5055.80 |
| CP-52 | 7827.04 | 5015.67 | 5034.80 |
| CP-53 | 7707.07 | 4822.83 | 5005.63 |
| CP-54 | 7516.44 | 5133.48 | 5014.02 |
| CP-11109 | 7055.98 | 5928.28 | 5044.17 |
| CP-11110 | 8055.10 | 5265.68 | 5131.028 |

| TREE DATA TABLE | | |
|---|---|---|
| TREE # | TRUNK DIA. | DRIP LINE DIA. |
| T1 | 10" | 10' |
| T2 | 8" | 10' |
| T3 | 10" | 15' |
| T4 | 6" | 10' |
| T5 | 8" | 15' |
| T6 | 8" | 15' |
| T7 | 6" | 15' |
| T8 | 10" | 20' |
| T9 | 8" | 15' |
| T10 | 12" | 20' |
| T11 | 4" | 5' |
| T12 | 6" | 5' |
| T13 | 5" | 5' |
| T14 | 12" | 12' |
| T15 | 36" | 35' |
| T16 | 14" | 25' |
| T17 | 12" | 15' |
| T18 | 15" | 20' |
| T19 | 12" | 15' |
| T20 | 18" | 20' |
| T21 | 18" | 35' |

LEGEND:

- CURB AND GUTTER
- EASEMENTS LINES AS INDICATED
- HUNTSMAN – PHASE 1 BOUNDARY
- BOUNDARY LINES AS INDICATED
- SEWER LINE W/MANHOLE
- STORM DRAIN LINE W/MANHOLE
- WATER LINE W/MANHOLE
- POWER LINE W/MANHOLE
- COMMUNICATION LINE W/MANHOLE
- GAS LINE W/MANHOLE
- HIGH TEMP. WATER LINE W/MANHOLE
- WATER VALVE & FIRE HYDRANT
- FIRE DEPARTMENT BUILDING HOOKUP
- S. DRAIN CATCH BASINS & ROOF DRAINS
- AIR CONDITIONING UNIT
- GAS METER & VALVE
- LIGHT POLE
- IRRIGATION & ELECTRICAL BOXES
- SIGN
- BUILDINGS & STRUCTURES
- 5010 MAJOR GROUND CONTOUR
- 5012 MINOR GROUND CONTOUR
- TREE (DECIDUOUS)
- TREE (CONIFER)
- T9 REFERENCE NUMBER FOR TREE TABLE

HUNTSMAN PHASE 4



SITE LOCATION MAP
N.T.S.

NARRATIVE

A detailed Topographic Survey of the subject area was requested by the State of Utah D.F.C.M. to address future design considerations for proposed expansion of the Huntsman Cancer Institute (Phase 4). The horizontal and vertical locations shown hereon are based upon the University of Utah Control Survey Datum.

SURVEYOR'S NOTES

The Basis of Bearings for this survey is North 03°54'28" East 4855.34 feet measured between the University of Utah Control Survey monuments GPS-1 and U-64. The benchmark for elevations is the University of Utah Control Survey monument U-64, which equals elevation 4878.97.

This survey was completed on the ground at the project site utilizing RTK and Conventional Total Station methods on November 13, 2013.

No documents or descriptions were provided for this survey. All phase, parcel, section and easement lines shown are based upon prior surveys and information known to exist in this area.

The underground utilities shown have been located from visible indications, information provided. The surveyor makes no guarantees that the underground utilities shown comprise all such utilities in the area, either in service or abandoned, the surveyor further does not warrant that the underground utilities are in the exact location indicated although he does certify that they are located as accurately as possible from information available at the time of this survey. The surveyor has not physically located the underground utilities. Many of the manholes and boxes are sealed and were not accessible at the time of this survey.

DRAWN KT 11/13 DATE — CHECKED JDP 11/13 DATE

DESIGNED _____ DATE — PROJECT ENGINEER

APPROVED JDP DATE — PROJECT MANAGER

**STATE OF UTAH D.F.C.M.**

**SALT LAKE CITY, SALT LAKE COUNTY, UTAH**

Dominion Engineering Associates, L.C.
5684 South Green Street
Murray, Utah 84123 801-713-3000

**TOPOGRPAHIC SURVEY MAPPING**
**HUNTSMAN CANCER INSTITUTE - PHASE 4**

**LOCATED IN LOT 14, SECTION 33 & LOT 10, SECTION 34, TOWNSHIP 1 NORTH, RANGE 1 EAST, SALT LAKE BASE & MERIDIAN**

| NO. | REVISIONS | BY | DATE |
|---|---|---|---|
| 1 | ADD PHASE 4 BOUNDARY | JDP | 12.11.13 |
| 0 | RELEASED FOR REVIEW | JDP | 11.26.13 |

PROJECT NO. 2204-01
SHEET NO. 1 of 1
FILE NAME: ALTA
SCALE: 1"=40'

Path: P:\UTCM HUNTSMAN PH 4 ALTA 2204\SURVEY\dwg\PHASE 4 ALTA.dwg | plot date: December 11, 2013 | plotted by: Jmp

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## 7.3 CHEMICAL INVENTORY

The following pages contain an inventory of chemicals used in the building listed by name and classification.

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| Chemical Name | Alternatel Name | CAS# | Classification | Acute Toxicity | Toxic | Sensitizer | Carcinogen | Teratogen | Mutagen | Irritant | Corrosive | Flammable | Oxidizer | Reactive | Compressed Gas | Environmental Toxicity | May Be Harmful (MBH) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AAG/Geldanamycin | 17-(Allylamino)-17-demethoxygeldanamycin | 75747-14-7 | MBH | | | | | | | | | | | | | | MBH | | |
| Acetic acid | Glacial Acetic Acid | 64-19-7 | Corrosive, Flammable | | | | | | | | Corr | Flam | | | | | | | |
| Acetic anhydride | | 108-24-7 | Corrosive | | | | | | | | Corr | | | | | | | | |
| Acetone | 2-Propanone | 67-64-1 | Acute Toxicity, Flammable, Irritant | Acute Tox | | | | | | Irrit | | Flam | | | | | | | |
| Acetonitrile | Methyl cyanide; Cyanomethane | 75-05-8 | Acute Toxicity, Flammable, Irritant | Acute Tox | | | | | | Irrit | | Flam | | | | | | | |
| Acetyl CoA | | 102029-73-2 | Toxic, Irritant | | Tox | | | | | Irrit | | | | | | | | | |
| Acetyl Lysine | Nε-Acetyl-L-lysine | 692-04-6 | MBH | | | | | | | | | | | | | | MBH | | |
| Acridine Orange | Acridine orange hemi(zinc chloride) salt | 10127-02-3 | Mutagen | | | | | | Mut | | | | | | | | | | |
| Acridine Orange hyrochloride hydrate | | 65-61-2 | Mutagen | | | | | | Mut | | | | | | | | | | |
| Acrylamide | Ethylenecarboxamide; 2-Propenamide | 79-06-1 | Acute Toxicity | Acute Tox | | | | | | | | | | | | | | | |
| Actinomycin D | | 50-76-0 | Acute Toxicity | Acute Tox | | | | | | | | | | | | | | | |
| Activase® | (Alteplase, recominant) | 105857-23-6 | MBH | | | | | | | | | | | | | | MBH | | |
| Adenine | 6-Aminopurine ; Vitamin B4 | 73-24-5 | Acute Toxicity | Acute Tox | | | | | | | | | | | | | | | |
| Adenine Hemisulfate salt | | 321-30-2 | MBH | | | | | | | | | | | | | | MBH | | |
| Adenine hydrochloride hydrate | | 6055-72-7 | MBH | | | | | | | | | | | | | | MBH | | |
| Adenosine | Adenine riboside; Adenine-9-β-D-ribofuranoside; 9-β-D-Ribofuranosyladenine | 58-61-7 | MBH | | | | | | | | | | | | | | MBH | | |
| Adenosine 3′,5′-cyclophosphate | 3′,5′-Cyclic AMP; cAMP | 60-92-4 | MBH | | | | | | | | | | | | | | MBH | | |
| Adenosine 5' - diphosphoribose sodium salt | ADP Ribose | 68414-18-6 | Toxic, Irritant | | Tox | | | | | Irrit | | | | | | | MBH | | |
| Adenosine 5′-triphosphate disodium salt hydrate | ATPdisodium salt | 987-65-5 | Toxic, Irritant, Carcinogen | | Tox | | Carcin | | | Irrit | | | | | | | | | |
| Adenosine 5'-Diphosphate sodium salt | ADP | 20398-34-9 | MBH | | | | | | | | | | | | | | MBH | | |
| Adenosine 5'-Monophosphate sodium salt | | 149022-20-8 | MBH | | | | | | | | | | | | | | MBH | | |
| Adenosine triphosphate disodium salt hydrate | ATP disodium salt | 34369-07-8 | Toxic, Irritant, Carcinogen | | Tox | | Carcin | | | Irrit | | | | | | | | | |
| Adenosine-5'-monophosphate monohydrate | 5′-Adenylic acid; AMP | 61-19-8 | MBH | | | | | | | | | | | | | | MBH | | |
| ADP monpotassium salt hydrate | | 72696-48-1 | MBH | | | | | | | | | | | | | | MBH | | |
| Adriamycin RDF ® | Doxirubicin Hydrochloride; Doxil | 25316-40-9 | Toxic | | | | | | | | | | | | | | | | |
| AEBSF | 4-(2-Aminoethyl)benzenesulfonyl fluoride hydrochloride | 30827-99-7 | Corrosive, Toxic | | | | | | | | Corr | | | | | | | | |
| AG501-X8 Resin | Amberlite; Dowex Resin | 60177-39-1 | MBH | | | | | | | | | | | | | | MBH | | |
| Agarose | | 9012-36-6 | MBH | | | | | | | | | | | | | | MBH | | |
| AICAR | 5-Aminoimidazole-4-carboxamide 1-β-D-ribofuranoside | 2627-69-2 | Toxic, Irritant | | Tox | | | | | Irrit | | | | | | | | | |
| Alanine | | 56-41-7 | MBH | | | | | | | | | | | | | | MBH | | |
| Albumin, bovine | | 9048-46-8 | MBH | | | | | | | | | | | | | | MBH | | |
| Alcian Blue | | 33864-99-2 | MBH | | | | | | | | | | | | | | MBH | | |
| Alcohol 200 proof | | 64-17-5 | Flammable | | | | | | | | | Flam | | | | | | | |
| Alcohol Ethoxylate | | 68002-97-1 | Toxic, Carcinogen, Irritant | | Tox | | Carcin | | | Irrit | | | | | | | | | |
| Alginic Acid from Brown Algae | Mixed polymer of mannuronic and guluronic acid | 9005-32-7 | MBH | | | | | | | | | | | | | | MBH | | |
| Alkaline Phosphatase | | 9001-78-9 | Irritant | | | | | | | Irrit | | | | | | | | | |
| Alkeran® | Melphalan | 148-82-3 | Acute Toxicity, Carcinogen, Teratogen | Acute Tox | | | Carcin | Terat | | | | | | | | | | | |

# Chemical List

| Chemical Name | Alternatel Name | CAS# | Classification | Acute Toxicity | Toxic | Sensitizer | Carcinogen | Teratogen | Mutagen | Irritant | Corrosive | Flammable | Oxidizer | Reactive | Compressed Gas | Environmental Toxicity | May Be Harmful (MBH) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| All Trans-Retinoic Acid | Tretinoin; ATRA | 302-79-4 | Acute Toxicity | Acute Tox | | | | | | | | | | | | | | | |
| Allantoin | | 97-59-6 | Acute Toxicity | Acute Tox | | | | | | | | | | | | | | | |
| Allopurinol | | 315-30-0 | Acute Toxicity, Sensitizer | Acute Tox | | Sensi | | | | | | | | | | | | | |
| Allose D-(+) | | 2595-97-3 | MBH | | | | | | | | | | | | | | MBH | | |
| Alpha factor | | 59401-28-4 | MBH | | | | | | | | | | | | | | MBH | | |
| Alteplase | Cathflo® Activase® /Plasminogen Activator | 105857-23-6 | Toxic | | Tox | | | | | | | | | | | | | | |
| Aluminum Chloride | | 7446-70-0 | Reactive, Corrosive | | | | | | | | Corr | | | React | | | | | |
| Aluminum potassium sulfate dodecahydrate | | 7784-24-9 | MBH | | | | | | | | | | | | | | MBH | | |
| AM 580 | retinoid derivative | 102121-60-8 | MBH | | | | | | | | | | | | | | MBH | | |
| Amanitin (α-) | | 23109-05-9 | Acute Toxicity | Acute Tox | | | | | | | | | | | | | | | |
| Amido Black Stain | | 1064-48-8 | Irritant | | | | | | | Irrit | | | | | | | | | |
| Amiloride 5-(N-ethyl-N-isopropyl) | | 1154-25-2 | Irritant | | | | | | | Irrit | | | | | | | | | |
| Amiloride hydrochloride hydrate | | 2016-88-8 | Acute Toxicity | Acute Tox | | | | | | | | | | | | | | | |
| Aminoadipic acid | DL-2-Aminoadipic acid | 542-32-5 | Sensitizer | | | | | | | | | | | | | | | | |
| Aminobenzamide | | 2835-68-9 | Acute Toxicity | Acute Tox | | | | | | | | | | | | | | | |
| Amitrol | 3 amino 1,2,4,triazole | 61-82-5 | Toxic, Carcinogen, Teratogen, Aquatic Toxicity | | Tox | | Carcin | Terat | | | | | | | | Aq Tox | | | |
| Ammonia Solution | | 7664-41-7 | Acute toxicity, Flammable, Corrosive | Acute Tox | | | | | | | Corr | Flam | | | | | | | |
| Ammonium Acetate | | 631-61-8 | MBH | | | | | | | | | | | | | | MBH | | |
| Ammonium Bicarbonate | | 1066-33-7 | Acute Toxicity | Acute Tox | | | | | | | | | | | | | | | |
| Ammonium bisulfate | | 7803-63-6 | Corrosive | | | | | | | | Corr | | | | | | | | |
| Ammonium Carbonate | | 506-87-6 | MBH | | | | | | | | | | | | | | MBH | | |
| Ammonium Chloride | | 12125-02-9 | Acute Toxicity, Irritant | Acute Tox | | | | | | Irrit | | | | | | | | | |
| Ammonium Hydroxide | | 1336-21-6 | Corrosive | | | | | | | | Corr | | | | | | | | |
| Ammonium Iron(II) Sulfate hexahydrate | | 7783-85-9 | Acute Toxicity, Irritant | Acute Tox | | | | | | Irrit | | | | | | | | | |
| ammonium molybdate tetrahydrate | | 12054-85-2 | Irritant, Aquatic Toxicity | | | | | | | Irrit | | | | | | Aq Tox | | | |
| Ammonium Nitrate | | 6484-52-2 | Oxidizer, Carcinogen | | | | Carcin | | | | | | Oxid | | | | | | |
| Ammonium Persulfate | APS | 7727-54-0 | Acute Toxicity, Oxidizing gases, Sensitizer, Irritant | Acute Tox | | Sensi | | | | Irrit | | | Oxid | | | | | | |
| Ammonium Phosphate, monobasic | | 231-764-5 | Irritant | | | | | | | Irrit | | | | | | | | | |
| Ammonium sulfate | | 7783-20-2 | Acute Toxicity | Acute Tox | | | | | | | | | | | | | | | |
| Ammonium sulfite | | 7783-11-1 | Toxic, Irritant | | Tox | | | | | Irrit | | | | | | | | | |
| Ammonium-15N chloride | | 39466-62-1 | Toxic | | Tox | | | | | | | | | | | | | | |
| Amphocin | Amphotericin b/Fungizone | 1386-97-3 | MBH | | | | | | | | | | | | | | MBH | | |
| Ampicillin | | 7177-48-2 | Toxic, Irritant | | Tox | | | | | Irrit | | | | | | | | | |
| Ampicillin, sodium salt | | 69-52-3 | Sensitizer | | | | | | | | | | | | | | | | |
| Androstan (5α-)-17β-ol-3-one | Androstanolone, 4,5-α-dihydrotestosterone | 521-18-6 | Toxic, Carcinogen, Teratogen | | Tox | | Carcin | Terat | | | | | | | | | | | |
| Angiotensin I human Acetate Hydrate | | 70937-97-2 | MBH | | | | | | | | | | | | | | MBH | | |
| Angiotensinogen | | 64315-16-8 | MBH | | | | | | | | | | | | | | MBH | | |

| Chemical Name | Alternatel Name | CAS# | Classification | Acute Toxicity | Toxic | Sensitizer | Carcinogen | Teratogen | Mutagen | Irritant | Corrosive | Flammable | Oxidizer | Reactive | Compressed Gas | Environmental Toxicity | May Be Harmful (MBH) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Aniline Blue diammonium salt | | 66687-07-8 | Toxic, Irritant | | Tox | | | | | Irrit | | | | | | | | | |
| Anisomycin | | 22862-76-6 | Toxic | | Tox | | | | | | | | | | | | | | |
| Antimycin A | | 1397-94-0 | Acute Toxicity | Acute Tox | | | | | | | | | | | | | | | |
| ANZEMET® Injection Multidose Vials | Dolesatron mesylate hydrate | 115956-13-3 | MBH | | | | | | | | | | | | | | MBH | | |
| Aparaginase | KLSPAR | 9015-68-3 | Sensitizer, Teratogen | | | Sensi | | Terat | | | | | | | | | | | |
| APMA | 4-Aminophenylmercuric acetate | 6283-24-5 | Acute Toxicity, Aquatic Toxicity | Acute Tox | | | | | | | | | | | Aq Tox | | | | |
| Apopain Substrate | N-Acetyl-Asp-Glu-Val-Asp7-amido-methylcoumarin | 169332-61-0 | MBH | | | | | | | | | | | | | | MBH | | |
| Aprotinin | | 9087-70-1 | Toxic | | Tox | | | | | | | | | | | | | | |
| Arabinose | | 5328-37-0 | MBH | | | | | | | | | | | | | | MBH | | |
| ARANESP (HAS) | Darbepoetin alfa/erythropoietin | 11096-26-7 | MBH | | | | | | | | | | | | | | MBH | | |
| Aredia | Pamidronate disodium salt hydrate | 57248-88-1 | MBH | | | | | | | | | | | | | | MBH | | |
| Arginine | | 1119-34-2 | MBH | | | | | | | | | | | | | | MBH | | |
| Arginine (L-) | | 74-79-3 | MBH | | | | | | | | | | | | | | MBH | | |
| Arginine L(+)- | | 74-79-3 | MBH | | | | | | | | | | | | | | MBH | | |
| Ascorbic Acid (L) | | 50-81-7 | MBH | | | | | | | | | | | | | | MBH | | |
| Ascorbic acid sodium salt | | 134-03-2 | MBH | | | | | | | | | | | | | | MBH | | |
| Asparagine | | 70-47-3 | MBH | | | | | | | | | | | | | | MBH | | |
| Asparagine monohydrate | | 5794-13-8 | MBH | | | | | | | | | | | | | | MBH | | |
| Aspartic acid | | 1783-96-6 | MBH | | | | | | | | | | | | | | MBH | | |
| Atropine | | 55-48-1 | Acute Toxicity | Acute Tox | | | | | | | | | | | | | | | |
| Aurintricarboxylic acid | | 4431-00-9 | Toxic, Irritant | | Tox | | | | | Irrit | | | | | | | | | |
| Avastin | Bevacizumab | 216974-75-3 | Toxic | | Tox | | | | | | | | | | | | | | |
| Azacytidine | 5-Azacytidine/Ladakamycin | 320-67-2 | Acute Toxicity, Carcinogen | Acute Tox | | | Carcin | | | | | | | | | | | | |
| Azauracil(6-) | | 461-89-2 | Toxic, Irritant | | Tox | | | | | Irrit | | | | | | | | | |
| Azoin (2-2')-Bis Diammonium Salt | | 30931-67-0 | Toxic, Irritant | | Tox | | | | | Irrit | | | | | | | | | |
| Azure II | | 37247-10-2 | Acute Toxicity | Acute Tox | | | | | | | | | | | | | | | |
| Azure II eosinate | | 53092-85-6 | Irritant | | | | | | | Irrit | | | | | | | | | |
| Bafilomycin A1 | | 88899-55-2 | Irritant | | | | | | | Irrit | | | | | | | | | |
| BAPTA-AM | 1,2-Bis(2-aminophenoxy)ethane-N,N,N',N'-tetraacetic acid | 126150-97-8 | Toxic, Irritant | | Tox | | | | | Irrit | | | | | | | | | |
| Barium sulfate | | 7727-43-7 | MBH | | | | | | | | | | | | | | MBH | | |
| Basic Fuchsin | Basic violet 14 | 58969-01-0 | Toxic, Carcinogen | | Tox | | Carcin | | | | | | | | | | | | |
| Bathocuproinedisulfonic acid, disodium salt hydrate | Disodium bathocuproinedisulfonate | 52698-84-7 | MBH | | | | | | | | | | | | | | MBH | | |
| BCIP | 5-Bromo-4-chloro-3-indolyl phosphate disodium salt | 102185-33-1 | MBH | | | | | | | | | | | | | | MBH | | |
| BCP | 1-bromo-3-chloropropane | 109-70-6 | Toxic, Flammable | | Tox | | | | | | | Flam | | | | | | | |
| Benomyl | B-glucuronidase | 17804-35-2 | Toxic, Aquatic Toxicity | | Tox | | | | | | | | | | | Aq Tox | | | |
| Benzalkonium chloride | BacDown detergent/disinfectant | 68391-01-5 | Corrosive | | | | | | | | Corr | | | | | | | | |
| Benzamidine hydrochloride hydrate | | 206752-36-5 | Irritant | | | | | | | Irrit | | | | | | | | | |
| Benzidine | | 92-87-5 | Toxic, Aquatic Toxicity, Carcinogenic | | Tox | | Carcin | | | | | | | | | Aq Tox | | | |
| Benzyl alcohol | | 100-51-6 | Toxic, Flammable | | Tox | | | | | | | Flam | | | | | | | |

# Chemical List

| Chemical Name | Alternatel Name | CAS# | Classification | Acute Toxicity | Toxic | Sensitizer | Carcinogen | Teratogen | Mutagen | Irritant | Corrosive | Flammable | Oxidizer | Reactive | Compressed Gas | Environmental Toxicity | May Be Harmful (MBH) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Benzylkonium chloride | | 68391-01-5 | Acute Toxicity | Acute Tox | Tox | | | | | | | | | | | | | | |
| BES | N,N-Bis(2-hydroxyethyl)-2-aminoethanesulfonic acid | 10191-18-1 | Toxic, Irritant | | Tox | | | | | Irrit | | | | | | | | | |
| Bestatin | N-[(2S,3R)-3-Amino-2-hydroxy-4-phenylbutyryl]-L</>-leucine | 58970-76-6 | MBH | | | | | | | | | | | | | | MBH | | |
| Beta-Alanine | | 107-95-9 | MBH | | | | | | | | | | | | | | MBH | | |
| Betaine | | 107-43-7 | MBH | | | | | | | | | | | | | | MBH | | |
| Betaine Monohydrate | | 590-47-6 | MBH | | | | | | | | | | | | | | MBH | | |
| Beta-Mercaptoethanol | 2-Mercaptoethanol; BME | 60-24-2 | Acute Toxicity, Flammable, Aquatic Toxicity | Acute Tox | | | | | | | | Flam | | | | Aq Tox | | | |
| Beta-Naphthoflavone | | 60-51-87-2 | MBH | | | | | | | | | | | | | | MBH | | |
| B-Glycerophosphate, disodium salt, hydrate | | 154804-51-0 | MBH | | | | | | | | | | | | | | MBH | | |
| BiCNU | Carmustine for injection/1,3-Bis(2-chloroethyl)-1-nitrosourea | 154-93-8 | Acute Toxicity, Carcinogenic | Acute Tox | | | Carcin | | | | | | | | | | | | |
| Biebrich Scarlet-ACID Fuchsin Solution | Ponceau BS | 4196-99-0 | MBH | | | | | | | | | | | | | | MBH | | |
| Bio-Safe II liquid scintillation fluid | monoalkylates/non-ionic surfactants | 68648-87-3/9016-45-9 | MBH | | | | | | | | | | | | | | MBH | | |
| Biotin | | 58-85-5 | MBH | | | | | | | | | | | | | | MBH | | |
| Biotin | | 58-85-5 | MBH | | | | | | | | | | | | | | MBH | | |
| Biotin hydrazide | | 66640-86-6 | MBH | | | | | | | | | | | | | | MBH | | |
| Bis acrylamide | N.N-Methylenebisacrylamide | 110-26-9 | Acute Toxicity | Acute Tox | | | | | | | | | | | | | | | |
| Bisbenzimide Hoechst NO 33258 Trihydrochloride | | 23491-45-4 | MBH | | | | | | | | | | | | | | MBH | | |
| Bisindolylameide | GF109203X-HCL | 176504-36-2 | MBH | | | | | | | | | | | | | | MBH | | |
| Bismuth | Cerrobend | 7440-69-9 | Toxic | | Tox | | | | | | | | | | | | | | |
| BIS-TRIS | | 6976-37-0 | Toxic | | Tox | | | | | | | | | | | | | | |
| Blasticidin S HCL | | 3513-03-9 | Acute Toxicity | Acute Tox | | | | | | | | | | | | | | | |
| Bleomycin For Injection USP | Blenoxane | 9041-93-4 | Mutagen | | | | | | Mut | | | | | | | | | | |
| Blue Dextran | | 87915-38-6 | MBH | | | | | | | | | | | | | | MBH | | |
| Boric Acid | | 10043-35-3 | Acute Toxicity, Teratogen | Acute Tox | | | | Terat | | | | | | | | | | | |
| Bortezomib | Velcade | 179324-69-7 | Toxic | | Tox | | | | | | | | | | | | | | |
| Bovine serum albumin, fraction V | | 9048-46-8 | MBH | | | | | | | | | | | | | | MBH | | |
| BrdU | 5-Bromo-2'-deoxyuridine | 59-14-3 | Toxic, Mutagen | | Tox | | | | Mut | | | | | | | | | | |
| Brefeldin A | | 20350-15-6 | Toxic | | Tox | | | | | | | | | | | | | | |
| brilliant blue G-250 | Coomassie Brilliant Blue G | 6104-58-1 | MBH | | | | | | | | | | | | | | MBH | | |
| brilliant blue R-250 | | 6104-59-2 | MBH | | | | | | | | | | | | | | MBH | | |
| Bromobimane | Monobromobimane | 71418-44-5 | MBH | | | | | | | | | | | | | | MBH | | |
| Bromophenol Blue | | 115-39-9 | Irritant | | | | | | | Irrit | | | | | | | | | |
| Bromophenol blue sodium salt | | 62625-28-9 | Irritant | | | | | | | Irrit | | | | | | | | | |
| Bromothymol Blue | | 76-59-5 | Irritant | | | | | | | Irrit | | | | | | | | | |
| Busulfex™ | Busulfan/Myleran | 55-98-1 | Toxic | | Tox | | | | | | | | | | | | | | |
| Butanol | | 71-36-3 | Toxic, Flammable | | Tox | | | | | | | Flam | | | | | | | |
| Butanol(1-) | 1-Butanol; n-Butanol; n-Butyl alcohol | 71-36-3 | Toxic, Flammable | | Tox | | | | | | | Flam | | | | | | | |
| Butanol(2-) | | 78-92-2 | Toxic, Flammable | | Tox | | | | | | | Flam | | | | | | | |
| Butylated hydroxyanisole | | 25013-16-5 | Toxic | | Tox | | | | | | | | | | | | | | |

| Chemical Name | Alternatel Name | CAS# | Classification | Acute Toxicity | Toxic | Sensitizer | Carcinogen | Teratogen | Mutagen | Irritant | Corrosive | Flammable | Oxidizer | Reactive | Compressed Gas | Environmental Toxicity | May Be Harmful (MBH) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Butyric acid | | 107-92-6 | Flammable, Corrosive | | | | | | | | Corr | Flam | | | | | | | |
| Cacodylic acid | | 75-60-5 | Toxic, Irritant, Carcinogen | | Tox | | | | | Irrit | | | | | | | | | |
| Cadmium chloride | | 10108-64-2 | Toxic, Carcinogen | | Tox | | Carcin | | | | | | | | | | | | |
| caffeine | | 58-08-2 | MBH | | | | | | | | | | | | | | MBH | | |
| Calcium Carbonate | | 471-34-1 | Irritant | | | | | | | Irrit | | | | | | | | | |
| Calcium Chloride | | 10043-52-4 | Acute Toxicity, Irritant | Acute Tox | | | | | | Irrit | | | | | | | | | |
| Calcium Chloride dihydrate | | 10035-04-8 | Irritant | | | | | | | | | | | | | | | | |
| Calcium ionophore | | 160563-01-9 | MBH | | | | | | | | | | | | | | MBH | | |
| Calcium nitrate | | 10124-37-5 | MBH | | | | | | | | | | | | | | MBH | | |
| Calcium nitrate hydrate | | 35054-52-5 | Oxidizer | | | | | | | | | | Oxid | | | | | | |
| Calcium sulfate | | 7778-18-9 | MBH | | | | | | | | | | | | | | MBH | | |
| Calcium Sulfate dihydrate | | 10101-41-4 | MBH | | | | | | | | | | | | | | MBH | | |
| Calphostin C | | 121263-19-2 | MBH | | | | | | | | | | | | | | MBH | | |
| Calyculin | | 101932-71-2 | Toxic | | Tox | | | | | | | | | | | | | | |
| Camptosar | Irinotecan | 100286-90-6 | Toxic | | Tox | | | | | | | | | | | | | | |
| Camptothecin | | 7689-03-4 | Toxic | | Tox | | | | | | | | | | | | | | |
| Canavanine | | 2219-31-0 | Acute Toxicity | Acute Tox | | | | | | | | | | | | | | | |
| CAPS | N-Cyclohexyl-3-aminopropanesulfonic acid | 1135-40-6 | MBH | | | | | | | | | | | | | | MBH | | |
| Carbamoyl phosphate dilithium | | 1866-68-8 | Toxic, Irritant | | Tox | | | | | Irrit | | | | | | | | | |
| Carbenicillin | | 4800-94-6 | Sensitizer | | | Sensi | | | | | | | | | | | | | |
| Carbenoxolone disodium salt | | 7421-40-1 | Toxic, Irritant | | Tox | | | | | Irrit | | | | | | | | | |
| Carbon Dioxide | | 124-38-9 | Compressed Gas | | | | | | | | | | | | Comp gas | | | | |
| Carbonic Anhydrase | | 9001-03-0 | MBH | | | | | | | | | | | | | | MBH | | |
| Carbonyl cyanide 3-chlorophenylhydrazone | | 555-60-2 | Toxic | | Tox | | | | | | | | | | | | | | |
| Carbonyl cyanide 4-(trifluoromethoxy)phenylhydrazone | | 370-86-5 | Toxic, Sensitizer | | Tox | Sensi | | | | | | | | | | | | | |
| Carboplatin | | 41575-94-4 | Toxic | | Tox | | | | | | | | | | | | | | |
| Carmine | | 1390-65-4 | MBH | | | | | | | | | | | | | | MBH | | |
| Carnitine (L-) | | 541-15-1 | Irritant | | | | | | | Irrit | | | | | | | | | |
| Carnosine (L-) Crystalline | | 305-84-0 | MBH | | | | | | | | | | | | | | MBH | | |
| casein | | 9000-71-9 | MBH | | | | | | | | | | | | | | MBH | | |
| Casein Kinase II Inhibitor | | 366806-33-9 | MBH | | | | | | | | | | | | | | MBH | | |
| Catalase | | 9001-05-2 | MBH | | | | | | | | | | | | | | MBH | | |
| Ceftriaxione | | 104376-79-6 | Irritant, Sensitizer | | | Sensi | | | | Irrit | | | | | | | | | |
| Cerubidine® | Daunorubicin | 23541-50-6 | Toxic, Carcinogen | | Tox | | Carcin | | | | | | | | | | | | |
| Cesium Chloride | | 7647-17-8 | Toxic | | Tox | | | | | | | | | | | | | | |
| Cetuximab | Erbitux™ | 205923-56-4 | Acute Toxicity | Acute Tox | | | | | | | | | | | | | | | |
| CHAPS | (3-[(3-Cholamidopropyl)dimethylammonio]-1-propanesulfonate) | 75621-03-3 | Toxic, Irritant | | Tox | | | | | Irrit | | | | | | | | | |
| Charcoal | Carbon | 1333-86-4 | Toxic, Carcinogen | | Tox | | Carcin | | | | | | | | | | | | |
| Chelex 100 | | 68954-42-7 | Irritant | | | | | | | Irrit | | | | | | | | | |

# Chemical List

| Chemical Name | Alternatel Name | CAS# | Classification | Acute Toxicity | Toxic | Sensitizer | Carcinogen | Teratogen | Mutagen | Irritant | Corrosive | Flammable | Oxidizer | Reactive | Compressed Gas | Environmental Toxicity | May Be Harmful (MBH) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Chlorambucil | Leukeran | 305-03-3 | Toxic, Carcinogen | | Tox | | Carcin | | | | | | | | | | | | |
| Chloramine Trihydrate | | 127-65-1 | Acute Toxicity, Corrosive | Acute Tox | | | | | | | Corr | | | | | | | | |
| Chloramphenicol | | 56-75-7 | Toxic, Carcinogen | | Tox | | Carcin | | | | | | | | | | | | |
| Chloro(5-)-2'-deoxyuridine | | 50-90-8 | Acute Toxicity, Carcinogen | Acute Tox | | | Carcin | | | | | | | | | | | | |
| Chloroethane | | 75-00-3 | Toxic, Flammable, Compressed Gas, Carcinogen | | Tox | | Carcin | | | | | Flam | | | Comp gas | | | | |
| Chloroform | Trichloromethane/Methyl trichloride | 67-66-3 | Toxic, Carcinogen, Irritant, Teratogen | | Tox | | Carcin | Terat | | Irrit | | | | | | | | | |
| Chloroquine diphosphate salt | | 50-63-5 | Toxic | | Tox | | | | | | | | | | | | | | |
| Chlorpromazine Hydrochloride | CPZ | 69-09-0 | Acute Toxicity | Acute Tox | | | | | | | | | | | | | | | |
| Cholecalciferol/Vitamin D3 | 1α, 25 Dihydroxyvitamin D3 | 67-97-0 | Acute Toxicity, Teratogen | Acute Tox | | | | Terat | | | | | | | | | | | |
| Cholera Toxin Vibrio cholerae | | 9012-63-9 | Acute Toxicity | Acute Tox | | | | | | | | | | | | | | | |
| Choline Chloride | | 67-48-1 | Toxic, Irritant | | Tox | | | | | Irrit | | | | | | | | | |
| Chromium VI oxide | | 1333-82-0 | Acute Toxicity, Oxidizer, Aquatic Toxicity | Acute Tox | | | | | | | | | | | | Aq Tox | | | |
| Chymostatin | | 9076-44-2 | MBH | | | | | | | | | | | | | | MBH | | |
| Chymotrypsin(α-) | | 9004-07-3 | Acute Toxicity, Sensitizer | Acute Tox | | Sensi | | | | | | | | | | | | | |
| Cimetidine Hydrochloride | | 70059-30-2 | Irritant | | | | | | | Irrit | | | | | | | | | |
| Cinacalcet Hydrochloride | | 364782-34-3 | MBH | | | | | | | | | | | | | | MBH | | |
| Ciprofloxacin | N-Chlorobenzenesulfonamide sodium salt | 127-52-6 | Toxic, Sensitizer | | Tox | Sensi | | | | | | | | | | | | | |
| Cisplatin | cis-Diammineplatinum(II) dichloride | 15663-27-1 | Acute Toxicity, Carcinogen | Acute Tox | | | Carcin | | | | | | | | | | | | |
| Citraconic anhydrate | | 616-02-4 | Toxic | | Tox | | | | | | | | | | | | | | |
| Citric Acid Monohydrate | | 5949-29-1 | Toxic, Irritant | | Tox | | | | | Irrit | | | | | | | | | |
| Citric acid, anhydrous | | 77-92-9 | Toxic, Irritant | | Tox | | | | | Irrit | | | | | | | | | |
| Clofilium tosylate | | 92953-10-1 | Toxic | | Tox | | | | | | | | | | | | | | |
| Clonat | Nourseothricin sulfate | 96736-11-7 | Toxic, Irritant | | Tox | | | | | Irrit | | | | | | | | | |
| Clotrimazole | | 23593-75-1 | Toxic, Irritant | | Tox | | | | | Irrit | | | | | | | | | |
| Cobalt(II) chloride (cobalt dichloride), CoCl2 | | 7646-79-9 | Acute Toxicity, Sensitizer, Mutagen | Acute Tox | | Sensi | | | Mut | | | | | | | | | | |
| Cobalt(II) Chloride Hexahydrate | | 7791-13-1 | Toxic | | Tox | | | | | | | | | | | | | | |
| Coenzyme A | | 55672-92-9 | MBH | | | | | | | | | | | | | | MBH | | |
| Colchicine | | 64-86-8 | Acute toxicity, Mutagen, Irritant | Acute Tox | | | | | | Irrit | | | | | | | | | |
| Collagen | | 9007-34-5 | MBH | | | | | | | | | | | | | | MBH | | |
| Collagenase | | 9001-12-1 | Toxic, Irritant, Sensitizer | | Tox | Sensi | | | | Irrit | | | | | | | | | |
| Colloidin Solution | cellulose nitrate | 9004-70-0 | Flammable | | | | | | | | | | | | | | | | |
| Compound C | 6-[4-(2-Piperidin-1-ylethoxy)phenyl]-3-pyridin-4-ylpyrazolo[1,5-a]prymidine | 866405- 64-3 | Toxic | | Tox | | | | | | | | | | | | | | |
| Concanamycin A | | 80890-47-7 | Acute Toxicity | Acute Tox | | | | | | | | | | | | | | | |
| Congo Red | | 573-58-0 | Irritant, Carcinogen, Teratogen | | | | Carcin | Terat | | Irrit | | | | | | | | | |
| Consume Eco-Lyzer | Quaternary Ammonium comound | 68424-95-3 | MBH | | | | | | | | | | | | | | MBH | | |
| Copper sulfate pentahydrate | | 7758-99-8 | Toxic, Irritant | | Tox | | | | | Irrit | | | | | | | | | |
| Copper(II) Chloride Dihydrate | | 10125-13-0 | Toxic | | Tox | | | | | | | | | | | | | | |
| Copper(II) Sulfate | | 7758-98-7 | Acute Toxicity. Aquatic Toxicity | Acute Tox | | | | | | | | | | | | Aq Tox | | | |
| Corn Oil | | 8001-30-7 | MBH | | | | | | | | | | | | | | MBH | | |

| Chemical Name | Alternatel Name | CAS# | Classification | Acute Toxicity | Toxic | Sensitizer | Carcinogen | Teratogen | Mutagen | Irritant | Corrosive | Flammable | Oxidizer | Reactive | Compressed Gas | Environmental Toxicity | May Be Harmful (MBH) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Coumaric Acid | | 501-98-4 | Acute Toxicity, Irritant | Acute Tox | | | | | | Irrit | | | | | | | | | |
| Crystal violet | | 548-62-9 | Toxic, Irritant, Carcinogen | | Tox | | Carcin | | | | | | | | | | | | |
| Cyanocobalamin | | 68-19-9 | MBH | | | | | | | | | | | | | | MBH | | |
| Cyanogen bromide | | 506-68-3 | Acute Toxicity, Corrosive | Acute Tox | | | | | | | Corr | | | | | | | | |
| Cyanogen Bromide Activated Agarose | | 68987-32-6 | MBH | | | | | | | | | | | | | | MBH | | |
| Cycloheximide | | 66-81-9 | Acute Toxicity, Mutagen, Teratogen | Acute Tox | | | | Terat | Mut | | | | | | | | | | |
| Cyclohexyl-3-2-morphoenoethyl carbodiimide | | 2491-17-0 | Toxic, Irritant | | Tox | | | | | Irrit | | | | | | | | | |
| Cyclopentane | | 287-92-3 | Flammable, Toxic | | | | | | | | | Flam | | | | | | | |
| Cyclophosphamide | | 6055-19-2 | Toxic, Carcinogen, Teratogen | | Tox | | Carcin | Terat | | | | | | | | | | | |
| Cyclophosphamide monohydrate | Cytoxan | 6055-19-2 | MBH | | | | | | | | | | | | | | MBH | | |
| Cyclosporin A | | 59865-13-3 | Toxic, Carcinogen, Teratogen | | Tox | | Carcin | Terat | | | | | | | | | | | |
| Cysteine | | 7048-04-6 | Irritant | | | | | | | Irrit | | | | | | | | | |
| Cysteine (L-) | | 52-90-4 | MBH | | | | | | | | | | | | | | MBH | | |
| Cysteine-Boc | Boc-S-(4-methylbenzyl)-L-cysteine | 61925 - 77 - 7 | MBH | | | | | | | | | | | | | | MBH | | |
| Cytidine 5'- Monophosphate | | 63-37-6 | MBH | | | | | | | | | | | | | | MBH | | |
| Cytochalasin B | | 14930-96-2 | Acute Toxicity, Teratogen | Acute Tox | | | | Terat | | | | | | | | | | | |
| Cytochalasin D | | 22144-77-0 | Acute Toxicity | Acute Tox | | | | | | | | | | | | | | | |
| Cytochrome C | | 9007-43-6 | MBH | | | | | | | | | | | | | | MBH | | |
| Cytosine-beta-D-arabinofuranocide hydrochloride | | 69-74-9 | Toxic, Teratogen, Mutagen | | Tox | | | Terat | Mut | | | | | | | | | | |
| Cytosine-β-D-arabinofuranocide | Cytarabine | 147-94-4 | Toxic, Sensitizer | | Tox | Sensi | | | | | | | | | | | | | |
| Dacarbazine | | 4342-03-4 | Toxic, Irritant, Carcinogen | | Tox | | Carcin | | | Irrit | | | | | | | | | |
| Dansyl-L-Glutamic Aciddi | Cyclohexylammonium | 53332-33-5 | MBH | | | | | | | | | | | | | | MBH | | |
| Dantrolene sodium salt | | 14663-23-1 | MBH | | | | | | | | | | | | | | MBH | | |
| DAPI | 4,6-Diamidino 2-phenylindole | 28718-90-3 | MBH | | | | | | | | | | | | | | MBH | | |
| Dasatinib | | 863127-77-9 | MBH | | | | | | | | | | | | | | MBH | | |
| DDM | n-dodecyl-b-D-maltoside | 69227-93-6 | MBH | | | | | | | | | | | | | | MBH | | |
| DEAE Dextran hydrochloride | | 9015-73-0 | MBH | | | | | | | | | | | | | | MBH | | |
| DEAE Sepharose | | 57407-08-6 | MBH | | | | | | | | | | | | | | MBH | | |
| Decitabine (Dacogen™) | 5-Aza-2'-deoxycytidine | 2353-33-5 | Acute Toxicity, Mutagen, Teratogen | Acute Tox | | | | Terat | Mut | | | | | | | | | | |
| Decylubiquinone | | 55486-00-5 | Toxic, Irritant | | Tox | | | | | Irrit | | | | | | | | | |
| Deferoxamine Mesylate | Desferal | 138-14-7 | MBH | | | | | | | | | | | | | | MBH | | |
| Deoxy-Benzoxadiazol-Glucose | 2-Deoxy-2-[(7-nitro-2,1,3-benzoxadiazol-4-yl)amino]-D-glucose | 186689-07-6 | MBH | | | | | | | | | | | | | | MBH | | |
| Deoxycholic acid-sodium salt | | 302-95-4 | Toxic, Irritant | | Tox | | | | | Irrit | | | | | | | | | |
| Deoxy-Glucose | 2-Deoxy-D-Glucose | 154-17-6 | MBH | | | | | | | | | | | | | | MBH | | |
| Deoxyribonuclease I | | 9003-98-9 | MBH | | | | | | | | | | | | | | MBH | | |
| Deuterium Oxide | | 7789-20-0 | MBH | | | | | | | | | | | | | | MBH | | |
| Dexamethasone | | 50-02-2 | Toxic | | Tox | | | | | | | | | | | | | | |
| Dexrazoxane | | 24584-09-6 | Toxic, Irritant | | Tox | | | | | Irrit | | | | | | | | | |
| Dextran | | 9004-54-0 | MBH | | | | | | | | | | | | | | MBH | | |

# Chemical List

| Chemical Name | Alternatel Name | CAS# | Classification | Acute Toxicity | Toxic | Sensitizer | Carcinogen | Teratogen | Mutagen | Irritant | Corrosive | Flammable | Oxidizer | Reactive | Compressed Gas | Environmental Toxicity | May Be Harmful (MBH) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Dextran sulfate sodium salt | | 9011-18-1 | Irritant | | | | | | | Irrit | | | | | | | | | |
| Dextrose, anhydrous | D-Glucose | 50-99-7 | MBH | | | | | | | | | | | | | | MBH | | |
| Di(2,6-)chlorophenolindophenol sodium salt hydrate | | 620-45-1 | MBH | | | | | | | | | | | | | | MBH | | |
| Di(2,7 )chlorohydrofluorescein deacetate | | 4091-99-0 | Irritant | | | | | | | Irrit | | | | | | | | | |
| Diamide | | 10465-78-8 | MBH | | | | | | | | | | | | | | MBH | | |
| Diamidino-2-pheylindole dihydrochloride | | 28718-90-3 | MBH | | | | | | | | | | | | | | MBH | | |
| Dichloroethane (1,2-) | | 107-06-2 | Toxic, Flammable, Carcinogen, Irritant | | Tox | | Carcin | | | Irrit | | Flam | | | | | | | |
| Dichloromethane | | 75-09-2 | Toxic, Carcinogen | | Tox | | Carcin | | | | | | | | | | | | |
| Dideoxyinosine | | 69655-05-6 | Toxic | | Tox | | | | | | | | | | | | | | |
| Diethanolamine | | 111-42-2 | Toxic, Flammable, Corrosive | | Tox | | | | | | Corr | Flam | | | | | | | |
| Diethyl 2-oxoglutarate | | 13192-04-6 | MBH | | | | | | | | | | | | | | MBH | | |
| Diethyl Pyrocarbonate (DEPC) | | 1609-47-8 | Acute Toxicity, Flammable | Acute Tox | | | | | | | | Flam | | | | | | | |
| Difluoroethane(1,1,-) | EXP31300 and EXP 31301 Compressed Gas Dusters (X82055 and X82056) | 75-37-6 | Compressed Gas, Flammable | | | | | | | | | Flam | | | Comp gas | | | | |
| Digitonin | | 11024-24-1 | Acute Toxicity | Acute Tox | | | | | | | | | | | | | | | |
| Dihydroethidium | | 104821-25-2 | MBH | | | | | | | | | | | | | | MBH | | |
| Dihydroorotic acid | | 5988-19-2 | Irritant | | | | | | | Irrit | | | | | | | | | |
| Dimercaprol | 2,3-Dimercapto-1-propanol | 59-52-9 | Acute Toxicity, Irritant | Acute Tox | | | | | | Irrit | | | | | | | | | |
| Dimethyl Acrylamide | | 2680-03-7 | Toxic, Flammable | | | | | | | | | Flam | | | | | | | |
| Dimethyl Pimelimidate | DMP | 36875-25-9 | Acute Toxicity | Acute Tox | | | | | | | | | | | | | | | |
| Dimethyl sulfoxide | DMSO | 67-68-5 | Flammable, Irritant | | | | | | | Irrit | | Flam | | | | | | | |
| Dimethylacetamide | | 127-19-5 | Toxic, Irritant | | Tox | | | | | Irrit | | | | | | | | | |
| Dimethylformamide(N-N-) | DMF | 68-12-2 | Toxic, Flammable, Irritant | | Tox | | | | | Irrit | | Flam | | | | | | | |
| Dimthyl Pimelimidate Dihydrochloride | | 58567-94-3 | Toxic | | Tox | | | | | | | | | | | | | | |
| Dinitrophenol | 2,4 dinitrophenol | 51-28-5 | Acute Toxicity, Flammable | Acute Tox | | | | | | | | Flam | | | | | | | |
| Diphenhydramine Hydrochloride | | 147-24-0 | Toxic | | Tox | | | | | | | | | | | | | | |
| Diphenyloxazole(2,5-) | Cytoscint | 92-71-7 | Toxic | | Tox | | | | | | | | | | | | | | |
| Dipyridamole | | 58-32-2 | Irritant | | | | | | | Irrit | | | | | | | | | |
| Disuccinimidyl glutarate | DSG | 79642-50-5 | Irritant | | | | | | | Irrit | | | | | | | | | |
| Dithioerythritol | 1,4, Dithioerythriol/DTE | 6892-68-8 | Toxic, Irritant | | Tox | | | | | Irrit | | | | | | | | | |
| Dithiothreitol | DTT/DL-1,4-Dithiothreitol | 3483-12-3 | Toxic, Irritant | | Tox | | | | | Irrit | | | | | | | | | |
| DMBA | 7,12-Dimethylbenz[a]antracene | 57-97-6 | Acute Toxicity, Carcinogen, Teratogen, Mutagen | Acute Tox | | | Carcin | Terat | Mut | | | | | | | | | | |
| DON | 6-Diazo-5-oxo-L-norleucine | 157-03-9 | Acute Toxicity | Acute Tox | | | | | | | | | | | | | | | |
| Doxorubicin hydrochloride | Doxil®, Caelyx™ | 25316-40-9 | Toxic, Carcinogen | | Tox | | Carcin | | | | | | | | | | | | |
| Doxycycline hyclate | | 24390-14-5 | Acute Toxicity, Irritant | Acute Tox | | | | | | Irrit | | | | | | | | | |
| DRB | 5,6 Dichlorobenzimidazole riboside | 53-85-0 | MBH | | | | | | | | | | | | | | MBH | | |
| Drierite | | 7778-18-9 | Toxic, Sensitizer, Irritant | | Tox | Sensi | | | | Irrit | | | | | | | | | |
| DTNB | 5,5′-Dithiobis(2-nitrobenzoic acid) | 69-78-3 | Toxic, Irritant | | Tox | | | | | Irrit | | | | | | | | | |
| DTNB | 5,5'-dithio-bis(nitrobenzoic acid) | 69- 78-3 | Irritant | | | | | | | | | | | | | | | | |
| Ducosate sodium | | 577-11-7 | Toxic | | Tox | | | | | | | | | | | | | | |

| Chemical Name | Alternatel Name | CAS# | Classification | Acute Toxicity | Toxic | Sensitizer | Carcinogen | Teratogen | Mutagen | Irritant | Corrosive | Flammable | Oxidizer | Reactive | Compressed Gas | Environmental Toxicity | May Be Harmful (MBH) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DXP | 1-Deoxy-D-xylulose 5-phosphate | 190079-18-6 | MBH | | | | | | | | | | | | | | MBH | | |
| E64 | N-(Trans-Epoxysuccinyl)-L-Leucine 4-Guanidinobutylamide | 66701-25-5 | MBH | | | | | | | | | | | | | | MBH | | |
| E64d Protease Inhibitor | | 88321-09-9 | Toxic, Irritant | | Tox | | | | | Irrit | | | | | | | | | |
| EDC | 1-Ethyl-3(3-Dimethylamino-propyl)carbodiimide HCl | 25952-53-8 | Toxic, Irritant | | Tox | | | | | Irrit | | | | | | | | | |
| EDC | 1-(3-Dimethylaminopropyl)-3-ethylcarbodiimide hydrochloride | 25952-53-8 | Toxic, Irritant | | Tox | | | | | Irrit | | | | | | | | | |
| EDTA | Ethylenediaminetetraacetic acid disodium salt hydrate | 60-00-4 | Irritant | | | | | | | Irrit | | | | | | | | | |
| EDTA | Ethylenediaminetetraacetic acid | 6381-92-6 | Acute Toxicity | Acute Tox | | | | | | | | | | | | | | | |
| EGTA | ethylene glycol tetraacetic acid/Ethylenebis(oxyethylenenitrilo)tetraacetic acid | 67-42-5 | Toxic | | Tox | | | | | | | | | | | | | | |
| Emetine dihydrochloride hydrate | | 316-42-7 | MBH | | | | | | | | | | | | | | MBH | | |
| ENBREL™ | Etanercept/Anti-TNF Receptor II | 185243-69-0 | Toxic | | Tox | | | | | | | | | | | | | | |
| ENGERIX-B | Recombivax-B/Hepatitis B vaccine | 351186-51-1 | Toxic | | Tox | | | | | | | | | | | | | | |
| Eosin Y | Bromofluoroscein | 15086-94-9 | MBH | | | | | | | | | | | | | | MBH | | |
| Epidermal Growth Factor Human | EGF | 62229-50-9 | MBH | | | | | | | | | | | | | | MBH | | |
| Epinephrine | | 51-43-4 | Acute Toxicity | Acute Tox | | | | | | | | | | | | | | | |
| Epirubicin | Ellence/Pharmorubicin | 56390-09-1 | Toxic | | Tox | | | | | | | | | | | | | | |
| Epoetin alfa | Epogen® | 113427-24-0 | Toxic | | Tox | | | | | | | | | | | | | | |
| Erythro(D-)-sphingosine | (2S,3R,4E)-2-Amino-4-eicosene-1,3,-diol | 6918-49-6 | Toxic | | Tox | | | | | | | | | | | | | | |
| Estradiol | β-Estradiol | 50-28-2 | Carcinogen, Teratogen | | | | Carcin | Terat | | | | | | | | | | | |
| Estradiol (β-) 17-acetate | | 1743-60-8 | Toxic, Reproductive Hazard | | Tox | | | | | | | | | | | | | | |
| Estradiol (β-) 3-benzoate | | 50-50-0 | Toxic, Carcinogen, Teratogen, Reproductive Hazard | | Tox | | Carcin | Terat | | | | | | | | | | | |
| Ethanol | Ethyl Acohol | 64-17-5 | Toxic, Flammable | | Tox | | | | | | | Flam | | | | | | | |
| Ethanolamine | | 141-43-5 | Acute Toxicity, Flammable, Corrosive | Acute Tox | | | | | | | Corr | | | | | | | | |
| Ethanolamine-Hydrochloride | | 2002-24-6 | Irritant | | | | | | | Irrit | | | | | | | | | |
| Ether (Anhydrous) | Diethyl ether | 7578-39-4 | Flammable | | | | | | | | | Flam | | | | | | | |
| Ethidium Bromide | | 1239-45-8 | Acute Toxicity, Mutagen | Acute Tox | | | | | Mut | | | | | | | | | | |
| Ethyl 3-aminobenzoate methanesulfonate salt | Tricaine | 886-86-2 | Toxic, Irritant | | Tox | | | | | Irrit | | | | | | | | | |
| Ethyl acetate | | 141-78-6 | Toxic, Flammable, Irritant | | Tox | | | | | Irrit | | Flam | | | | | | | |
| Ethyl methanesulfonate (EMS) | | 62-50-0 | Toxic, Mutagen, Carcinogen | | Tox | | Carcin | | | | | | | | | | | | |
| Ethyldiisopropylamine | N,N-Diisopropylethylamine | 7087-68-5 | Toxic, Flammable, Corrosive | | Tox | | | | | | Corr | Flam | | | | | | | |
| Ethylene Glycol | | 107-21-1 | Toxic | | Tox | | | | | | | | | | | | | | |
| Ethylene Glycol Butyl Ether | | 111-76-2 | Toxic, Flammable | | Tox | | | | | | | Flam | | | | | | | |
| Ethylenediamine branched | | 25987-06-8 | Acute Toxicity, Irritant | Acute Tox | | | | | | Irrit | | | | | | | | | |
| Ethylenediamine-tetracetic acid | EDTA tetrasodium salt | 10378-23-1 | Irritant | | | | | | | Irrit | | | | | | | | | |
| Ethyol® | Amifostine/2-(3-Aminopropyl)aminoethyl phosphorothioate | 20537-88-6 | Toxic | | Tox | | | | | | | | | | | | | | |
| Etoposide | | 33419-42-0 | Toxic, Carcingogen | | Tox | | Carcin | | | | | | | | | | | | |
| Evans Blue | | 314-13-6 | Toxic, Carcingogen | | Tox | | Carcin | | | | | | | | | | | | |
| FAA | 2 amino 5 fluorobenzoic acid (FAA) | 446-08-2 | Toxic, Irritant | | Tox | | | | | Irrit | | | | | | | | | |
| Fampridine | 4-Aminopyridine | 504-24-5 | Acute Toxicity, Aquatic Toxicity, Irritant | Acute Tox | | | | | | Irrit | | | | | | Aq Tox | | | |
| Fast Corinth V zinc chloride double salt | | 61966-14-1 | Toxic, Carcinogen | | Tox | | Carcin | | | | | | | | | | | | |

# Chemical List

| Chemical Name | Alternatel Name | CAS# | Classification | Acute Toxicity | Toxic | Sensitizer | Carcinogen | Teratogen | Mutagen | Irritant | Corrosive | Flammable | Oxidizer | Reactive | Compressed Gas | Environmental Toxicity | May Be Harmful (MBH) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Fast Red Tablets | Tetramisole hydrochloride/Naphthol AS-MX phosphate | 16595-80-5 | MBH | | | | | | | | | | | | | | MBH | | |
| Ferric Chloride | Iron(III) chloride | 7705-08-0 | Toxic, Corrosive, Irritant | | Tox | | | | | Irrit | Corr | | | | | | | | |
| Ferrous Sulfate heptahydrate | | 7720-78-7 | Toxic | | Tox | | | | | | | | | | | | | | |
| Ficoll | | 26873-85-8 | MBH | | | | | | | | | | | | | | MBH | | |
| FITC Standard | Fluorescein isothiocyanate isomer | 3326-32-7 | Sensitizer | | | Sensi | | | | | | | | | | | | | |
| Flavin adenine dinucleotide | | 84366-81-4 | MBH | | | | | | | | | | | | | | MBH | | |
| Flavopridol hydrochloride | | 131740-09-5 | Toxic | | Tox | | | | | | | | | | | | | | |
| Flucytosine | 5-Fluorcytosine | 2022-85-7 | Teratogen | | | | | Terat | | | | | | | | | | | |
| Fludarabine Phosphate | | 75607-67-9 | MBH | | | | | | | | | | | | | | MBH | | |
| Flumazenil | | 78755-81-4 | Irritant | | | | | | | Irrit | | | | | | | | | |
| Fluorescein isothiocyanate | FITC | 27072-45 -3 | Sensitizer | | | Sensi | | | | | | | | | | | | | |
| Fluorodeoxyglucose F-18 | D-Glucose, 2-deoxy-2-(fluoro-18F)- | 63503-12-8 | MBH | | | | | | | | | | | | | | MBH | | |
| Fluorootic(5-) acid hydrate | 5-FOA | 703-95-7 | Acute Toxicity, Irritant | Acute Tox | | | | | | Irrit | | | | | | | | | |
| Fluorouracil | | 51-21-8 | Toxic | | Tox | | | | | | | | | | | | | | |
| Fluorouracil(5-) | 5-FU | 51-21-8 | Acute Toxicity | Acute Tox | | | | | | | | | | | | | | | |
| Flutax-1 | | 191930-58-2 | Toxic | | Tox | | | | | | | | | | | | | | |
| Folic Acid | | 59-30-3 | MBH | | | | | | | | | | | | | | MBH | | |
| Formaldehyde | | 50-00-0 | Acute Toxicity, Flammable, Corrosive | Acute Tox | | | | | | | Corr | Flam | | | | | | | |
| Formamide | | 75-12-7 | Acute Toxicity, Irritant, Mutagen, Teratogen | Acute Tox | | | | Terat | Mut | Irrit | | | | | | | | | |
| Formic Acid | | 64-18-6 | Acute Toxicity, Flammable, Corrosive | Acute Tox | | | | | | | Corr | Flam | | | | | | | |
| Forskolin | | 66575-29-9 | Toxic | | Tox | | | | | | | | | | | | | | |
| FUDR | 5-Fluoro-2-deoxyuridine/Floxuridine | 50-91-9 | Acute Toxicity, Mutagen | Acute Tox | | | | | Mut | | | | | | | | | | |
| Fulvestrant | Faslodex® | 129453-61-8 | MBH | | | | | | | | | | | | | | MBH | | |
| Furosemide | | 54-31-9 | Acute Toxicity | Acute Tox | | | | | | | | | | | | | | | |
| G418 disulfate salt | Geneticin | 108321-42-2 | Sensitizer | | | Sensi | | | | | | | | | | | | | |
| Gadolinum (III) chloride hexahydrate | | 13450-84-5 | Irritant | | | | | | | Irrit | | | | | | | | | |
| Galactose | | 59-23-4 | MBH | | | | | | | | | | | | | | MBH | | |
| Galactose D (+) | | 59-23-4 | MBH | | | | | | | | | | | | | | MBH | | |
| Gastrografin | Meglumine diatrizoate | 131-49-7 | MBH | | | | | | | | | | | | | | MBH | | |
| Gelatin | | 9000-70-8 | MBH | | | | | | | | | | | | | | MBH | | |
| Gemcitabine hydrochloride | | 122111-03-9 | Toxic | | Tox | | | | | | | | | | | | | | |
| Gentamycin | | 1405-41-0 | Toxic, Sensitizer | | Tox | Sensi | | | | | | | | | | | | | |
| Giemsa Stain | | 51811-82-6 | Toxic, Flammable | | Tox | | | | | | | Flam | | | | | | | |
| Glass wool/spheres | | 65997-17-3 | Irritant, Carcinogen | | | | Carcin | | | Irrit | | | | | | | | | |
| Glucos(D-)-6-phosphate disodium salt dihydrate | | 3671-99-6 | MBH | | | | | | | | | | | | | | MBH | | |
| Glucosamine | | 66-84-2 | MBH | | | | | | | | | | | | | | MBH | | |
| Glucose D(+) | | 50-99-7 | MBH | | | | | | | | | | | | | | MBH | | |
| Glucose-6-phosphate | | 3671-99-6 | MBH | | | | | | | | | | | | | | MBH | | |
| Glutamic acid hydrochloride | | 138-15-8 | Corrosive | | | | | | | | Corr | | | | | | | | |

| Chemical Name | Alternatel Name | CAS# | Classification | Acute Toxicity | Toxic | Sensitizer | Carcinogen | Teratogen | Mutagen | Irritant | Corrosive | Flammable | Oxidizer | Reactive | Compressed Gas | Environmental Toxicity | May Be Harmful (MBH) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Glutamic acid L-(+) | | 56-86-0 | MBH | | | | | | | | | | | | | | MBH | | |
| Glutamine | | 5959-95-5 | MBH | | | | | | | | | | | | | | MBH | | |
| Glutamine (L-) | | 56-85-9 | MBH | | | | | | | | | | | | | | MBH | | |
| Glutaraldehyde | | 111-30-8 | Acute Toxicity | Acute Tox | | | | | | | | | | | | | | | |
| Glutathione - oxidized | | 27025-41-8 | Toxic, Carcinogen | | Tox | | Carcin | | | | | | | | | | | | |
| Glutathione - reduced | | 70-18-8 | MBH | | | | | | | | | | | | | | MBH | | |
| Gluytamic Acid (L-) | | 56-86-0 | MBH | | | | | | | | | | | | | | MBH | | |
| Glyceraldehyde | | 453-17-8 | MBH | | | | | | | | | | | | | | MBH | | |
| Glycerine | | 8043-29-6 | MBH | | | | | | | | | | | | | | MBH | | |
| Glycerol | | 56-81-5 | Irritant | | | | | | | Irrit | | | | | | | | | |
| Glycerol phosphate disodium salt | | 154804-51-0 | MBH | | | | | | | | | | | | | | MBH | | |
| Glycine | | 56-40-6 | MBH | | | | | | | | | | | | | | MBH | | |
| Glycogen | | 53956-04-0 | MBH | | | | | | | | | | | | | | MBH | | |
| Glycosidase(α) | | 9001- 42-7 | MBH | | | | | | | | | | | | | | MBH | | |
| Glycyrrhetinic (18α-) acid | | 1449-05-4 | Acute Toxicity | Acute Tox | | | | | | | | | | | | | | | |
| Glycyrrhetinic (18β-) acid | | 471-53-4 | Acute Toxicity | Acute Tox | | | | | | | | | | | | | | | |
| Glycyrrhizic acid ammonium salt | | 53956-04-0 | MBH | | | | | | | | | | | | | | MBH | | |
| Granisetron hydrochloride | Kytril | 107007-99-8 | Toxic | | Tox | | | | | | | | | | | | | | |
| GSK1210151A | I-BET151 | 1300031-49-5 | Toxic | | Tox | | | | | | | | | | | | | | |
| Guanabenz acetate salt | | 23256-50-0 | Toxic | | Tox | | | | | | | | | | | | | | |
| Guanidine Hydrochloride | | 50-01-1 | Acute Toxicity | Acute Tox | | | | | | | | | | | | | | | |
| Guanidine Isothiocyanate | Guanidine thiocyanate | 593-84-0 | Acute Toxicity | Acute Tox | | | | | | | | | | | | | | | |
| Guanosine 5-O-3 thiotriphosphate | | 94825-44-2 | Irritant | | | | | | | Irrit | | | | | | | | | |
| Guanosine-5'-diphosphate | GDP | 43139-22-6 | MBH | | | | | | | | | | | | | | MBH | | |
| Guanosine-5'-triphosphate | GTP | 36051-31-7 | Toxic | | Tox | | | | | | | | | | | | | | |
| Haloperidol | | 52-86-8 | Toxic, Sensitizer | | Tox | Sensi | | | | | | | | | | | | | |
| Hematoxylin | | 517-28-2 | Toxic, Irritant | | Tox | | | | | Irrit | | | | | | | | | |
| Hematoxylin 2 | | 517-28-2 | Irritant | | | | | | | Irrit | | | | | | | | | |
| Hemin | | 16009-13-5 | MBH | | | | | | | | | | | | | | MBH | | |
| Heparin sodium | Lovenox | 9041-08-1 | MBH | | | | | | | | | | | | | | MBH | | |
| Heparin sodium salt | | 9041-08-1 | MBH | | | | | | | | | | | | | | MBH | | |
| HEPES | | 7365-45-9 | MBH | | | | | | | | | | | | | | MBH | | |
| HEPES sodium salt | | 75277-39-3 | MBH | | | | | | | | | | | | | | MBH | | |
| Heptane | | 142-82-5 | Toxic, Flammable, Irritant | | Tox | | | | | Irrit | | Flam | | | | | | | |
| Hexadecyltrimethyl ammonium bromide | | 57-09-0 | Acute Toxicity, Irritant | Acute Tox | | | | | | Irrit | | | | | | | | | |
| Hexadimethrin Bromide | | 28728-55-4 | Acute Toxicity | Acute Tox | | | | | | | | | | | | | | | |
| Hexamethylmelamine | Hexalen® | 645-05-6 | Acute Toxicity | Acute Tox | | | | | | | | | | | | | | | |
| Hexamine cobalt chloride | | 10534-89-1 | Toxic, Irritant, Carcinogen | | Tox | | Carcin | | | Irrit | | | | | | | | | |
| Hexane | | 110-54-3 | Toxic, Flammable, Aquatic Toxicity | | Tox | | | | | | | | | | | Aq Tox | | | |

# Chemical List

| Chemical Name | Alternatel Name | CAS# | Classification | Acute Toxicity | Toxic | Sensitizer | Carcinogen | Teratogen | Mutagen | Irritant | Corrosive | Flammable | Oxidizer | Reactive | Compressed Gas | Environmental Toxicity | May Be Harmful (MBH) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hexokinase | | 9001-51-8 | MBH | | | | | | | | | Flam | | | | | MBH | | |
| Hexylene Glycol | | 107-41-5 | Irritant | | | | | | | Irrit | | | | | | | | | |
| Histidine | | 71-00-1 | MBH | | | | | | | | | | | | | | MBH | | |
| Histidine (L-) | | 71-00-1 | MBH | | | | | | | | | | | | | | MBH | | |
| Histidine monohydrochloride monohydrate | | 5934-29-2 | MBH | | | | | | | | | | | | | | MBH | | |
| Histone | | 37244-51-2 | MBH | | | | | | | | | | | | | | MBH | | |
| Hoechst 33258 | | 23491-45-4 | Toxic | | Tox | | | | | | | | | | | | | | |
| Hoechst 33342 | | 23491-52-3 | Toxic, Irritant Mutagen | | Tox | | | | Mut | Irrit | | | | | | | | | |
| Hyaluronic Acid Potassium Salt | | 31799-91-4 | MBH | | | | | | | | | | | | | | MBH | | |
| Hydrochloric acid | | 7647-01-0 | Corrosive | | | | | | | | Corr | | | | | | | | |
| Hydrocortisone | | 50-23-7 | Teratogen | | | | | | | | | | | | | | | | |
| Hydrocortisone Sodium Succinate | A-HydroCort® | 125-04-2 | MBH | | | | | | | | | | | | | | MBH | | |
| Hydrogen peroxide | | 7722-84-1 | Corrosive, Oxidizer, Carcinogen | | | | Carcin | | | | Corr | | Oxid | | | | | | |
| Hydroquinone | benzene-1,4-diol or quinol | 123-31-9 | Toxic, Irritant, Carcinogen, Mutagen | | Tox | | Carcin | | Mut | Irrit | | | | | | | | | |
| Hydroxylamine Hydrochloride | | 5470-11-1 | Toxic, Irritant, Carcinogen | | Tox | | Carcin | | | Irrit | | | | | | | | | |
| Hydroxyquinoline | 8-hydroxy quinoline | 148-24-3 | Toxic, Irritant | | Tox | | | | | Irrit | | | | | | | | | |
| Hydroxytamoxifen(4-) | | 68047-06-3 | Acute Toxicity, Irritant, Teratogen | Acute Tox | | | | Terat | | Irrit | | | | | | | | | |
| Hydroxyurea | | 127-07-1 | Toxic, Teratogen, Mutagen | | Tox | | | | Mut | | | | | | | | | | |
| Hygromycin B | | 31282-04-9 | Acute Toxicity, Sensitizer, Irritant | Acute Tox | | Sensi | | | | Irrit | | | | | | | | | |
| Hypoxanthine | | 68-94-0 | MBH | | | | | | | | | | | | | | MBH | | |
| IBMX | 3-Isobutyl-1-Methylxanthine | 28822-58-4 | Toxic, Irritant | | Tox | | | | | Irrit | | | | | | | | | |
| IBMX | 3-isobutyl-1-methylxanthine | 28822-58-4 | Toxic | | Tox | | | | | | | | | | | | | | |
| Idarubicin Hydrochloride | | 57852-57-0 | Toxic, Teratogen, Mutagen | | Tox | | | Terat | Mut | | | | | | | | | | |
| IDU | 5-Iodo-2′-deoxyuridine/IdUr | 54-42-2 | Toxic, Irritant, Teratogen, Mutagen | | Tox | | | Terat | Mut | Irrit | | | | | | | | | |
| Ifosfamide | | 3778-73-2 | Toxic, Teratogen, Mutagen | | Tox | | | Terat | Mut | | | | | | | | | | |
| Igepal CA360 | | 9036-19-5 | Acute Toxicity, Corrosive | Acute Tox | | | | | | | Corr | | | | | | | | |
| Imatinib mesylate | Gleevec™ | 220127-57-1 | Toxic, Reproductive Hazard | | Tox | | | | | | | | | | | | | | |
| Imidazole | Glyoxaline; Imidazole Glyoxaline; Imidazole, ULTROL Grade; 1,3-diazole; IMZ; 1H-imidazole | 288-32-4 | Acute Toxicity, Corrosive, Teratogen | Acute Tox | | | | Terat | | | Corr | | | | | | | | |
| IMXP | 2-isobutyl -3-methylxanthine | 24683-00-9 | Toxic, Irritant | | Tox | | | | | Irrit | | | | | | | | | |
| Indigo Carmine | | 860-22-0 | Acute Toxicity, Irritant | Acute Tox | | | | | | Irrit | | | | | | | | | |
| Indocyanine green | Cardiogreen | 3599-32-4 | Irritant | | | | | | | Irrit | | | | | | | | | |
| Inosine | | 58-63-9 | MBH | | | | | | | | | | | | | | MBH | | |
| Insulin (bovine) | | 11070-73-8 | MBH | | | | | | | | | | | | | | MBH | | |
| Insulin (human) | | 11061-68-0 | MBH | | | | | | | | | | | | | | MBH | | |
| Iodine | | 7553-56-2 | Toxic, Sensitizer, Corrosive | | Tox | Sensi | | | | | Corr | | | | | | | | |
| Iodoacetamide | | 144-48-9 | Acute Toxicity, Sensitizer | Acute Tox | | Sensi | | | | | | | | | | | | | |
| Iodophenol(4-) | | 540-38-5 | Acute Toxicity, Corrosive | Acute Tox | | | | | | | Corr | | | | | | | | |
| Iodotubercidin(5-) | | 24386-93-4 | Toxic | | Tox | | | | | | | | | | | | | | |
| Ionomycin | | 56092-82-1 | Toxic | | Tox | | | | | | | | | | | | | | |

| Chemical Name | Alternatel Name | CAS# | Classification | Acute Toxicity | Toxic | Sensitizer | Carcinogen | Teratogen | Mutagen | Irritant | Corrosive | Flammable | Oxidizer | Reactive | Compressed Gas | Environmental Toxicity | May Be Harmful (MBH) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IPTG | Isopropyl β-D-thiogalactopyranoside | 367-93-1 | Toxic, Carcinogen | | Tox | | Carcin | | | | | | | | | | | | |
| Irgasan | Triclosan | 3380-34-5 | Toxic, Irritant | | Tox | | | | | Irrit | | | | | | | | | |
| Iron Dextran | Infed | 9004-66-4 | Toxic, Sensitizer | | Tox | Sensi | | | | | | | | | | | | | |
| Iron(III) Chloride Hexahydrate | | 10025-77-1 | Toxic, Corrosive | | Tox | | | | | | Corr | | | | | | | | |
| Isoamyl alcohol | 3-methylbutanol | 123-51-3 | Acute Toxicity, Flammable, Irritant | Acute Tox | | | | | | Irrit | | Flam | | | | | | | |
| Isobutyl alchohol | 2-Methyl-1-propanol; Isobutanol | 78-83-1 | Acute Toxicity, Flammable, Irritant | Acute Tox | | | | | | Irrit | | Flam | | | | | | | |
| Isobutyric acid | 2-methylpropanoic acid | 79-31-2 | Acute Toxicity, Flammable | Acute Tox | | | | | | | | Flam | | | | | | | |
| Isoflurane | | 26675-46-7 | Acute Toxicity, Irritant | Acute Tox | | | | | | Irrit | | | | | | | | | |
| Isoleucine | | 73-32-5 | MBH | | | | | | | | | | | | | | MBH | | |
| Isoprenaline hydrochloride | | 51-30-9 | Toxic, Irritant | | Tox | | | | | Irrit | | | | | | | | | |
| Isopropanol | 2-Propanol; Isopropyl alcohol; IPA | 67-63-0 | Flammable, irritant | | | | | | | Irrit | | Flam | | | | | | | |
| Isopropyl-β-D-Thioglucopyranoside | | 19165-11-8 | Acute Toxicity | Acute Tox | | | | | | | | | | | | | | | |
| Isoquinolinylsulfonyl-3-methylpiperazine dihydrochloride | | 140663-38-3 | MBH | | | | | | | | | | | | | | MBH | | |
| Jenner's Stain | | 62851-42-7 | MBH | | | | | | | | | | | | | | MBH | | |
| JQ-1 Inhibitor | Bromodomain inhibitor | 1268524-70-4 | MBH | | | | | | | | | | | | | | MBH | | |
| Kanamycin | | 70560-51-9 | Toxic, Reproductive Hazard | | Tox | | | | | | | | | | | | | | |
| Kanamycin sulfate | | 25389-94-0 | Acute Toxicity | Acute Tox | | | | | | | | | | | | | | | |
| Kerosene | | 8008-20-6 | Toxic, Flammable | | Tox | | | | | | | Flam | | | | | | | |
| Ketoglutaric Acid di-sodium | | 305-72-6 | Irritant | | | | | | | Irrit | | | | | | | | | |
| Kineret™ | Anakinra | 143090-92-0 | MBH | | | | | | | | | | | | | | MBH | | |
| Lactacystin | | 133343-34-7 | MBH | | | | | | | | | | | | | | MBH | | |
| Lactate dehydrogenase | | 9001-60-9 | MBH | | | | | | | | | | | | | | MBH | | |
| Lactic acid | | 79-33-4 | Toxic, Irritant | | Tox | | | | | Irrit | | | | | | | | | |
| Lauroylsarcosine | Sarkosyl | 97-78-9 | Irritant | | | | | | | | | | | | | | | | |
| Laurylsarcosine sodium salt | sarkosyl | 137-16-6 | Acute Toxicity, Irritant | Acute Tox | | | | | | Irrit | | | | | | | | | |
| Lead Citrate trihydrate | | 6107-83-1 | Toxic, Carcinogen | | Tox | | Carcin | | | | | | | | | | | | |
| Leptin | | 177404-21-6 | Toxic | | Tox | | | | | | | | | | | | | | |
| Leptomycin B | | 87081-35-4 | Toxic | | Tox | | | | | | | | | | | | | | |
| Leucine | | 61-90-5 | Toxic | | Tox | | | | | | | | | | | | | | |
| Leucine (L-) | | 61-90-5 | MBH | | | | | | | | | | | | | | MBH | | |
| Leucovorin Calcium | Folinic Acid Calcium Hydrate | 1492-18-8 | Toxic, Carcinogen | | Tox | | Carcin | | | | | | | | | | | | |
| Leupeptin hemisulfate salt | | 103476-89-7 | MBH | | | | | | | | | | | | | | MBH | | |
| Leupeptin hydrochloride | | 24125-16-4 | MBH | | | | | | | | | | | | | | MBH | | |
| Leuprolide Acetate | | 74381-53-6 | MBH | | | | | | | | | | | | | | MBH | | |
| Lidocaine | | 137-58-6 | Toxic | | Tox | | | | | | | | | | | | | | |
| Ligase | | 9015-85-4 | MBH | | | | | | | | | | | | | | MBH | | |
| Light Green SF | Yellowish Stain | 5141-20-8 | Toxic, Carcinogen | | Tox | | Carcin | | | | | | | | | | | | |
| Lithium acetate dihydrate | | 6108-17-4 | Irritant, Teratogen | | | | | Terat | | Irrit | | | | | | | | | |
| Lithium chloride | | 7447-41-8 | Toxic | | Tox | | | | | | | | | | | | | | |

# Chemical List

| Chemical Name | Alternatel Name | CAS# | Classification | Acute Toxicity | Toxic | Sensitizer | Carcinogen | Teratogen | Mutagen | Irritant | Corrosive | Flammable | Oxidizer | Reactive | Compressed Gas | Environmental Toxicity | May Be Harmful (MBH) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lithium Hydride | | 7580-67-8 | Toxic, Corrosive, Water-reactive | | Tox | | | | | | Corr | | | React | | | | | |
| Lithium perchlorate | | 7791-03-9 | Oxidizer, Toxic, Irritant | | | | | | | Irrit | | | Oxid | | | | | | |
| Lomustine | CeeNU | 13010-47-4 | Carcinogen | | | | Carcin | | | | | | | | | | | | |
| Loperamide hydrochloride | | 34552-83-5 | Acute Toxicity | Acute Tox | | | | | | | | | | | | | | | |
| Lorazepam | | 846-49-1 | Toxic | | Tox | | | | | | | | | | | | | | |
| Luciferin (D-) potassium salt | | 15144-35-9 | MBH | | | | | | | | | | | | | | MBH | | |
| Luciferin(D-), sodium salt | | 103404-75-7 | MBH | | | | | | | | | | | | | | MBH | | |
| LY294002 PI3 Kinase inhibitor | | 154447-36-6 | MBH | | | | | | | | | | | | | | MBH | | |
| Lysine (L-) | | 56-87-1 | MBH | | | | | | | | | | | | | | MBH | | |
| Lysine (L-) | | 657-27-2 | MBH | | | | | | | | | | | | | | MBH | | |
| Lysophospatidylcholine (L-α-) | | 9008-30-4 | MBH | | | | | | | | | | | | | | MBH | | |
| Lysophosphatidylcholine | | 9008-30-4 | MBH | | | | | | | | | | | | | | MBH | | |
| Lysozyme from chicken egg | | 12650-88-3 | MBH | | | | | | | | | | | | | | MBH | | |
| Lysozyme from human neutrophils | | 9001-63-2 | MBH | | | | | | | | | | | | | | MBH | | |
| Lyticase | | 37340-57-1 | Sensitizer | | | Sensi | | | | | | | | | | | | | |
| Magnesium Acetate solution | | 142-72-3 | MBH | | | | | | | | | | | | | | MBH | | |
| Magnesium Acetate tetrahydrate | | 16674-78-5 | MBH | | | | | | | | | | | | | | MBH | | |
| Magnesium Carbonate | | 7760-50-1 | MBH | | | | | | | | | | | | | | MBH | | |
| Magnesium Chloride | | 7786-30-3 | Toxic | | Tox | | | | | | | | | | | | | | |
| Magnesium chloride, hexahydrate | | 7791-18-6 | MBH | | | | | | | | | | | | | | MBH | | |
| Magnesium Sulfate | | 7487-88-9 | MBH | | | | | | | | | | | | | | MBH | | |
| Magnesium sulfate heptahydrate | | 10034-99-8 | MBH | | | | | | | | | | | | | | MBH | | |
| Malachite green carbinol hydrochloride | | 123333-61-9 | Toxic, Irritant, Teratogen | | Tox | | | Terat | | Irrit | | | | | | | | | |
| Malachite green chloride | | 569-64-2 | Toxic, Irritant, Teratogen | | Tox | | | Terat | | Irrit | | | | | | | | | |
| Maleic Acid | | 110-16-7 | Acute Toxicity, Sensitizer, Irritant | Acute Tox | | Sensi | | | | Irrit | | | | | | | | | |
| Maleic acid sodium salt | | 3105-55-3 | Acute Toxicity, Sensitizer, Irritant | Acute Tox | | Sensi | | | | Irrit | | | | | | | | | |
| Maltose (D+) monohydrate | | 6363-53-7 | MBH | | | | | | | | | | | | | | MBH | | |
| Manganese (II) chloride tetrahydrate | | 13446-34-9 | Acute Toxicity, Aquatic Toxicity | Acute Tox | | | | | | | | | | | | | | | |
| Manganese Sulfate | | 10034-96-5 | Toxic, Aquatic Toxicity | | Tox | | | | | | | | | | | Aq Tox | | | |
| Manganese(II) Chloride | | 7773-01-5 | Toxic, Aquatic Toxicity | | Tox | | | | | | | | | | | Aq Tox | | | |
| Manganese(II) chloride hydrate | | 73913-06-1 | Toxic, Irritant, Aquatic Toxicity | | Tox | | | | | Irrit | | | | | | Aq Tox | | | |
| Mannitol | | 69-65-8 | MBH | | | | | | | | | | | | | | MBH | | |
| Mannose | | 3458-28-4 | MBH | | | | | | | | | | | | | | MBH | | |
| Mastoparan | | 72093-21-1 | MBH | | | | | | | | | | | | | | MBH | | |
| Medroxyprogensterone acetate | DEPO-PROVERA ® | 71-58-9 | Toxic | | Tox | | | | | | | | | | | | | | |
| Mefloquine hydrochloride | | 51773-92-3 | Toxic | | Tox | | | | | | | | | | | | | | |
| MEK Inhibitor - U0126 | | 109511-58-2 | MBH | | | | | | | | | | | | | | MBH | | |
| MES | morpholino-ethane sulfonic acid | 4432-31-9 | MBH | | | | | | | | | | | | | | MBH | | |
| MES Monohydrate | | 145224-94-8 | Irritant | | | | | | | Irrit | | | | | | | | | |

| Chemical Name | Alternatel Name | CAS# | Classification | Acute Toxicity | Toxic | Sensitizer | Carcinogen | Teratogen | Mutagen | Irritant | Corrosive | Flammable | Oxidizer | Reactive | Compressed Gas | Environmental Toxicity | May Be Harmful (MBH) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MES sodium salt | | 71119-23-8 | MBH | | | | | | | | | | | | | | MBH | | |
| Metanil Yellow | | 587-98-4 | Toxic, Sensitzer | | Tox | Sensi | | | | | | | | | | | | | |
| Metformin | 1-1-Dimethylbiguanide hydrochloride | 1115-70-4 | Acute Toxicity, Irritant | Acute Tox | | | | | | Irrit | | | | | | | | | |
| Metformin hydrochloride | | 1115-70-4 | Acute Toxicity, Irritant | Acute Tox | | | | | | Irrit | | | | | | | | | |
| Methanol | Carbinol; Methyl alcohol | 67-56-1 | Acute Toxicity, Flammable | Acute Tox | | | | | | | | Flam | | | | | | | |
| Methionine (L-) | | 63-68-3 | MBH | | | | | | | | | | | | | | MBH | | |
| Methionine (L-) | | 63-68-3 | MBH | | | | | | | | | | | | | | MBH | | |
| Methotrexate | Amethopterin | 59-05-2 | Toxic | | Tox | | | | | | | | | | | | | | |
| Methotrexate hydrate | | 133073-73-1 | Toxic, Teratogen, Mutagen | | Tox | | | Terat | Mut | | | | | | | | | | |
| Methyl Benzoate | | 93-58-3 | Toxic, Flammable | | Tox | | | | | | | Flam | | | | | | | |
| Methyl methane sulfonate | MMS | 66-27-3 | Toxic, Irritant, Carcinogen | | Tox | | Carcin | | | Irrit | | | | | | | | | |
| Methyl Violet | | 8004-87-3 | Toxic, Carcinogen | | Tox | | | | | | | | | | | | | | |
| Methyl Viologen dichloride hydrate | | 1910-42-5 | Acute Toxicity, Irritant, Aquatic Toxicity | Acute Tox | | | | | | Irrit | | | | | | Aq Tox | | | |
| Methyl(2-)-2 Butene | | 513-35-9 | Toxic, Irritant, Mutagen | | Tox | | | | Mut | Irrit | | | | | | | | | |
| Methyl(7-) guanosine | | 20244-86-4 | MBH | | | | | | | | | | | | | | MBH | | |
| Methyl-4-phenylpyridinium iodide | MPP | 36913-39-0 | Toxic | | Tox | | | | | | | | | | | | | | |
| Methyladenine(3-) | | 5142-23-4 | MBH | | | | | | | | | | | | | | MBH | | |
| Methylbutane | | 78-78-4 | Toxic, Flammable, Irritant | | Tox | | | | | Irrit | | Flam | | | | | | | |
| Methylcellulose | | 9004-67-5 | MBH | | | | | | | | | | | | | | MBH | | |
| Methylcyclohexane | | 108-87-2 | Toxic, Flammable, Irritant | | Tox | | | | | Irrit | | Flam | | | | | | | |
| Methylene blue | | 7220-79-3 | Toxic | | Tox | | | | | | | | | | | | | | |
| Methylene Blue hydrate | | 122965-43-9 | Toxic | | Tox | | | | | | | | | | | | | | |
| Methylprednisone acetate | Depo-Medrol | 53-36-1 | Toxic | | Tox | | | | | | | | | | | | | | |
| Methylsalicylate | | 119-36-8 | Toxic, Irritant, Teratogen | | Tox | | | Terat | | Irrit | | | | | | | | | |
| MG132 protease inhibitor | z-Leu-Leu-Leu-al) | 133407-82-6 | MBH | | | | | | | | | | | | | | MBH | | |
| Microcystin LR | | 101043-37-2 | Toxic, Flammable, Irritant | | Tox | | | | | Irrit | | Flam | | | | | | | |
| Mineral Oil | | 8042-47-5 | Irritant, Flammable | | | | | | | Irrit | | Flam | | | | | | | |
| Mitomycin C | | 50-07-7 | Toxic, Carcinogen | | Tox | | Carcin | | | | | | | | | | | | |
| Molybdic Acid | Sodium molybdate | 10102-40-6 | Irritant, Carcinogen | | | | Carcin | | | Irrit | | | | | | | | | |
| Monensin sodium salt | | 22373-78-0 | Toxic | | Tox | | | | | | | | | | | | | | |
| MONOSODIUM URATE CRYSTALS | | 1198-77-2 | MBH | | | | | | | | | | | | | | MBH | | |
| MOPS | (3-(N-morpholino)propanesulfonic acid) 3-Morpholinopropanesulfonic Acid | 1132-61-2 | Toxic, Irritant | | Tox | | | | | Irrit | | | | | | | | | |
| MTS-4-Fluorescein | | 887355-30-8 | MBH | | | | | | | | | | | | | | MBH | | |
| MUG/A | 4-Methylumbelliferyl β-D-galactopyranoside | 6160-78-7 | MBH | | | | | | | | | | | | | | MBH | | |
| Mycophenolic acid | | 24280-93-1 | Toxic, Teratogen, Mutagen | | Tox | | | Terat | Mut | | | | | | | | | | |
| Myoinositol | | 87-89-8 | MBH | | | | | | | | | | | | | | MBH | | |
| Myoinositol pentakisphosphate ammonium salt | | 20298-95-7 | MBH | | | | | | | | | | | | | | MBH | | |
| Myristic acid | Tetradecanoic acid | 544-63-8 | Irritant | | | | | | | Irrit | | | | | | | | | |
| N-(1-Naphthyl)-Ethylenediammonium Dichloride | | 1465-25-4 | Toxic, Irritant | | Tox | | | | | Irrit | | | | | | | | | |

# Chemical List

| Chemical Name | Alternatel Name | CAS# | Classification | Acute Toxicity | Toxic | Sensitizer | Carcinogen | Teratogen | Mutagen | Irritant | Corrosive | Flammable | Oxidizer | Reactive | Compressed Gas | Environmental Toxicity | May Be Harmful (MBH) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| N-acetyl L tryptophanamide | | 2382-79-8 | MBH | | | | | | | | | | | | | | MBH | | |
| N-acetyl-glucosamine | NAG; hexosaminidase | 7512-17-6 | MBH | | | | | | | | | | | | | | MBH | | |
| N-acetyl-L-Cysteine | | 616-91-1 | MBH | | | | | | | | | | | | | | MBH | | |
| NAD | nicotinamide adenine dinucleotide | 53-84-9 | Irritant | | | | | | | Irrit | | | | | | | | | |
| NAD, Reduced form | Nicotinamide adenine dinucleotide | 104809-32-7 | Irritant | | | | | | | Irrit | | | | | | | | | |
| NADH, Disodium Salt | Nicotinamide adenine dinucleotide | 606-68-8 | MBH | | | | | | | | | | | | | | MBH | | |
| NADP | Nicotinamide adenine dinucleotide phosphate | 1184-16-3 | Irritant | | | | | | | Irrit | | | | | | | | | |
| Nalidixic Acid | | 389-08-2 | Acute Toxicity, Sensitizer, Carcinogen, Mutagen, Teratogen | Acute Tox | | Sensi | Carcin | Terat | Mut | | | | | | | | | | |
| Naphthoflavone(α) | | 604-59-1 | MBH | | | | | | | | | | | | | | MBH | | |
| Naphthyl(α-) butyrate | | 3121-70-8 | Toxic | | Tox | | | | | | | | | | | | | | |
| Neomycin sulfate | | 1405-10-3 | Sensitizer | | | Sensi | | | | | | | | | | | | | |
| N-ethylmaleimide | | 128-53-0 | Acute Toxicity | | | | | | | | | | | | | | | | |
| Neutral Red | | 553-24-2 | MBH | | | | | | | | | | | | | | MBH | | |
| Nickel Chloride | | 7791-20-0 | Acute toxicity, Sensitizer, Irritant, Mutagen, Teratogen | Acute Tox | | Sensi | | Terat | Mut | Irrit | | | | | | | | | |
| Nickel sulphate | | 7786-81-4 | Acute toxicity, Sensitizer, Irritant, Mutagen, Teratogen | Acute Tox | | Sensi | | Terat | Mut | Irrit | | | | | | | | | |
| Nickel(II) Sulfate Hexahydrate | | 10101-97-0 | Acute toxicity, Sensitizer, Irritant, Mutagen, Teratogen | Acute Tox | | Sensi | | Terat | Mut | Irrit | | | | | | | | | |
| Nicotinamide | | 98-92-0 | Toxic, Irritant | | Tox | | | | | Irrit | | | | | | | | | |
| Nitric Acid | | 7697-37-2 | Acute Toxicity, Oxidizer, Corrosive | Acute Tox | | | | | | | Corr | | Oxid | | | | | | |
| Nitrogen - liquid | LN2 | 7727-37-9 | Compressed Gas, Cryogenic | | | | | | | | | | | | Comp gas | | | | |
| Nitropropionic acid(3-) | | 504-88-1 | Acute Toxicity, Irritant | Acute Tox | | | | | | Irrit | | | | | | | | | |
| Nitroquinoline(4-)-N-oxide | | 56-57-5 | Carcinogen | | | | Carcin | | | | | | | | | | | | |
| Nitrotetrazolium Blue Chloride | NBT | 298-83-9 | Toxic, Irritant | | Tox | | | | | Irrit | | | | | | | | | |
| Nocodazole | | 31430-18-9 | Mutagen, Teratogen | | | | | Terat | Mut | | | | | | | | | | |
| N-Octyl-Beta-Dglucopyranoside | | 29836-26-8 | MBH | | | | | | | | | | | | | | MBH | | |
| N-Phenylthiourea | | 103-85-5 | Acute Toxicity, Sensitizer | Acute Tox | | Sensi | | | | | | | | | | | | | |
| Nuclear Fast Red | | 6409-77-4 | Irritant, Aquatic Toxicity | | | | | | | Irrit | | | | | | Aq Tox | | | |
| O-(carboxymethyl) hydroxylamine hemi hydrochloride | | 2921-14-4 | Irritant | | | | | | | Irrit | | | | | | | | | |
| O-3-methyl-D-glucopyranose | | 13224-94-7 | MBH | | | | | | | | | | | | | | MBH | | |
| Octyl B-D-glucopyranoside | | 29836-26-8 | MBH | | | | | | | | | | | | | | MBH | | |
| Octyl-β-D-glucopyranoside | | 29836-26-8 | MBH | | | | | | | | | | | | | | MBH | | |
| ODQ | 1H-[1,2,4]Oxadiazolo[4,3-a]quinoxalin-1-one | 41443-28-1 | Toxic, Irritant | | Tox | | | | | Irrit | | | | | | | | | |
| O-glycosidase | | 9032-92-2 | MBH | | | | | | | | | | | | | | MBH | | |
| Oil Red O | Solvent Red 27 | 1320-06-5 | MBH | | | | | | | | | | | | | | MBH | | |
| Oleic Acid | | 112-80-1 | Toxic, Irritant | | Tox | | | | | Irrit | | | | | | | | | |
| Oligomycin | | 1404-19-9 | Acute Toxicity, Irritant | Acute Tox | | | | | | Irrit | | | | | | | | | |
| Ondansetron Hydrochloride Dihydrate | | 103639-04-9 | Acute Toxicity | Acute Tox | | | | | | | | | | | | | | | |
| ONPG | 2-Nitrophenyl-beta-D-galactopyranoside | 369-07-3 | MBH | | | | | | | | | | | | | | MBH | | |
| Orotic acid | | 65-86-1 | Toxic, Irritant | | Tox | | | | | Irrit | | | | | | | | | |
| Osmium tetroxide | | 20816-12-0 | Acute Toxicity, Sensitizer, Corrosive | Acute Tox | | Sensi | | | | | Corr | | | | | | | | |

| Chemical Name | Alternatel Name | CAS# | Classification | Acute Toxicity | Toxic | Sensitizer | Carcinogen | Teratogen | Mutagen | Irritant | Corrosive | Flammable | Oxidizer | Reactive | Compressed Gas | Environmental Toxicity | May Be Harmful (MBH) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ovalbumin | | 9006-59-1 | Sensitizer | | | | | | | | Corr | | | | | | | | |
| Oxalacetic Acid | | 328-42-7 | Corrosive | | | | | | | | | | | | | | | | |
| Oxaliplatin | ELOOXATIN® | 61825-94-3 | Toxic, Sensitizer, Irritant | | Tox | Sensi | | | | Irrit | | | | | | | | | |
| PABA | para-aminobenzoic acid; 4-Aminobenzoic acid | 150-13-0 | Irritant, Sensitizer | | | Sensi | | | | Irrit | | | | | | | | | |
| Paclitaxel | Taxol | 33069-62-4 | Toxic, Irritant, Sensitizer, Carcinogen, Teratogen, Mutagen | | Tox | Sensi | Carcin | Terat | Mut | Irrit | | | | | | | | | |
| Palmitic Acid | | 57-10-3 | Toxic, Irritant | | Tox | | | | | | | | | | | | | | |
| Palonosetron Hydrochloride | | 135729-67-3 | Toxic | | Tox | | | | | | | | | | | | | | |
| Pantothenic Acid | | 137-08-6 | MBH | | | | | | | | | | | | | | MBH | | |
| Paraformaldehyde | | 30525-89-4 | Acute Toxicity, Flammable Solid, Sensitizer, Irritant, Carcinogen | Acute Tox | | Sensi | | | | Irrit | | Flam | | | | | | | |
| Pargyline hydrochloride | | 306-07-0 | Toxic | | Tox | | | | | | | | | | | | | | |
| PDA | phorbol diacetate | 24928-15-2 | Acute Toxicity | Acute Tox | | | | | | | | | | | | | | | |
| Penicillin | | 69-57-8 | Sensitizer | | | Sensi | | | | | | | | | | | | | |
| Pepstatin A | | 26305-03-3 | MBH | | | | | | | | | | | | | | MBH | | |
| Peptone | | 91079-38-8 | MBH | | | | | | | | | | | | | | MBH | | |
| Perchloric Acid | | 7601-90-3 | Toxic , Corrosive, Oxidizer | | Tox | | | | | | Corr | | Oxid | | | | | | |
| Perifosine | | 157716-52-4 | MBH | | | | | | | | | | | | | | MBH | | |
| Periodic Acid | | 10450-60-9 | Oxidizer, Corrosive | | | | | | | | Corr | | Oxid | | | | | | |
| Phenanthroline | | 66-71-7 | Acute Toxicity, Aquatic Toxicity | Acute Tox | | | | | | | | | | | | Aq Tox | | | |
| Phenanthroline monohydrate | | 5144-89-8 | Acute Toxicity, Aquatic Toxicity | Acute Tox | | | | | | | | | | | | Aq Tox | | | |
| Phenazine methosulfate | 5-Methylphenazinium Methyl Sulphate | 299-11-6 | Toxic, Irritant | | Tox | | | | | Irrit | | | | | | | | | |
| Phenazine methosulfate | PMS solution | 299-11-6 | Toxic, Irritant, Mutagen | | Tox | | | | Mut | Irrit | | | | | | | | | |
| Phenethyl isothiocyanate | | 2257-09-2 | Acute Toxicity, Irritant, Sensitizer | Acute Tox | | Sensi | | | | Irrit | | | | | | | | | |
| Phenformin hydrochloride | | 834-28-6 | Toxic | | Tox | | | | | | | | | | | | | | |
| Phenol | | 108-95-2 | Acute Toxicity, Corrosive, Mutagen | Acute Tox | | | | | Mut | | Corr | | | | | | | | |
| Phenol Red | | 143-74-8 | Toxic, Irritant | | Tox | | | | | Irrit | | | | | | | | | |
| Phenolphthalein | | 77-09-8 | Toxic, Carcinogen, Mutagen | | Tox | | Carcin | | Mut | | | | | | | | | | |
| Phenylalanine (L-) | | 63-91-2 | MBH | | | | | | | | | | | | | | MBH | | |
| Phenylalanine (L-) | | 63-91-2 | MBH | | | | | | | | | | | | | | MBH | | |
| Phenylarsine oxide | | 637-03-6 | Acute Toxicity | Acute Tox | | | | | | | | | | | | | | | |
| Phenylbutyric(4-) acid | | 1821-12-1 | Flammable, MBH | | | | | | | | | Flam | | | | | MBH | | |
| Phenylenediamine | | 106-50-3 | Acute Toxicity, Aquatic Toxicity | Acute Tox | | | | | | | | | | | | Aq Tox | | | |
| Phenylenediamine dihydrochloride | | 624-18-0 | Toxic, Irritant, Sensitizer, Aquatic Toxicity | | Tox | Sensi | | | | Irrit | | | | | | Aq Tox | | | |
| Phenylmethylsulfonyl fluoride | PMSF | 329-98-6 | Acute Toxicity, Corrosive | Acute Tox | | | | | | | Corr | | | | | | | | |
| Phenylphenol | | 90-43-7 | Acute Toxicity, Flammable | Acute Tox | | | | | | | | Flam | | | | | | | |
| Phleomycin | | 11006-33-0 | Toxic, Mutagen | | Tox | | | | Mut | | | | | | | | | | |
| Phloxine B | | 18472-87-2 | MBH | | | | | | | | | | | | | | MBH | | |
| Phorbol 12-Myristate 13-Acetate | PMA/TPA | 16561-29-8 | Irritant | | | | | | | Irrit | | | | | | | | | |
| Phospatidylcholine (L-α-) | | 8002-43-5 | MBH | | | | | | | | | | | | | | MBH | | |
| Phosphatidic acid (L-α-) | | 7091-44-3 | MBH | | | | | | | | | | | | | | MBH | | |

# Chemical List

| Chemical Name | Alternatel Name | CAS# | Classification | Acute Toxicity | Toxic | Sensitizer | Carcinogen | Teratogen | Mutagen | Irritant | Corrosive | Flammable | Oxidizer | Reactive | Compressed Gas | Environmental Toxicity | May Be Harmful (MBH) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phosphogluconic(6-) acid | | 53411-70-4 | MBH | | | | | | | | | | | | | | MBH | | |
| Phosphoric Acid | | 7664-38-2 | Toxic, Corrosive | | Tox | | | | | | Corr | | | | | | | | |
| Phosphorylethanolamine | | 1071-23-4 | Corrosive | | | | | | | | | | | | | | | | |
| Phytic acid | | 83-86-3 | Irritant | | | | | | | Irrit | | | | | | | | | |
| PIPES | | 5625-37-6 | MBH | | | | | | | | | | | | | | MBH | | |
| PIPES - sesquisodium salt | Piperazine ehtane sulfonic acid | 100037-69-2 | MBH | | | | | | | | | | | | | | MBH | | |
| PIPES - sodium salt | Piperazine ehtane sulfonic acid | 10010-67-0 | MBH | | | | | | | | | | | | | | MBH | | |
| Pluronic F-68 | | 106392-12-5 | MBH | | | | | | | | | | | | | | MBH | | |
| p-Nitrophenyl Phosphate | PNPP | 4264-83-9 | Toxic, Corrosive | | Tox | | | | | | Corr | | | | | | | | |
| poly (dI-dC) - poly (dI-dC) | | 118578-37-3 | MBH | | | | | | | | | | | | | | MBH | | |
| poly dG-dC | | 90385-88-9 | MBH | | | | | | | | | | | | | | MBH | | |
| poly L Lysine | | 25988-63-0 | MBH | | | | | | | | | | | | | | MBH | | |
| Poly(ethylene-co-vinyl acetate) | | 24937-78-8 | MBH | | | | | | | | | | | | | | MBH | | |
| Polyacrylamide | | 9003-05-8 | MBH | | | | | | | | | | | | | | MBH | | |
| Polyadenylic acid potassium salt | | 26763-19-9 | MBH | | | | | | | | | | | | | | MBH | | |
| Polycytidylic acid | Poly I-Poly C | 24939-03-5 | MBH | | | | | | | | | | | | | | MBH | | |
| Poly-D-lysine hydrobromide | | 27964-99-4 | MBH | | | | | | | | | | | | | | MBH | | |
| Polyethylene - oxidized | Carefree | 68441-17-8 | MBH | | | | | | | | | | | | | | MBH | | |
| Polyethylene glycol dodecyl ether | BRIJ 35 solution | 9002-92-0 | Toxic | | Tox | | | | | | | | | | | | | | |
| Polyethylene glycol hexadecyl ether | Brij | 9004-95-9 | Toxic | | Tox | | | | | | | | | | | | | | |
| Polyethyleneglycol | PEG | 25322-68-3 | MBH | | | | | | | | | | | | | | MBH | | |
| Polyethylenimine | | 9002-98-6 | Acute Toxicity, Aquatic Toxicity | Acute Tox | | | | | | | | | | | | Aq Tox | | | |
| Polyguanylic acid potassium salt | | 54684-83-2 | MBH | | | | | | | | | | | | | | MBH | | |
| Polyinosnic - Polycytidylic acid sodium salt | | 42424-50-0 | MBH | | | | | | | | | | | | | | MBH | | |
| Polymaleic acid | | 26099-09-2 | Corrosive | | | | | | | | Corr | | | | | | | | |
| Polyurydilic acid potassium salt | | 27416-86-0 | MBH | | | | | | | | | | | | | | MBH | | |
| Polyvinyl alcohol | | 9002-89-5 | Flammable | | | | | | | | | Flam | | | | | | | |
| Polyvinyl pyrrolidine | | 9003-39-8 | MBH | | | | | | | | | | | | | | MBH | | |
| Ponceau S Stain | | 6226-79-5 | Toxic, Corrosive | | Tox | | | | | | Corr | | | | | | | | |
| Porphobilinogen | | 487-90-1 | Toxic, Irritant | | Tox | | | | | Irrit | | | | | | | | | |
| Potassium acetate | | 127-08-2 | Toxic | | Tox | | | | | | | | | | | | | | |
| Potassium bicarbonate | | 298-14-6 | MBH | | | | | | | | | | | | | | MBH | | |
| Potassium bromide | | 7758-02-3 | Toxic, Irritant, Mutagen | | Tox | | | | Mut | Irrit | | | | | | | | | |
| Potassium Carbonate | | 584-08-7 | Toxic, Irritant | | Tox | | | | | Irrit | | | | | | | | | |
| Potassium chloride | | 7447-40-7 | Toxic, Aquatic Toxicity | | Tox | | | | | | | | | | | | | | |
| Potassium Cyanide | | 151-50-8 | Acute Toxicity, Corrosive, Aquatic Toxicity | Acute Tox | | | | | | | Corr | | | | | Aq Tox | | | |
| Potassium dichromate | | 7778-50-9 | Acute Toxicity, Corrosive Oxidizer, Carcinogen Aquatic Toxicity | Acute Tox | | | Carcin | | | | Corr | | Oxid | | | Aq Tox | | | |
| Potassium ferricyanide | | 13746-66-2 | Toxic | | Tox | | | | | | | | | | | | | | |
| Potassium fluoride | | 7789-23-3 | Acute Toxicity | Acute Tox | | | | | | | | | | | | | | | |

# Chemical List

| Chemical Name | Alternatel Name | CAS# | Classification | Acute Toxicity | Toxic | Sensitizer | Carcinogen | Teratogen | Mutagen | Irritant | Corrosive | Flammable | Oxidizer | Reactive | Compressed Gas | Environmental Toxicity | May Be Harmful (MBH) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Potassium hexacyanoferrate trihydrate | | 14459-95-1 | Toxic | | Tox | | | | | | | | | | | | | | |
| Potassium hydrogen phthalate | | 877-24-7 | Toxic | | Tox | | | | | | | | | | | | | | |
| Potassium hydroxide | | 1310-58-3 | Acute Toxicity, Corrosive, Aquatic Toxicity | Acute Tox | | | | | | | Corr | | | | | Aq Tox | | | |
| Potassium Iodide | | 7681-11-0 | Toxic, Teratogen | | Tox | | | Terat | | | | | | | | | | | |
| Potassium phosphate dibasic | | 7758-11-4 | MBH | | | | | | | | | | | | | | MBH | | |
| potassium phosphate dibasic trihydrate | | 16788-57-1 | MBH | | | | | | | | | | | | | | MBH | | |
| Potassium phosphate monobasic | | 7778-77-0 | MBH | | | | | | | | | | | | | | MBH | | |
| Potassium sulfate | | 7778-80-5 | MBH | | | | | | | | | | | | | | MBH | | |
| Potassium Thiocyanate | | 333-20-0 | Toxic, Aquatic Toxicity | | Tox | | | | | | | | | | | Aq Tox | | | |
| Prednisolone | | 50-24-8 | Toxic | | Tox | | | | | | | | | | | | | | |
| Probucol | | 23288-49-5 | MBH | | | | | | | | | | | | | | MBH | | |
| Progesterone | | 57-83-0 | Toxic, Carcingogen | | Tox | | Carcin | | | | | | | | | | | | |
| Proline(L-) | | 147-85-3 | MBH | | | | | | | | | | | | | | MBH | | |
| Propidium Iodide | | 25535-16-4 | Toxic, Irritant | | Tox | | | | | Irrit | | | | | | | | | |
| Propylene glycol | | 57-55-6 | Irritant | | | | | | | Irrit | | | | | | | | | |
| Prostaglandin J2 | 15-Deoxy-Δ12,14-prostaglandin J2 | 87893-55-8 | Acute Toxicity, Flammable, Irritant | Acute Tox | | | | | | Irrit | | Flam | | | | | | | |
| Protease | | 9014-01-1 | Acute Toxicity, Sensitizer | Acute Tox | | Sensi | | | | | | | | | | | | | |
| Protease | | 25535-16-4 | Toxic | | Tox | | | | | | | | | | | | | | |
| Proteinase K | | 39450-01-6 | Toxic, Irritant, Sensitizer | | Tox | | | | | | | | | | | | | | |
| PUGNac | O-(2-Acetamido-2-deoxy-D-glucpyranosylidene)amino-N-phenyl carbamate | 132489-69-1 | MBH | | | | | | | Irrit | | | | | | | MBH | | |
| Puromycin Dihydrochloride | | 58-58-2 | Toxic | | Tox | | | | | | | | | | | | | | |
| Pyridine | | 110-86-1 | Acute Toxicity, Carcinogen | Acute Tox | | | Carcin | | | | | | | | | | | | |
| Pyridoxal 5 phosphate | | 853645-22-4 | MBH | | | | | | | | | | | | | | MBH | | |
| Pyronin | | 92-32-0 | MBH | | | | | | | | | | | | | | MBH | | |
| Pyrophosphate Disodium Salt | Sodium pyrophosphate dibasic | 7758-16-9 | MBH | | | | | | | | | | | | | | MBH | | |
| Pyroxidine | | 65-23-6 | Toxic, Irritant | | Tox | | | | | Irrit | | | | | | | | | |
| Pyruvic Acid | | 127-17-3 | Corrosive, Combustible | | | | | | | | Corr | | | | | | | | |
| Quercetin dihydrate | | 6151-25-3 | Acute Toxicity | Acute Tox | | | | | | | | | | | | | | | |
| Quinine | | 130-95-0 | Toxic, Sensitizer | | Tox | Sensi | | | | | | | | | | | | | |
| Quinolinol | 8-hydroxyquinoline | 148-24-3 | Acute Toxicity, Irritant, Aquatic Toxicity | Acute Tox | | | | | | Irrit | | | | | | Aq Tox | | | |
| Raffinose D(+) | | 17629-30-0 | MBH | | | | | | | | | | | | | | MBH | | |
| Ranibizumab | Lucentis™ | 347-396-82-1 | Toxic | | Tox | | | | | | | | | | | | | | |
| Rapamycin | | 53123-88-9 | Toxic | | Tox | | | | | | | | | | | | | | |
| Rhodamine 123 | | 62669-70-9 | MBH | | | | | | | | | | | | | | MBH | | |
| Riboflavin | | 83-88-5 | MBH | | | | | | | | | | | | | | MBH | | |
| Ribonuclease A | | 9001-99-4 | MBH | | | | | | | | | | | | | | MBH | | |
| Rifampicin | | 13292-46-1 | Acute Toxicity, Irritant | Acute Tox | | | | | | Irrit | | | | | | | | | |
| Rotenone | | 83-79-4 | Acute Toxicity, AquaticToxicity | Acute Tox | | | | | | | | | | | | Aq Tox | | | |
| Rubidium chloride | | 7791-11-9 | Toxic | | Tox | | | | | | | | | | | | | | |

# Chemical List

| Chemical Name | Alternatel Name | CAS# | Classification | Acute Toxicity | Toxic | Sensitizer | Carcinogen | Teratogen | Mutagen | Irritant | Corrosive | Flammable | Oxidizer | Reactive | Compressed Gas | Environmental Toxicity | May Be Harmful (MBH) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ruthenium Red | | 11103-72-3 | MBH | | | | | | | | | | | | | | MBH | | |
| S-(4-Nitrobenzyl)-6-thioinosine | NBTI | 38048-32-7 | MBH | | | | | | | | | | | | | | MBH | | |
| S-(4-Nitrobenzyl)Glutathione | | 6803-19-6 | MBH | | | | | | | | | | | | | | MBH | | |
| s-adenosyl methionine chloride | SAM | 24346-00-7 | MBH | | | | | | | | | | | | | | MBH | | |
| S-Adenosyl-L-homocystein | | 979-92-0 | MBH | | | | | | | | | | | | | | MBH | | |
| Salicylic Acid | | 69-72-7 | Toxic, Irritant | | Tox | | | | | Irrit | | | | | | | | | |
| Salmon sperm DNA | | 68938-01-2 | MBH | | | | | | | | | | | | | | MBH | | |
| Saponin | | 8047-15-2 | Toxic, Irritant | | Tox | | | | | Irrit | | | | | | | | | |
| Sephadex DEAE | | 12609-80-2 | MBH | | | | | | | | | | | | | | MBH | | |
| sephadex G10 | | 9050-68-4 | MBH | | | | | | | | | | | | | | MBH | | |
| Serine (DL-) | | 302-84-1 | MBH | | | | | | | | | | | | | | MBH | | |
| Serine (L-) | | 56-45-1 | MBH | | | | | | | | | | | | | | MBH | | |
| Sesame oil | | 8008-74-0 | Irritant, Flammable | | | | | | | Irrit | | Flam | | | | | | | |
| Silicone Oil | | 63148-62-9 | Irritant | | | | | | | Irrit | | | | | | | | | |
| Silver nitrate | | 7761-88-8 | Acute Toxicity, Oxidizer, Corrosive, Aquatic Toxicity | Acute Tox | | | | | | | Corr | | Oxid | | | Aq Tox | | | |
| Simethicone | | 8050-81-5 | MBH | | | | | | | | | | | | | | MBH | | |
| Sirtinol | | 410536-97-9 | MBH | | | | | | | | | | | | | | MBH | | |
| Sodium Acetate | | 127-09-3 | Toxic, Irritant | | Tox | | | | | Irrit | | | | | | | | | |
| Sodium Acetate Trihydrate | | 6131-90-4 | MBH | | | | | | | | | | | | | | MBH | | |
| Sodium arsenate dibasic heptahydrate | | 10048-95-0 | Acute Toxicity, Carcinogen | Acute Tox | | | Carcin | | | | | | | | | | | | |
| Sodium arsenite | | 7784-46-5 | Acute Toxicity, Carcinogen, Aquatic Toxicity | Acute Tox | | | Carcin | | | | | | | | | Aq Tox | | | |
| Sodium Azide | | 26628-22-8 | Acute Toxicity, Aquatic Toxicity | Acute Tox | | | | | | | | | | | | Aq Tox | | | |
| Sodium Bicarbonate | | 144-55-8 | MBH | | | | | | | | | | | | | | MBH | | |
| Sodium Bisulfite | | 7681-57-4 | Acute Toxicity, Aquatic Toxicity | Acute Tox | | | | | | | | | | | | Aq Tox | | | |
| Sodium Borate | Borax | 1330-43-4 | Acute Toxicity | Acute Tox | | | | | | | | | | | | | | | |
| Sodium borohydride | | 16940-66-2 | Water Reactive, Flammable, Toxic, Corrosive | | | | | | | | Corr | Flam | | React | | | | | |
| Sodium bromide | | 7647-15-6 | Acute Toxicity | Acute Tox | | | | | | | | | | | | | | | |
| sodium butyrate | | 156-54-7 | Irritant, Mutagen | | | | | | Mut | Irrit | | | | | | | | | |
| Sodium Carbonate | | 497-19-8 | Toxic | | Tox | | | | | | | | | | | | | | |
| Sodium chloride | | 7647-14-5 | MBH | | | | | | | | | | | | | | MBH | | |
| Sodium Citrate | | 6132-04-3 | MBH | | | | | | | | | | | | | | MBH | | |
| Sodium Deoxycholate | | 302-95-4 | Acute Toxicity | Acute Tox | | | | | | | | | | | | | | | |
| Sodium dichloroacetic acid | | 2156-56-1 | Toxic, Irritant, Carcinogen | | Tox | | Carcin | | | Irrit | | | | | | | | | |
| Sodium dodecyl sulfate (SDS) | | 151-21-3 | Toxic, Flammable, Irritant | | Tox | | | | | Irrit | | Flam | | | | | | | |
| Sodium Fluoride | | 7681-49-4 | Acute toxicity, Irritant | Acute Tox | | | | | | Irrit | | | | | | | | | |
| Sodium hydrogen difluoride | | 1333-83-1 | Acute toxicity, Corrosive | Acute Tox | | | | | | | Corr | | | | | | | | |
| Sodium hydroxide | | 1310-73-2 | Corrosive, Aquatic Toxicity | | | | | | | | Corr | | | | | Aq Tox | | | |
| Sodium Hypchlorite | | 7681-52-9 | Toxic, Corrosive, Oxidizer, Aquatic Toxicity | | Tox | | | | | | Corr | | | | | Aq Tox | | | |
| Sodium Hypochlorite | Hypochlorous Acid Sodium Salt | 7681-52-9 | Corrosive, Aquatic Toxicity | | | | | | | | Corr | | | | | Aq Tox | | | |

| Chemical Name | Alternatel Name | CAS# | Classification | Acute Toxicity | Toxic | Sensitizer | Carcinogen | Teratogen | Mutagen | Irritant | Corrosive | Flammable | Oxidizer | Reactive | Compressed Gas | Environmental Toxicity | May Be Harmful (MBH) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sodium iodide | | 7681-82-5 | Acute Toxicity, Irritant | Acute Tox | | | | | | Irrit | | | | | | | | | |
| Sodium iodoacetate | | 305-53-3 | Toxic, Irritant | | Tox | | | | | Irrit | | | | | | | | | |
| Sodium L-ascorbate | | 134-03-2 | MBH | | | | | | | | | | | | | | MBH | | |
| Sodium metavanadate | | 13718-26-8 | Toxic, Irritant | | Tox | | | | | Irrit | | | | | | | | | |
| Sodium Nitrate | | 7631-99-4 | Acute Toxicity, Irritant | Acute Tox | | | | | | Irrit | | | | | | | | | |
| Sodium Nitrite | | 7632-00-0 | Acute Toxicity, Oxidizer, Carcinogen, Irritant | Acute Tox | | | Carcin | | | Irrit | | | Oxid | | | | | | |
| Sodium orthovanadate | | 13721-39-6 | Acute Toxicity, Aquatic Toxicity | Acute Tox | | | | | | | | | | | | Aq Tox | | | |
| Sodium Periodate | | 7790-28-5 | Acute Toxicity, Irritant | Acute Tox | | | | | | Irrit | | | | | | | | | |
| Sodium periodate | | 7790-28-5 | Toxic, Oxidizer, Irritant | | Tox | | | | | Irrit | | | Oxid | | | | | | |
| Sodium Phenylbutyrate | | 1716-12-7 | Irritant | | | | | | | Irrit | | | | | | | | | |
| Sodium phosphate | | 7601-54-9 | Toxic, Irritant, Aquatic Toxicity | | Tox | | | | | Irrit | | | | | | Aq Tox | | | |
| Sodium phosphate dibasic | | 7558-79-4 | Irritant | | | | | | | Irrit | | | | | | | | | |
| sodium phosphate dibasic heptahydrate | | 7782-85-6 | MBH | | | | | | | | | | | | | | MBH | | |
| sodium phosphate monobasic | | 7558-80-7 | MBH | | | | | | | | | | | | | | MBH | | |
| Sodium phosphate monobasic dihydrate | | 13472-35-0 | MBH | | | | | | | | | | | | | | MBH | | |
| Sodium phosphate monobasic monohydrate | | 10049-21-5 | MBH | | | | | | | | | | | | | | MBH | | |
| Sodium Pyrophosphate Decahydrate | | 13472-36-1 | Toxic, Irritant | | Tox | | | | | Irrit | | | | | | | | | |
| Sodium Pyruvate | | 113-24-6 | MBH | | | | | | | | | | | | | | MBH | | |
| Sodium selenite | | 10102-18-8 | Acute Toxicity, Aquatic Toxicity | Acute Tox | | | | | | | | | | | | Aq Tox | | | |
| Sodium Sulfate | | 7757-82-6 | Aquatic Toxicity | | | | | | | | | | | | | Aq Tox | | | |
| Sodium Sulfite | | 7757-83-7 | Acute Toxicity | Acute Tox | | | | | | | | | | | | | | | |
| Sodium Tetraborate | | 1303-96-4 | Acute Toxicity, Teratogen | Acute Tox | | | | Terat | | | | | | | | | | | |
| sodium tetraborate decahydrate | | 1303-96-4 | Toxic, Teratogen | | Tox | | | Terat | | | | | | | | | | | |
| Sodium Thiocyanate | | 540-72-7 | Acute Toxicity, Aquatic Toxicity | Acute Tox | | | | | | | | | | | | Aq Tox | | | |
| Sodium Thiosulfate | | 7772-98-7 | MBH | | | | | | | | | | | | | | MBH | | |
| Sorbitan monopalmitate | Span40 | 25322-68-3 | Irritant | | | | | | | Irrit | | | | | | | | | |
| Sorbitol | | 50-70-4 | MBH | | | | | | | | | | | | | | MBH | | |
| Spectinomycin dihydrochloride pentahydrate | | 22189-32-8 | MBH | | | | | | | | | | | | | | MBH | | |
| Spermidine | | 124-20-9 | Irritant | | | | | | | Irrit | | | | | | | | | |
| spermidine trihydrochloride | | 334-50-9 | Toxic, Irritant | | Tox | | | | | Irrit | | | | | | | | | |
| Spermine diphosphate salt | | 3891-79-0 | Irritant | | | | | | | Irrit | | | | | | | | | |
| Spermine tetrahydrochloride | | 306-67-2 | Irritant | | | | | | | Irrit | | | | | | | | | |
| Staurosporine | | 62996-74-1 | Toxic, Irritant, Carcinogen, Mutagen | | Tox | | Carcin | | Mut | Irrit | | | | | | | | | |
| Streptavidin | | 9013-20-1 | MBH | | | | | | | | | | | | | | MBH | | |
| Streptomycin sulfate salt | | 3810-74-0 | Toxic, Teratogen | | Tox | | | Terat | | | | | | | | | | | |
| Succinic acid | | 110-15-6 | Acute Toxicity | Acute Tox | | | | | | | | | | | | | | | |
| Succinic anhydride | | 108-30-5 | Acute Toxicity | Acute Tox | | | | | | | | | | | | | | | |
| Succinylacetone | 4,6 Dioxoheptanoic acid | 51568-18-4 | Irritant | | | | | | | Irrit | | | | | | | | | |
| Sucrose | | 57-50-1 | MBH | | | | | | | | | | | | | | MBH | | |

# Chemical List

| Chemical Name | Alternatel Name | CAS# | Classification | Acute Toxicity | Toxic | Sensitizer | Carcinogen | Teratogen | Mutagen | Irritant | Corrosive | Flammable | Oxidizer | Reactive | Compressed Gas | Environmental Toxicity | May Be Harmful (MBH) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sucrose D(+) | | 57-50-1 | MBH | | | | | | | | | | | | | | MBH | | |
| Sudan black B | | 4197-25-5 | MBH | | | | | | | | | | | | | | MBH | | |
| Sulfamic Acid | | 5329-14-6 | Acute Toxicity, Aquatic Toxicity | Acute Tox | | | | | | | | | | | | Aq Tox | | | |
| Sulfometuron methyl | | 74222-97-2 | Acute Toxicity, Aquatic Toxicity | Acute Tox | | | | | | | | | | | | Aq Tox | | | |
| Sulfosalicylic(5-) acid dihydrate | | 5965-83-3 | Toxic, Irritant | | Tox | | | | | Irrit | | | | | | | | | |
| Sulfuric acid | | 7664-93-9 | Corrosive, Oxidizer, Aquatic Toxicity | | | | | | | | Corr | | Oxid | | | Aq Tox | | | |
| Sunflower seed oil | | 8001-21-6 | Flammable | | | | | | | | | Flam | | | | | | | |
| Tannic acid | | 1401-55-4 | Acute Toxicity | Acute Tox | | | | | | | | | | | | | | | |
| TAPS | N-[Tris(hydroxymethyl)methyl]-3-aminopropanesulfonic acid | 29915-38-6 | MBH | | | | | | | | | | | | | | MBH | | |
| Taq Polymerase | | 9012-90-2 | Toxic, Irritant | | Tox | | | | | Irrit | | | | | | | | | |
| Taurine | | 107-35-7 | Toxic, Irritant | | Tox | | | | | Irrit | | | | | | | | | |
| Taurodeoxycholic acid | | 1180-95-6 | MBH | | | | | | | | | | | | | | MBH | | |
| TCDD | 2,3,7,8-Tetrachlorodibenzo-p-Dioxin (2,3,7,8,-TCDD) | 1746-01-6 | Acute Toxicity, Flammable, Irritant, Carcinogen, Teratogen | Acute Tox | | | Carcin | Terat | | Irrit | | Flam | | | | | | | |
| TEMED (Tetramethylethylenediamine)N,N,N',N',-Tetramethylethylenediamine | | 110-18-9 | Acute Toxicity, Flammable, Corrosive | Acute Tox | | | | | | | Corr | Flam | | | | | | | |
| Terbutaline hemisulfate | | 23031-32-5 | Sensitizer, Teratogen | | | Sensi | | Terat | | | | | | | | | | | |
| Tergitol | | 127087-87-0 | Toxic, corrosive | | Tox | | | | | | Corr | | | | | | | | |
| Tetracycline | | 60-54-8 | Toxic, Teratogen | | Tox | | | Terat | | | | | | | | | | | |
| Tetracycline hydrochloride | | 64-75-5 | Toxic, Irritant | | Tox | | | | | Irrit | | | | | | | | | |
| Tetraethylammonium hydroxide | | 77-98-5 | Corrosive | | | | | | | | Corr | | | | | | | | |
| Tetraethylthiuram disulfide | | 97-77-8 | Toxic, Sensitizer, Aquatic Toxicity | | Tox | Sensi | | | | | | | | | | Aq Tox | | | |
| Tetrafluoroethane(1,1,1,2-) | Cytocool™ II | 811-97-2 | Compressed Gas | | | | | | | | | | | | Comp gas | | | | |
| Tetrahydrofuran | | 109-99-9 | Toxic, Flammable, Irritant, Carcinogen | | Tox | | | | | Irrit | | Flam | | | | | | | |
| Tetramethylammonium chloride | | 75-57-0 | Acute Toxicity | Acute Tox | | | | | | | | | | | | | | | |
| Tetramethylrhodamine Ethyl Ester Perchlorate | TMRE | 115532-52-0 | Acute Toxicity, Irritant | Acute Tox | | | | | | Irrit | | | | | | | | | |
| Tetramisole hydrochloride | Levamisol | 16595-80-5 | Toxic | | Tox | | | | | | | | | | | | | | |
| Tetrazolium Bromide | MTT (Thiazolyl blue) | 298-93-1 | Toxic, Irritant, Mutagen | | Tox | | | | Mut | Irrit | | | | | | | | | |
| Thapsigargin | | 67526-95-8 | Toxic, Sensitizer, Irritant | | Tox | Sensi | | | | Irrit | | | | | | | | | |
| Thiabendazole | | 148-79-8 | Acute Toxicity, Aquatic Toxicity | Acute Tox | | | | | | | | | | | | Aq Tox | | | |
| Thialysine | | 4099-35-8 | MBH | | | | | | | | | | | | | | MBH | | |
| Thiamine Hydrochloride | | 67-03-8 | Toxic | | Tox | | | | | | | | | | | | | | |
| Thiamine monophosphate chloride dihydrate | | 273724-21-3 | MBH | | | | | | | | | | | | | | MBH | | |
| Thiazolylblue tetrazolium bromide | | 298-93-1 | Irritant, Mutagen | | | | | | Mut | Irrit | | | | | | | | | |
| Thimerosal | | 54-64-8 | Acute Toxicity, Aquatic Toxicity | Acute Tox | | | | | | | | | | | | Aq Tox | | | |
| Thioglycolic acid sodium salt | | 68-11-1 | Acute Toxicity, Corrosive, Aquatic Toxicity | Acute Tox | | | | | | | Corr | | | | | Aq Tox | | | |
| Thiourea | | 62-56-6 | Acute Toxicity, Carcinogen, Sensitizer, Irritant | Acute Tox | | Sensi | Carcin | | | Irrit | | | | | | | | | |
| Threonine | | 72-19-5 | MBH | | | | | | | | | | | | | | MBH | | |
| Threonine (L-) | | 72-19-5 | MBH | | | | | | | | | | | | | | MBH | | |
| Thrombin | | 9002-04-4 | Toxic, Sensitizer, Irritant | | Tox | Sensi | | | | Irrit | | | | | | | | | |
| Thrombin receptor activator peptide | TRAP | 137339-65-2 | MBH | | | | | | | | | | | | | | MBH | | |

| Chemical Name | Alternatel Name | CAS# | Classification | Acute Toxicity | Toxic | Sensitizer | Carcinogen | Teratogen | Mutagen | Irritant | Corrosive | Flammable | Oxidizer | Reactive | Compressed Gas | Environmental Toxicity | May Be Harmful (MBH) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Thromboxane B2 | TXB2 | 54397-85-2 | Teratogen | | | | | Terat | | | | | | | | | | | |
| Thymidine | | 50-89-5 | MBH | | | | | | | | | | | | | | MBH | | |
| Tiopronin | N-(2-Mercaptopropionyl)glycine | 1953-02-2 | Toxic | | Tox | | | | | | | | | | | | | | |
| Tiron | 4,5- Dihydroxy- 1,3- benzenedisulfonic acid disodium salt monohydrate | 270573-71-2 | Toxic, Irritant | | Tox | | | | | Irrit | | | | | | | | | |
| Tocopherol (α-) | Vitamin E | 10191-41-0 | Flammable, MBH | | | | | | | | | Flam | | | | | | | |
| Toluene | | 108-88-3 | Toxic, Flammable, Teratogen | | Tox | | | Terat | | | | Flam | | | | | | | |
| Toluidine blue | | 92-31-9 | MBH | | | | | | | | | | | | | | MBH | | |
| Trans-2-Phenylcyclopropylamine hemisulfate salt | | 13492-01-8 | Acute Toxicity | Acute Tox | | | | | | | | | | | | | | | |
| Trastuzamab | Herceptin® | 180288-69-1 | Toxic | | Tox | | | | | | | | | | | | | | |
| Trehalose dihydrate | | 6138-23-4 | Toxic | | Tox | | | | | | | | | | | | | | |
| Trehalose trihydrate | | 6138-23-4 | Toxic | | Tox | | | | | | | | | | | | | | |
| Tribromoethanol (2,2,2-) | | 75-80-9 | Acute Toxicity | Acute Tox | | | | | | | | | | | | | | | |
| Trichloroacetic acid | TCA | 76-03-9 | Acute Toxicity, Corrosive, Carcinogen, Aquatic toxicity | Acute Tox | | | Carcin | | | | Corr | | | | | Aq Tox | | | |
| Trichostatin A | | 58880-19-6 | Acute Toxicity, Sensitizer, Irritant | Acute Tox | | Sensi | | | | Irrit | | | | | | | | | |
| Tricine | | 5704-04-1 | MBH | | | | | | | | | | | | | | MBH | | |
| Trieethylammonium formate | | 585-29-5 | Irritant | | | | | | | Irrit | | | | | | | | | |
| Triethanolamine | | 102-71-6 | Flammable | | | | | | | | | Flam | | | | | | | |
| Triethylamine | | 121-44-8 | Acute toxicity, Flammable, Corrosive | Acute Tox | | | | | | | Corr | Flam | | | | | | | |
| Trifluoroacetic acid | TFA | 76-05-1 | Toxic, Corrosive | | Tox | | | | | | Corr | | | | | | | | |
| Trimethylsilyl xylose | | 18623-22-8 | MBH | | | | | | | | | | | | | | MBH | | |
| Trioctanion | | 538-23-8 | MBH | | | | | | | | | | | | | | MBH | | |
| Triptolide | | 38748-32-2 | MBH | | | | | | | | | | | | | | MBH | | |
| Tris | | 68112-30-1 | MBH | | | | | | | | | | | | | | MBH | | |
| Tris(2-Carboxyethyl) Phosphine hyrochloride | TCEP | 51805-45-9 | Acute Toxicity, Corrosive | Acute Tox | | | | | | | Corr | | | | | | | | |
| Triton x-100 | | 9002-93-1 | Acute Toxicity, Aquatic Toxicity | Acute Tox | | | | | | | | | | | | Aq Tox | | | |
| Trizma base | | 77-86-1 | Toxic, Irritant | | Tox | | | | | Irrit | | | | | | | | | |
| Trizma hydrochloride | | 1185-53-1 | MBH | | | | | | | | | | | | | | MBH | | |
| Trypan blue | Direct Blue 14; Niagara Blue 3B | 72-57-1 | Toxic, Carcinogen | | Tox | | Carcin | | | | | | | | | | | | |
| Trypsin | | 9002-07-7 | Toxic, Sensitizer, Irritant | | Tox | Sensi | | | | Irrit | | | | | | | | | |
| Trypsin inhibitor | | 9035-81-8 | Sensitizer | | | Sensi | | | | | | | | | | | | | |
| Tryptone - bacteriological | | 73049-73-7 | MBH | | | | | | | | | | | | | | MBH | | |
| Tryptophan (L-) | | 73-22-3 | MBH | | | | | | | | | | | | | | MBH | | |
| Tryptophan (L-) | | 73-22-3 | MBH | | | | | | | | | | | | | | MBH | | |
| Tunicamycin | | 11089-65-9 | Acute Toxicity, Teratogen | Acute Tox | | | | Terat | | | | | | | | | | | |
| Tween 20 | | 9005-64-5 | MBH | | | | | | | | | | | | | | MBH | | |
| Tween 80 | | 9005-65-6 | Irritant | | | | | | | Irrit | | | | | | | | | |
| Tyrosine (DL-) | | 556-03-6 | Toxic, Irritant | | Tox | | | | | Irrit | | | | | | | | | |
| Tyrosine (L-) | | 60-18-4 | Toxic, Irritant | | Tox | | | | | Irrit | | | | | | | | | |
| Tyrosine (L-) | | 60-18-4 | MBH | | | | | | | | | | | | | | MBH | | |

# Chemical List

| Chemical Name | Alternatel Name | CAS# | Classification | Acute Toxicity | Toxic | Sensitizer | Carcinogen | Teratogen | Mutagen | Irritant | Corrosive | Flammable | Oxidizer | Reactive | Compressed Gas | Environmental Toxicity | May Be Harmful (MBH) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Uracil | | 66-22-8 | MBH | | | | | | | | | | | | | | MBH | | |
| Urea | Carbamide | 57-13-6 | MBH | | | | | | | | | | | | | | MBH | | |
| Uridine | | 58-96-8 | MBH | | | | | | | | | | | | | | MBH | | |
| Uridine 5' monophosphate disodium salt | UMP | 3387-36-8 | MBH | | | | | | | | | | | | | | MBH | | |
| Uridine 5' triphosphate trisodium salt | UTP | 19817-92-6 | Toxic, Carcinogen | | Tox | | Carcin | | | | | | | | | | | | |
| Urokinase | Abbokinase ®/Plasminogen Activator | 9039-53-6 | MBH | | | | | | | | | | | | | | MBH | | |
| Valine (L-) | | 72-18-4 | MBH | | | | | | | | | | | | | | MBH | | |
| Valine (L-) | | 72-18-4 | MBH | | | | | | | | | | | | | | MBH | | |
| Valinomycin | | 2001-95-8 | Acute Toxicity | | | | | | | | | | | | | | | | |
| Verapamil hydrochloride | | 152-11-4 | Toxic | | Tox | | | | | | | | | | | | | | |
| Vinflunine Ditartrate | | 194468-36-5 | Toxic | | Tox | | | | | | | | | | | | | | |
| Wortmannin | | 19545-26-7 | Acute Toxicity | | | | | | | | | | | | | | | | |
| X-gal | 5-bromo-4-chloro-b-indolyl-b-D-galactopyranoside | 7240-90-6 | MBH | | | | | | | | | | | | | | MBH | | |
| Xylene | | 108-38-3 | Toxic, Flammable | | Tox | | | | | | | Flam | | | | | | | |
| Xylene Cyanol FF | | 2650-17-1 | Toxic, Irritant | | Tox | | | | | Irrit | | | | | | | | | |
| Xylenes | | 1330-20-7 | Acute Toxicity, Flammable, Aquatic Toxicity | Acute Tox | | | | | | | | Flam | | | | Aq Tox | | | |
| Yeast extract | | 8013-01-2 | MBH | | | | | | | | | | | | | | MBH | | |
| Zeocin | Phleomycin | 11006-33-0 | Toxic, Mutagen | | Tox | | | | Mut | | | | | | | | | | |
| Zinc acetate | | 557-34-6 | Toxic, Irritant | | Tox | | | | | Irrit | | | | | | | | | |
| Zinc acetate dihydrate | | 5970-45-6 | Toxic, Irritant | | Tox | | | | | Irrit | | | | | | | | | |
| Zinc chloride | | 7646-85-7 | Acute Toxicity, Corrosive, Aquatic Toxicity | Acute Tox | | | | | | | Corr | | | | | Aq Tox | | | |
| Zinc Sulfate | | 7733-02-0 | Acute Toxicity, Irritant, Aquatic Toxicity | Acute Tox | | | | | | Irrit | | | | | | Aq Tox | | | |
| Zinc sulfate heptahydrate | | 7446-20-0 | Acute Toxicity, Irritant, Aquatic Toxicity | Acute Tox | | | | | | Irrit | | | | | | Aq Tox | | | |

## 7.4 PLANT LIST

The following pages contain an inventory of plants to be selected for the Huntsman Phase IV project.

| TREES | | | | |
|---|---|---|---|---|
| Botanical Name | Common Name | Zone | Size (HxW) | Shade Tolerant |
| Abies concolor | White Fir | 3 | 50x30 | |
| Acer ginalla 'Flame' | Flame Amur Maple | 2 | 25x15 | |
| Acer grandidentatum | Big Tooth Maple | 3 | 30x20 | |
| Acer palmatum | Japanese Maple | 5 | 15x10 | Y |
| Cercis canadensis | Eastern Redbud | 5 | 25x25 | |
| Picea glauca densata | Black Hills Spruce | 2 | | |
| Picea orientalis 'Wells Green Knight' | Oriental Spruce | 5 | 25x10 | |
| Picea pungens ' Fat Albert' | Blue Spruce | 2 | 15x12 | |
| Pseudotsuga menziesii | Douglas Fir | 4 | 80x20 | |
| Quercus gambelii | Scrub Oak (clump) | 4 | 20x20 | |
| | | | | |

| SHRUBS | | | | |
|---|---|---|---|---|
| Botanical Name | Common Name | Zone | Size (HxW) | Shade Tolerant |
| Cercocarpus ledifolius | Curleaf Mountain Mahogany | 3 | 12x10 | |
| Cornus alba 'Baihalo' | Ivory Halo Dogwood | 3 | 5x5 | Y |
| Cornus alba 'Elegantissima' | Variegated Dogwood | 3 | 6x6 | Y |
| Cornus sericea 'Baleyi | Baleyi Red Osier Dogwood | 3 | 10x12 | Y |
| Cotoneaster apiculata | Cranberry Cotoneaster | 5 | 3x6 | |
| Euonymus alatus compacta | Dwarf Burning Bush | 3 | 6x8 | |
| Forsythia x intermedia 'Arnolds Dwarf' | Arnold Dwarf Forsythia | 4 | 3x7 | |
| Juniperus sabina 'Broadmoor' | Broadmoor Juniper | 3 | 1x6 | Y |
| Mahonia aquifoium compacta | Dwarf Oregon Grape | 4 | 3x4 | Y |
| Pinus mugo mugus 'Slowmound' | Slowmound Mugho Pine | 2 | 2x4 | |
| Pinus sylvestris 'Albyn Prostrata' | Spreading Scoth Pine | 3 | 3x5 | |
| Pinus sylvestris 'Hillside Creeper' | Creeping Scotch Pine | 4 | 2x6 | |
| Prunus besseyi | Western Sand Cherry | 2 | 6x6 | |

| | | | | |
|---|---|---|---|---|
| Rhus aromatica 'Gro Low' | Grow Low Sumac | 4 | 3x8 | |
| Rhus glabra | Smooth Sumac | 2 | 10x10 | |
| Rhus tilobata | Oakbrush/Three-leaf Sumac | 4 | 6x6 | |
| Rhus typhina 'Tiger Eyes' | Gold Leaf Sumac | 4 | 6x6 | Y |
| Ribes aureum | Golden Currant | 3 | 6x6 | Y |
| Spiraea bumalda 'Anthony Waterer' | Anthony Waterer Spirea | 4 | 3x5 | |
| Symphoricarpos alba | Common Snowberry | 3 | 6x6 | Y |
| Taxus media 'Dark Green Spreader' | Dark Green Spreader Yew | 4 | 5x8 | Y |
| Weigela florida 'Wine and Roses' | Weigela | 4 | 5x5 | |
| | | | | |
| **GROUNDCOVER** | | | | |
| Botanical Name | Common Name | Zone | Height | Shade Tolerant |
| Lysimphachia nummularia | Creeping Jenny | 4 | 4" | Y |
| Mahonia repens | Creeping Oregon Grape | 2 | 20" | Y |
| Pachysandra terminalis | Japanese Spurge | 4 | 8" | Y |
| Sedum acre | Utah Sedum | 3 | 3" | |
| Sedum kamtchaticum | Kamchaticum Sedum | 3 | 6" | |
| Sedum reflexum | Blue Spruce Sedum | 3 | 5" | |
| Thymus lanuginosus | Wooly Thyme | 3 | 3" | |
| Thymus serpyllum 'coccineus' | Creeping Red Thyme | 3 | 6" | |
| | | | | |
| **PERENNIALS & GRASSES** | | | | |
| Botanical Name | Common Name | Zone | Height | Shade Tolerant |
| Aquilegia alpina | Alpine Columbine | 3 | 20" | |
| Aquilegia crysantha | Yellow Star Columbine | 3 | 30" | |
| Calamagrostis acutiflora 'Karl Foerster' | Feather Reed Grass | 5 | 48" | |
| Chasmanthium latiflollum | Northern Sea Oats | 5 | 36" | Y |
| Festuca ovina glauca 'Elijah Blue' | Elijah Blue Fescue | 4 | 12" | |
| Hemerocallis | Daylilly | 3 | 20-30" | |
| Iris siberica 'Caesar's Brother' | Siberian Iris | 4 | 42" | |
| Iris siberica 'Ruffled Velvet' | Siberian Iris | 4 | 30" | |
| Linum lewisii | Blue Flax | 2 | 18" | |

| | | | | |
|---|---|---|---|---|
| Penstemon eatonii | Firecracker Penstemon | 3 | 36" | |
| Perovskia 'atriplicofolia' | Russian Sage | 5 | 48" | |
| Rudbeckia fulgida | Goldstrum Black Eyed Susan | 4 | 30" | |
| Salvia superbanemorosa | May Night Salvia | 4 | 28" | |
| Schizachyrium scoparium | Little Bluestem | 3 | 36" | |
| Stipa comata | Needle and Thread Grass | 4 | 48" | |
| Utah Wildflower Seed Mix | … | … | … | |
| | | | | |
| **DEEP SHADE PLANTS** | | | | |
| Botanical Name | Common Name | Zone | Height | Shade Tolerant |
| Acer palmatum | Japanese Maple | 5 | 15 | Y |
| Chasmanthium latiflollum | Northern Sea Oats | 5 | 36" | Y |
| Cornus alba 'Elegantissima' | Variegated Dogwood | 3 | 6x6 | Y |
| Dicentra | Bleeding Heart | 3 | 24"-36" | Y |
| Heuchera | Coral Bells | 2 | 12"-18" | Y |
| Hosta x | Plantain Lily | 4 | 15"-24" | Y |
| Lysimphachia nummularia | Creeping Jenny | 4 | 4" | Y |
| Mahonia repens | Creeping Oregon Grape | 2 | 20" | Y |
| Pachysandra terminalis | Japanese Spurge | 4 | 8" | Y |
| Picea glauca densata | Black Hills Spruce | 2 | 40 | * |
| Rhus typhina 'Tiger Eyes' | Gold Leaf Sumac | 4 | 6x6 | Y |
| Ribes aureum | Golden Currant | 3 | 6x6 | Y |
| Symphoricarpos alba | Common Snowberry | 3 | 6x6 | Y |
| Taxus media 'Dark Green Spreader' | Dark Green Spreader Yew | 4 | 5x8 | Y |
| | | | | |
| *Canopy Trees successful in cooler soils and part shade | | | | |

## 7.5 SUSTAINABILITY CHARRETTE NOTES

The following pages contain slides from the Sustainability Charrette for the Huntsman Phase IV project.

# LANDSCAPE & CIVIL
## Decisions

- 40,000 cubic yards of cut, includes bedrock
- reuse bedrock for site features. Share resources with net export on campus.
- Zone plants per consumption. Minimize turf to 10%.
- Align with pedestrian connection. Trail connection.

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The Primary Children's & Families' Cancer Research Center at Huntsman Cancer Institute

# LANDSCAPE & CIVIL
## Decisions

- Ground water needs to be quantified. 800 gallons per day at Phase 1 elevators.
- Integrate ground water into HCI4. Landscape use.

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# ARCHITECTURAL
## Decisions

- Daylighting, narrow wings at 60', large open space
  - Obscure glazing 60" AFF
  - Light Shelf 7' AFF, southwest face of the building
  - Experiential stair
  - PV commitment/ready building, 15 year payback
  - Solar heat, 15 to 20 payback

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# ARCHITECTURAL
## Decisions

- Reducing heat gain by reducing glazing (WWR)
- Shading strategies based on orientation
- Recycling, design collection and storage, phase 1 capacity included
- Roof garden, occupied/unoccupied. 18" soil profile.
- Train and monitor the building systems.

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# ARCHITECTURAL
## Decisions

- Monitor light loads separately from plug loads

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# MECH. & PLUMB.
## Decisions

- Balance between daylighting and thermal comfort. Reduction in WWR
- Lab benches with 100% outside air? liability?
- Expansion of the current smart building control. Occupancy sensors.
- Evaporative cooling, cyclotron and/or data spaces. Equipment would sit on the site.

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# MECH. & PLUMB.
## Decisions

- Heat recovery, pre-cooled incoming air
- Well lit mechanical rooms
- Supplemental radiant heat near commons and high glazing areas
- Neutral zone at the connection between buildings.
- Water recycling with cage system

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# MECH. & PLUMB.
## Decisions

- Captured rainwater for building systems. Ground water source? Law school case study. First cost of $300,000.
- Snow melt requires further study

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# ELEC. & AUX. SYSTEMS
## Decisions

- Energy Star rated equipment, energy informed purchasing policy
- Control of monitors, power saver features, throughout all spaces. 50% control in offices

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# ELEC. & AUX. SYSTEMS
## Decisions

- Light louvers 6'-8" AFF and project above the ceiling of offices
- Light wells through common space, 12" or 24" solar tube
- Orient the labs to take advantage of the daylight
- 50 KW of PV
- Independent control of lab benches

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# TECH. & EQUIPMENT
## Decisions

- Nitrogen freezer system, needs LCA. Capacity offsets cost. 1 N freezer for 4 standard (floor space)
- Low flow hood. 60 fpm. Heat recovery? Health and Safety verification.
- Bamboo veneer lab casework.
- Green stone lab bench top

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# TECH. & EQUIPMENT
## Decisions

- Washer and sterilizers, efficient use
- EPEAT certification
- Light sensors at task lights, lab benches and support
- High recycled content, low VOC
- Centralized chemical storage

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# TECH. & EQUIPMENT
## Decisions

- Dashboard, competitive lab group comparison
- Vivarium, existing facility for cage wash
- Efficient zebrafish equipment, water conservation
- High-density mice cage system

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