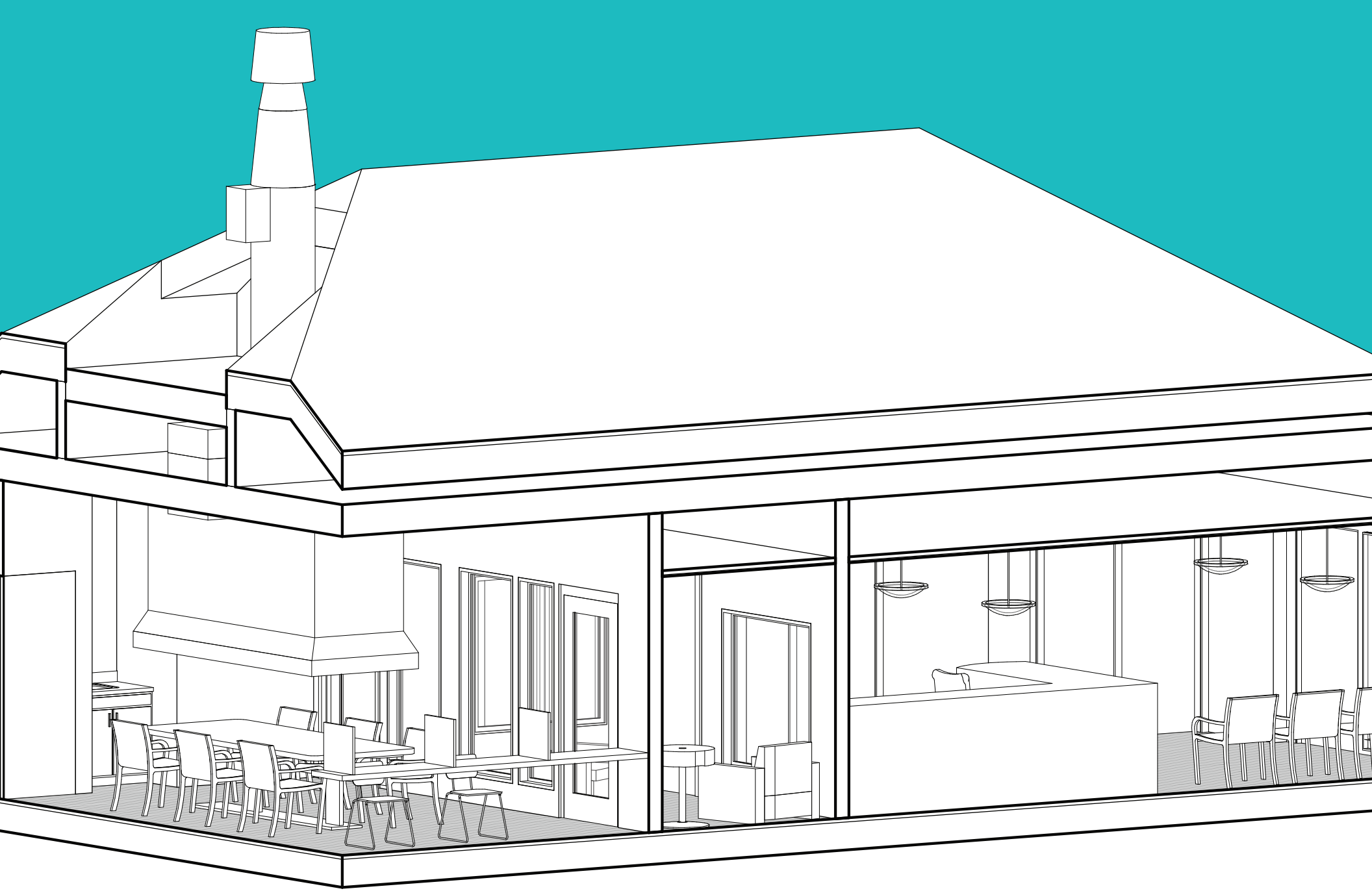

Inhalation Room Prototype Design

November 10, 2019

Preface/Postscript updated October 29, 2021

Inhalation Room Prototype Design

This document was developed as part of a Community Overdose Crisis Innovation Grant. The Study Team reviewed the available scientific evidence, policies and procedures in place in British Columbia, and examined examples of Drug Consumption Spaces in Canada and Europe to understand best practices.

Sponsor - Community Overdose Crisis Innovation Grant:

The grant's purpose is to support overdose prevention and response efforts that are community directed and led to address local needs, with an emphasis on actions to reach people using substances alone. The grant also aims to support communities to develop collaborative partnerships to provide focused, action-oriented strategies tailored to local community needs to address the overdose crisis.

CAI Community Action Initiative

Citation for Document:
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Study Team:

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Russell Maynard works with the PHS Community Services Society (PHS) primarily designing and developing Harm Reduction-related initiatives. He worked for many years as the PHS senior manager operating Insite and it's related projects. His current focus is on Harm Reduction as a public health and civil rights issue in contrast to a justice system or medical system issue.

Sean McEwen is a Vancouver architect with extensive experience on a wide variety of project types, including harm reduction projects. He was the architect for InSite, North America's first supervised injection site, and Onsite, Insite's wrap-around treatment facilities. He has also provided design advice for harm reduction projects in Montreal, Seattle and New York. He works primarily for the non-profit sector, on affordable housing, social enterprise, heritage, and community-based projects such as neighbourhood houses and child cares.

Hannah Leyland is an Intern Architect in Vancouver. She earned a Bachelor of Science in Population and Quantitative Health from Simon Fraser University, and a Master of Architecture degree from the University of British Columbia. Her 2018 graduating architecture thesis examined the design of Drug Consumption Spaces.

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  - *AMOC*, Amsterdam, The Netherlands

1 Preface/Postscript

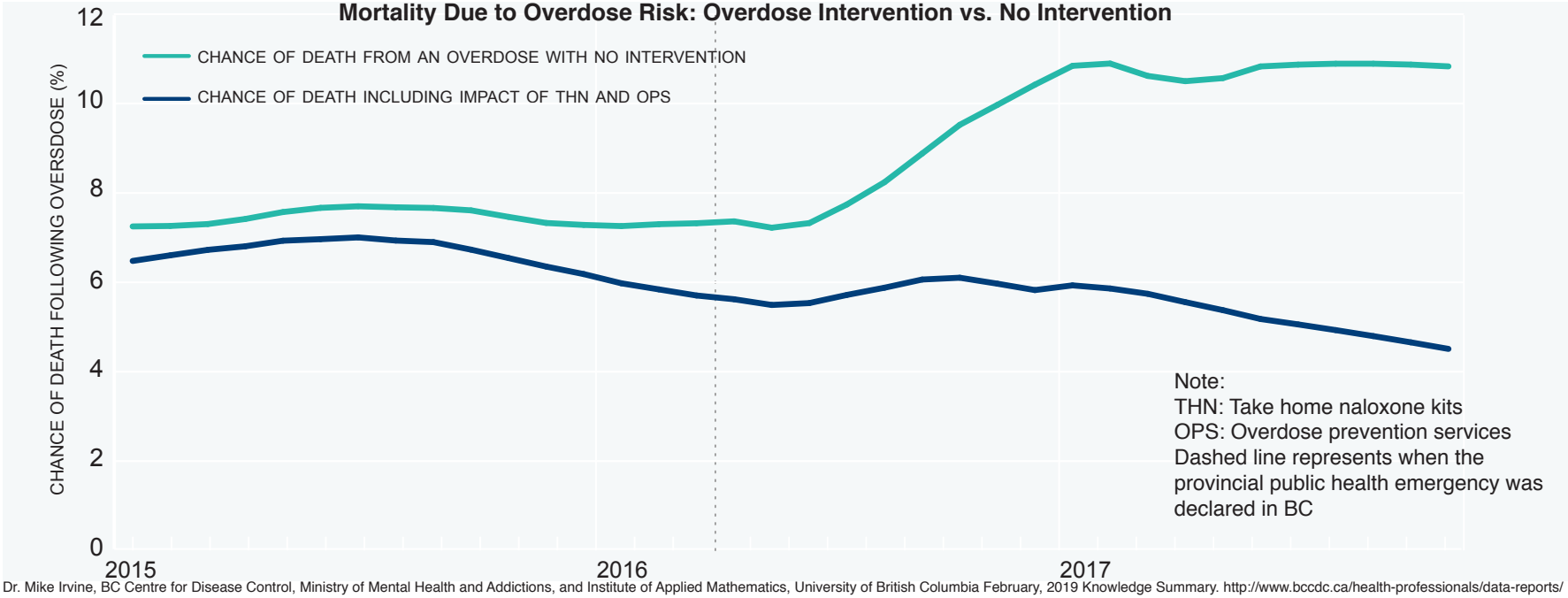
by Russell Maynard

Overdoses and overdose deaths have always been far too high in Vancouver. In 2003 Insite opened under the cloud of an overdose crisis[1] and an HIV epidemic. For more than a decade after the demonstrated success of Insite there was no increase in service capacity in terms of supervised services for street entrenched people who use drugs – by far the highest risk group for overdose.

The current overdose crisis was declared a public health emergency in 2016; in the decade from Jan. 2011 to now, late 2021, BC has lost more than 10,000 people to overdose.

Supervised services will remain the vanguard to off-set overdose risk until drug law revision and poverty become the focus of an effort to address the civil rights of the demographic served in supervised drug consumption sites.

To date the only action that has been shown to reduce the risk of death due to overdose is creating a robust network of Harm Reduction services, with an emphasis on meaningfully engaging marginalised street entrenched people who use drugs. In my long experience, supervised consumption is the most powerful tool we have to engage people who use drugs in detox and treatment services – though this is dependent on these services having excellent access to on-demand addiction services such as Detox and Recovery. The Insite model that PHS (PHS Community Services Society) and VCH (Vancouver Coastal Health) pioneered, with addiction services offered in the same building, remains the gold standard for uptake into recovery programs. Recent expansion of supervised consumption has included Overdose Prevention Sites (OPS). Getting naloxone effectively into the hands of community members has also been a major positive change.



Dr. Mike Irvine, BC Centre for Disease Control, Ministry of Mental Health and Addictions, and Institute of Applied Mathematics, University of British Columbia February, 2019 Knowledge Summary. http://www.bccdc.ca/health-professionals/data-reports/overdose-response-reports

This graph from the BCCDC models the effects of naloxone training (THN) and expanded supervised consumption (OPS) on risk of death amongst people who use drugs where these services are available.

This report was born out of the effort to address the serious gap in support services aimed at stemming the high rate of death and morbidity amongst people who are choosing to smoke, or inhale, their drugs. The need for inhalation services has been recognized at the Community level for many years now and more recently at the Health Authority level. Supervised inhalation services, like injection services, exist in many locations in Europe but had not been developed in North America.

As a community advocate and service operator, often working at or near the frontline, I was painfully aware of the need and of the potential to engage a population that was falling through the cracks even in an area of Vancouver that was world-renowned for its Harm Reduction services. What I would be told at so many meetings aimed at the overdose crisis (and before) was that it would be too expensive to build a stand-alone service with an HVAC system capable of providing a safe work environment for support staff.

Yet I couldn't find any original work that spoke to the public health needs of both people who use drugs and support workers that was based on actual testing or experience. It was becoming obvious that what we were discussing around inhalation services was still in the realm of, largely, urban myths.

I turned to Sean McEwen and Marcus Lem to develop a grant proposal to do just that: from scratch, develop a plan to actually create a cost effective and public health sensitive inhalation service on paper. Sean has decades of experience pioneering the design of supervised injection service infrastructure. Marcus had already begun to try to develop health and exposure guidelines for support services that might be working with people ingesting opioids; especially aimed at the advent of powerful illicit opioids like fentanyl and analogues of similar potency. Marcus, working in his capacity as the Senior Medical Advisor with the BCCDC[2], was struggling with the paucity of data or research on fentanyl use and the combustion of opioids outside of a lab setting. As soon as I approached him with the idea for this report he leapt at the potential opportunity to actually test for workplace parameters. This report got written but the real work has never been a priority for Health Ministries.

Since this report was published the unsubstantiated anxiety around responding to emergencies involving fentanyl has largely subsided as evidence indicated that exposure to skin was not potentially risky.

Sean was able to bring on Hannah Leyland, a recent masters of architecture graduate who did her thesis work on Supervised consumption services and became invaluable to this report.

Thanks to an Innovation Grant from BC's Community Action Initiative, our team has produced this report in an effort to advocate that we continue to develop an actual operational beta project. With an operational site built and running we will continue the work with the objective of developing work place protocols (in partnership with WorksafeBC) and design principles that would be applicable in many other jurisdictions and many other settings. We specifically intend to develop a model capable of addressing the urban/rural gap in supervised drug consumption services.

1. At that time peaking in 1998 with 413 overdose deaths in BC
2. British Columbia Centre for Disease Control

Postscript

Since this report became available, the single largest barrier that has emerged from meetings considering inhalation has been the arguments of public exposure, or workplace exposure, to secondhand smoke. This argument is a non-starter, though I acknowledge the structural barriers erected to counter the norms of cigarette smoking over decades.

Imagine the barrier to opening a supervised drug injection site in 2003, almost 20 years ago. I would venture a much harder conceptual barrier than secondhand smoke. But when viewed through the lens of the high risk of overdose death, engagement with a marginalized population (often younger and prior to IV use) and the many risk-reducing advantages of inhalation over IV use, the value of creating a safe supervised inhalation service comes into profound focus.

2 Introduction

by Dr. Marcus Lem

Smoking is one the most common ways for people who use drugs to ingest opioids. According to a recent 2018 survey conducted by the BC Centre for Disease Control, smoking or inhalation was the preferred method of drug use for over 50% of the survey participants[1].The practice of opium smoking has likely existed for thousands of years and heroin smoking, or “chasing the dragon”, originated in the 1920’s[2]. With the advent of the HIV-AIDS pandemic in the 1980’s, opioid smoking became perceived as less risky than intravenous drug injection because smoking did not contribute to the transmission of blood-borne diseases.

The prevalence of illicit fentanyl as a street drug is a more recent event. Canadian law enforcement first detected illicit fentanyl in 2005. Because of its high potency relative to heroin, fentanyl can be easily sold over the internet and shipped undetected by regular mail or parcel post and has an extremely high profit margin. According to Health Canada’s Drug Analysis Service, fentanyl and fentanyl analogues represent 69% of all opioid drugs in BC[3].The rapid influx of this potent synthetic opioid onto the illicit market is directly responsible for the exponential rise in overdose deaths since 2012. In British Columbia, fentanyl was involved in 79% of illicit drug overdose deaths from 2016-2018[4].

Unfortunately, smoking fentanyl does not appear to decrease the risk of fatal overdoses. In 2016, smoking was the mode of ingestion in 26% of illicit drug overdose deaths[5].

No overdose deaths have occurred in Overdose Prevention Service (OPS) or Supervised Consumption Service (SCS) sites[4]. However, at this point in time, drug smoking is not permitted within the enclosed space of OPS or SCS sites and is only allowed outside these facilities. The reason for this is that very little is known about what chemical by-products are produced when illicit drugs are burned, or their effects on health. The scarce published literature on the pyrolysis products and health effects of opioid smoke raises concerns for worker and client safety and most OPS and SCS facilities are not designed or built to contain potentially toxic smoke.

Burning fentanyl HCl is known to produce active metabolites such as norfentanyl and despropionylfentanyl[6]. Data from personal air sampling of health care workers in Overdose Prevention Services (OPS) and Supervised Consumption Services (SCS) sites in BC indicates that unlike injection, swallowing or snorting, smoking will aerosolize fentanyl[7]. Chronic heroin smoking appears to be related to impaired lung function[8] and may lead to transient or permanent neurologic conditions including toxic leukoencephalopathy[9].

Currently there is one facility in Canada approved by Health Canada as an SCS site for supervised inhalation including smoking and has been in operation since March 2018[10]. Although supervised inhalation rooms and services are available in many European cities, the design and construction of these facilities may not be practical or affordable for Canadian climates, rural settings, or health authorities or agencies with limited resources. In addition, because illicit fentanyl is still uncommon in Europe, occupational and environmental safety experience under regular operations for fentanyl smoke in these facilities is limited.

This document is intended as both a pilot project, and as a resource for jurisdictions and agencies wishing to provide supervised inhalation services in BC and Canada. We have attempted to cover specific issues related to opioid smoking, including the design, operation and safety evaluation of an indoor smoking facility that could be implemented in both urban and rural settings. As a pilot project, the principles, designs and protocols we outline are a work in progress and will continue to evolve and be refined with the construction and operation of a working facility.

Specific guidance on overdose prevention, recognition and treatment may be found in the BC Overdose Prevention Services Guide.

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2. Stran J, Griffiths P, Gossop M. Heroin smoking by 'chasing the dragon': origins and history. Addiction. 1997 Jun;92(6):673-83; discussion 685-95.
3. Health Canada Drug Analysis Service Drug Situation Summary Report – British Columbia: April to September 2018
4. BC Coroners Service. Illicit Drug Overdose Deaths in BC January 1, 2008 to December 31, 2018
5. BC Coroners Service. Illicit Drug Overdose Surveillance Report, 2007-2017
6. Nishikawa RK, Bell SC, Kraner JC, Callery PS. Potential biomarkers of smoked fentanyl utilizing pyrolysis gas chromatography-mass spectrometry. J Anal Toxicol. 2009 Oct; 33(8):418-22.
7. Assessment of occupational fentanyl exposure in Overdose Prevention and Supervised Consumption Service sites in British Columbia. BC Centre for Disease Control, BC Centre for Disease Control 2017.
8. Buster M, Rook L, van Brussel GH, van Ree J, van den Brink W. Chasing the dragon, related to impaired lung function among heroin users. Drug Alcohol Depend. 2002 Oct 1;68(2):221-8.
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10. https://www.cbc.ca/news/canada/calgary/first-safe-inhalation-site-opens-lethbridge-1.4566743

3 Assumptions

Assumptions guiding the design and development of an Inhalation Room Prototype design:

1. The nature of the opioid overdose crisis in BC currently differs from other provinces with regards to its intensity, history and stage of the Public Health response.
2. Fentanyl is now the most common illegal opioid consumed in BC and is responsible for much of the current overdose crisis.
3. Facilities should be designed and operated to both reduce barriers to accessing services and to encourage utilization.
4. Facilities should be designed and operated to reflect client preferences as well as needs whenever possible.
5. Client and staff safety is of paramount importance.
6. The facility should be designed to be sustainable and safely and easily maintainable.
7. The facility should be designed to reflect best practices for handling airborne contaminants including second-hand smoke and airborne pathogens.
8. Since little data or literature exists regarding the long-term effects of exposure to fentanyl smoke, the precautionary principle should be employed in the design, testing and monitoring of the facility.
9. Potentially toxic smoke should not be discharged from a consumption room. It should be captured and safely dealt with at source, and not be allowed to be discharged into other interior spaces or to the outdoors.

4 Design Principles

1 **Intention**: ***The Prototype Should Meet Needs Specific to British Columbia***

Much can be learned from looking at how other jurisdictions and countries have met the need for Supervised Inhalation Rooms, but the Prototype should be designed to meet needs of users, health care and support workers, and first responders who live and work in British Columbia.

2 **Fentanyl**: ***The Prototype Should Concern Itself Primarily with Harm Reduction Associated with the Smoking of Fentanyl***

While many stimulants and drugs are burned and smoked by users, the Prototype should consider how the harm associated with the smoking of fentanyl can most optimally be reduced.

The particular aspects of the burning of fentanyl that are of concern to the design of the Prototype are summarized as follows:

- Fentanyl is believed to be stable in the environment, and does not readily break down

(Note: further studies needed).

- Fentanyl residue will build up with repeated smoking activity in a Consumption Room, so frequent regular cleaning of finish surfaces in these areas is required. Steps must be taken to protect maintenance workers, as well as staff and users, from build-up of drug residue.

3 **Overall Environment:** ***The Prototype Should Have a Welcoming, Non-Clinical Character***

To encourage use by people who use drugs, and maximize benefits for users and staff, the Prototype should be designed to have a warm, welcoming feel. This can be achieved by employing materials and lighting that are non-clinical in appearance, but that still deliver a safe and durable interior finish.

4 **Inhalation Area*****: Design for a Group of Users Around a Table, Rather than for Users in Separate Individual Booths***

The Prototype will feature a central table for users. Experience has shown that people using together enhances the potential for supervision, since users can sometimes immediately tell if someone next to them is reacting adversely to smoking drugs.

5 **Safety*****: The Prototype Should be Constructed to Emphasize User and Staff Safety***

The Supervised Inhalation Room should:

- Be airtight and separate from staff and supervision areas.
- Glazing should be maximized between user and staff supervision areas.
- A vestibule should separate the Consumption Room from the staff supervisory areas.

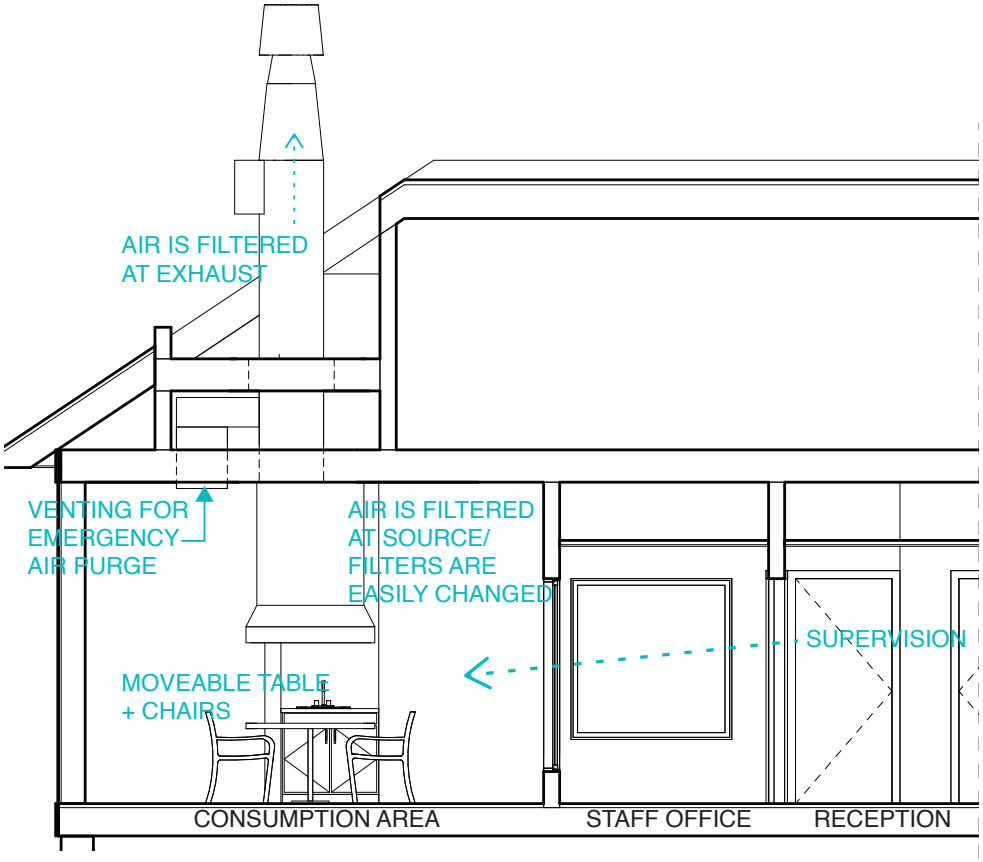
- The vestibule should be pressurized so that it acts as an “air-lock” between the Consumption Room and the staff supervisory area.

6

Ease of Maintenance: ***The Prototype Should Promote Ease of Maintenance and Safety for the Maintenance Worker***

The Prototype should be designed so that its material finishes and building system components promote ease of maintenance and worker safety:

- Finish materials should be as non-porous as possible, and be able to be wiped clean.



- Finish materials should be durable, and be resilient to breaking down with repeated cleaning over time, even with the use of stronger type cleaning agents.
- Flush detailing is preferred for all material assemblies and adjacencies. Recesses between materials should be avoided.
- As far as air filters are concerned, all filters should be easily changed, and the filters themselves should be accessible and positioned at the source point in the exhaust system.
- The length of air handling duct runs should be made as short as possible, so that the cleaning of ducts can be facilitated, and exposure to drug residue minimized.
- Consumption Room finishes should have a low flame-spread rating to minimize the possibility of fire. A direct line to the Fire Department should be installed in the staff supervisory area.

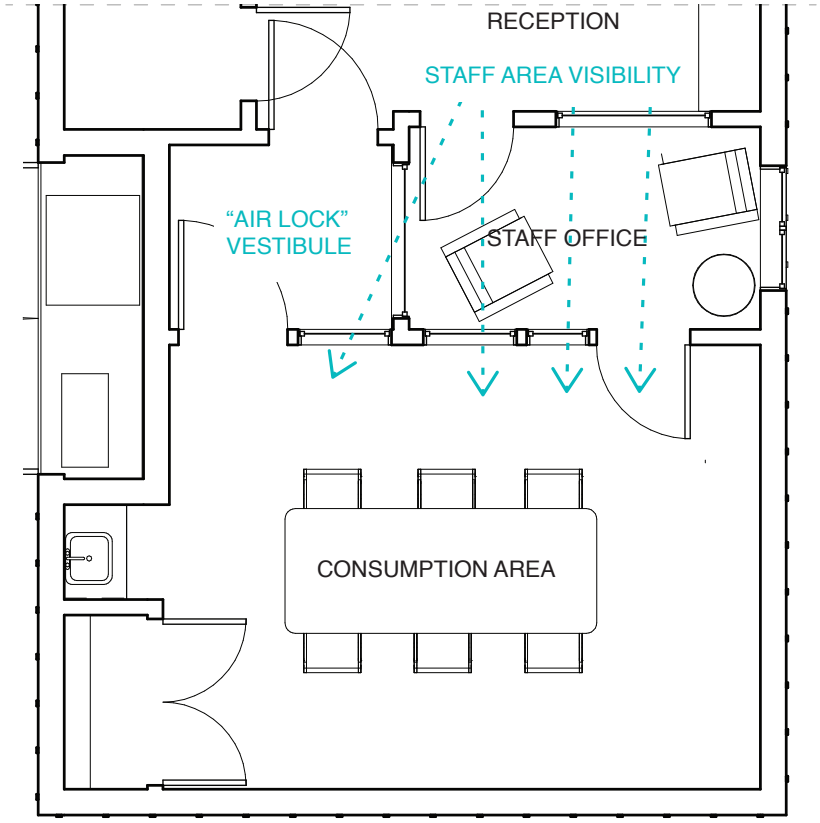
7

Air Handling System: ***The Prototype Should Be Designed with Appropriate Air Handling Systems***

Features of the Air Handing:

- The Consumption Room should have an air handing system that is entirely separate from all other areas in the Prototype facility. There must be no shared air space between the Smoking Room and any supervisory, staff, or public areas in the facility.
- In case of emergency, the Consumption Room system must be capable of quickly removing all of the air in the Room in a very short period of time.

- The Consumption Room must be designed with appropriate air pressure, so that Consumption Room air does not flow into the vestibule or into the supervisory space.
- There should be no exhaust at all of Consumption Room air into the environment, without point of source filtration. A filter system must be installed at the exhaust source point, to collect optimally all smoking residue before it is drawn into the exhaust duct.



- Space heating for the Consumption Room shall be designed so there can be no cross-contamination with other spaces in the Prototype facility, and make-up air shall be tempered to also maintain a comfortable temperature in the Consumption Room.

8

Testing and Data Collection: ***Ensure that the Prototype is Fitted Out to Allow for Testing and Field Study***

It will be important to document many of the operational aspects of the Prototype. Consider including the following strategies:

- Establish a methodology for monitoring key operational aspects of the facility.
- Provide for locating air testing equipment in the various parts of the Prototype.
- Install grid graphics on specific finish surfaces, so that residue amounts can be documented over specific periods of time.

9

Waste Management

- The room must have safe and appropriate receptacles for any drug consumption waste and procedures in place for collection and disposal.
- Garbage areas should be lockable.

10

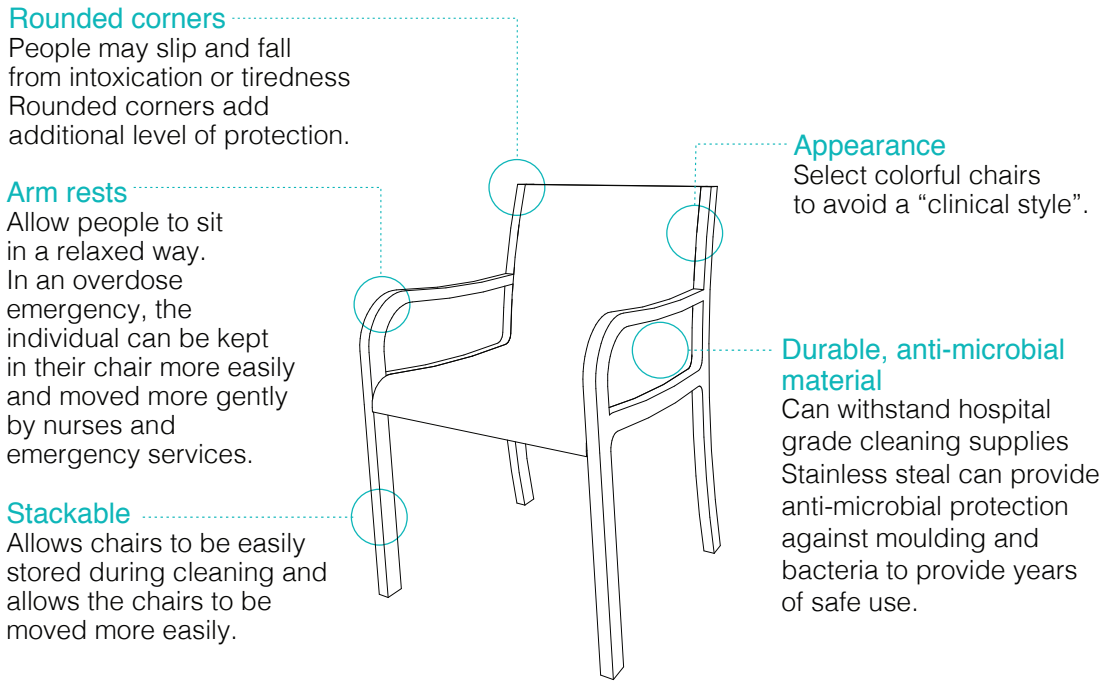
Occupant Movement/ Circulation

- Space is free from obstruction for those with mobility issues or those who are inebriated.

11

Furniture Selection

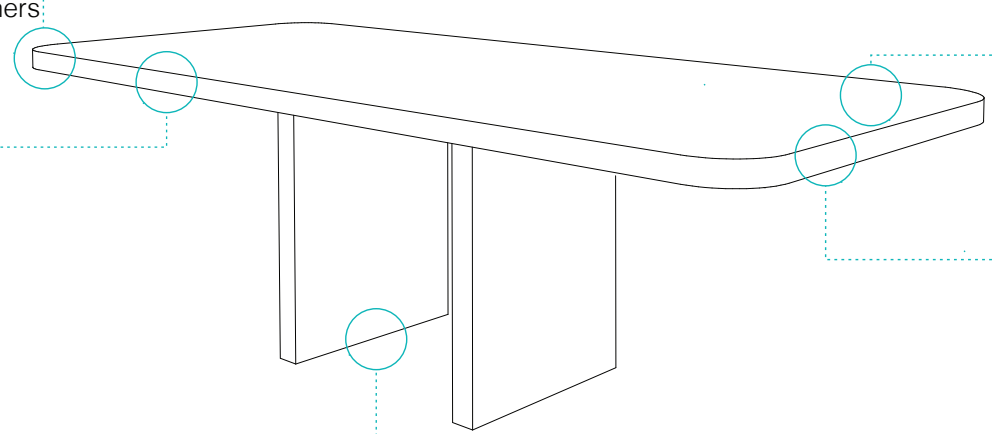
- Tables should be centrally supported with rounded corners to allow for ease of movement.
- Chairs should have rounded corners with arm rests. Arm rests provide support and stability for clients.



Rounded corners
People may slip and fall from intoxication or tiredness. Rounded corners add an additional level of protection.

Continuous material with no lip
Sometimes people discard needles in the lip of the table surface creating a risk for staff cleaning the area and other visitors sharing the space.

Centrally supported
Improves the ease of movement around the table and allows the chairs to fit around the outside in a flexible way.



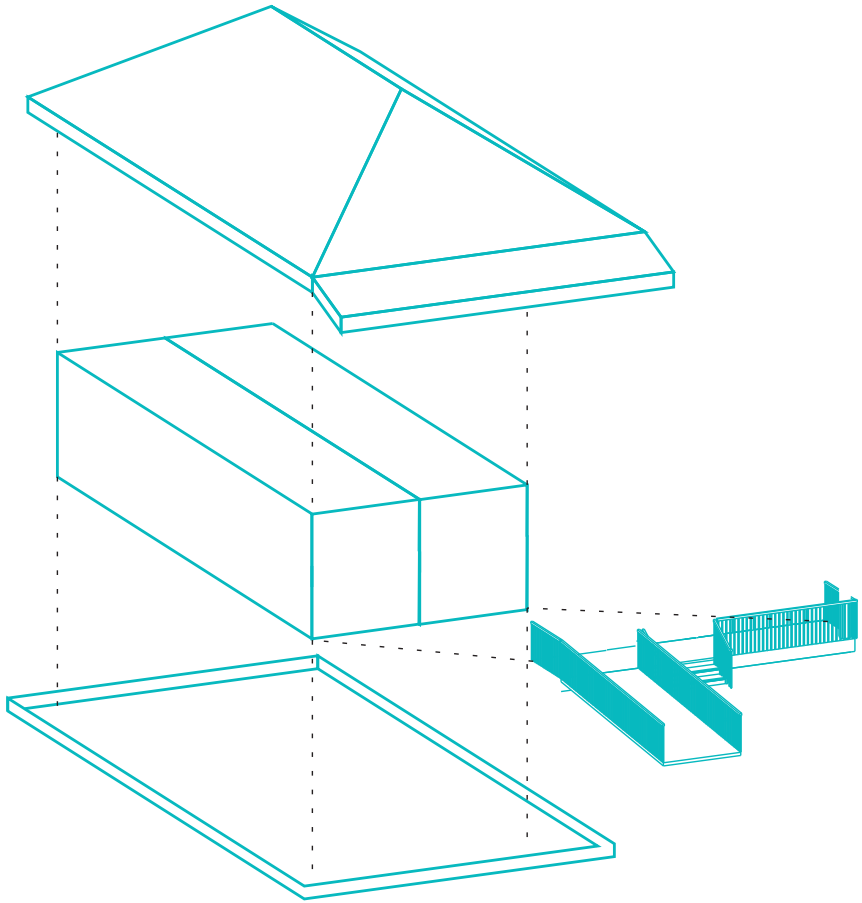
Fire retardant material

Durable, anti-microbial material
Can withstand hospital grade cleaning supplies Stainless steal can provide anti-microbial protection against moulding and bacteria to provide years of attractive use.

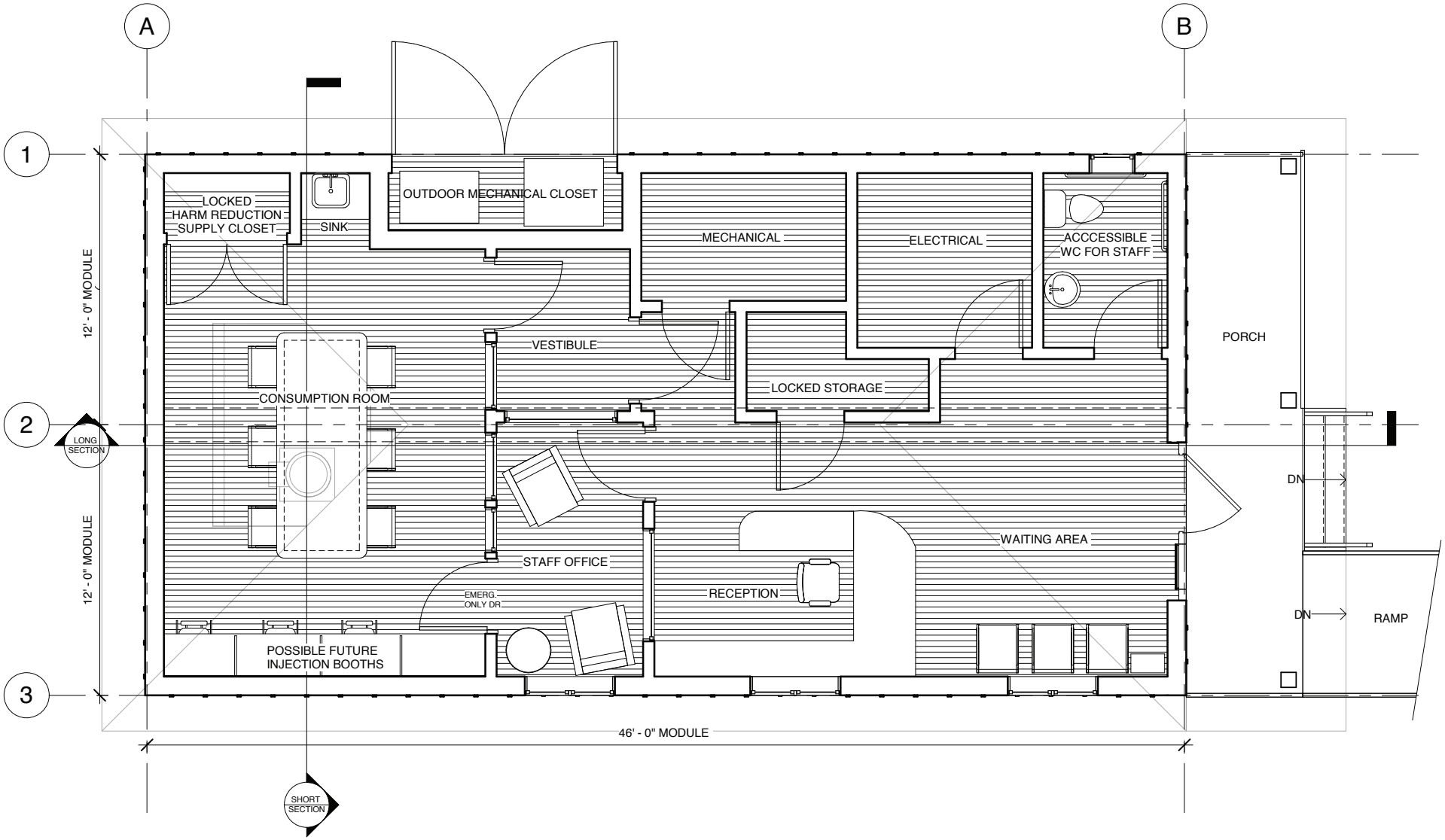
5 Architectural Design

Key Architectural Design Elements:

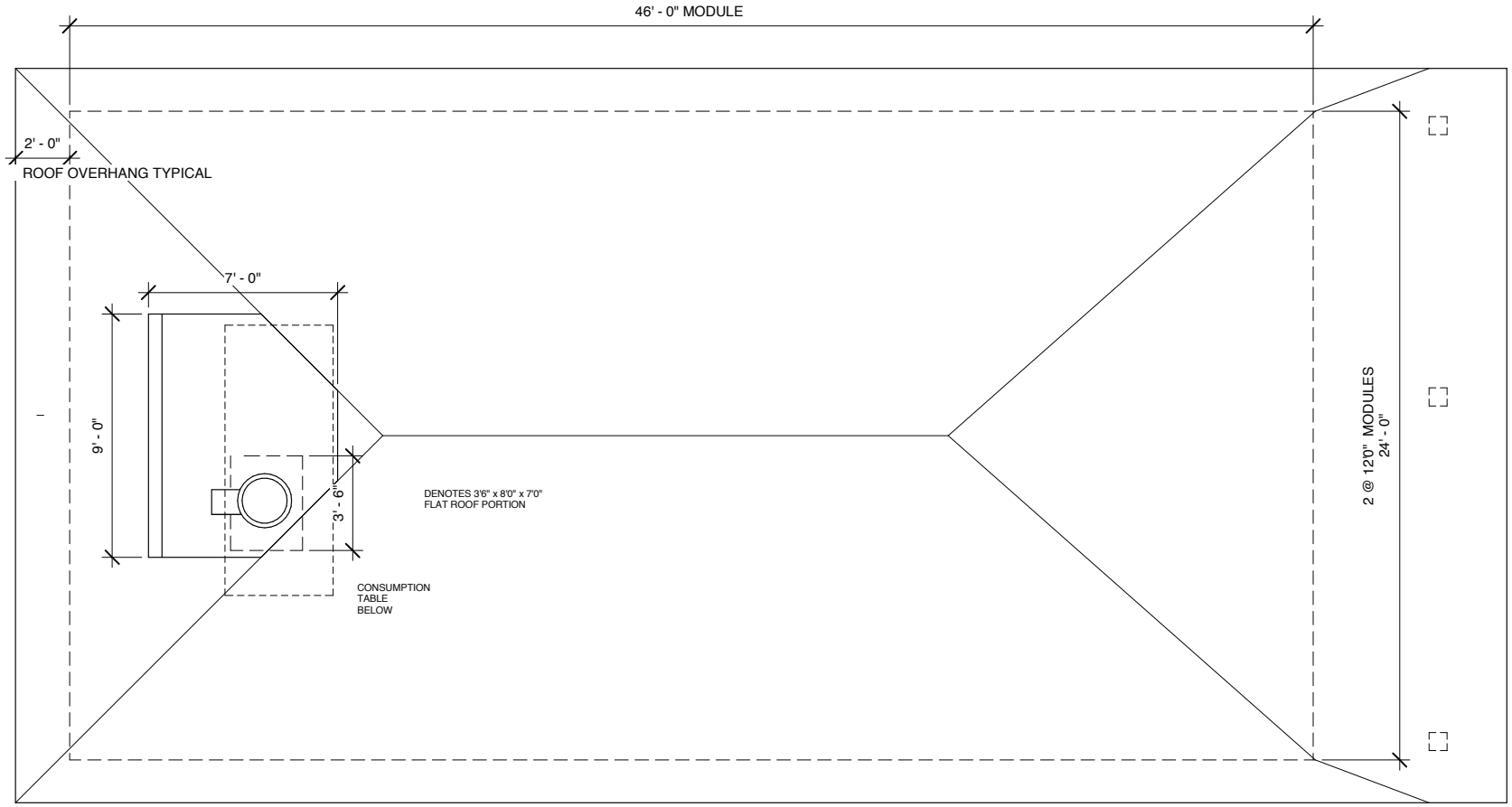
- Size of Inhalation Room based on one large 6-seat table, 10ft. X 4ft., spacious enough so that each participant has sufficient “elbow room”.
- 5 ft. deep circulation space on each long side of the table to allow for emergency attention in case of need for emergency intervention.
- The concept here is for a stand-alone facility constructed from two 12 ft. x 46 ft. modules. [like a “double-wide” mobile home]. The idea is that a future prototype could be constructed and tested, and then set up in the field somewhere in BC.
- Standard factory-built modular construction would be utilized, all pre-wired and serviced. The modules would be installed on locally-construction foundations with standard local service hook-ups.
- A roof truss roof system could be added after installation to help shed the weather in various sites around BC.
- A porch entry and ramp would be added after.
- The tested model could also be copied by stick-building and installing in an existing building, with additional mechanical exhaust design required that is separate from the existing building systems.



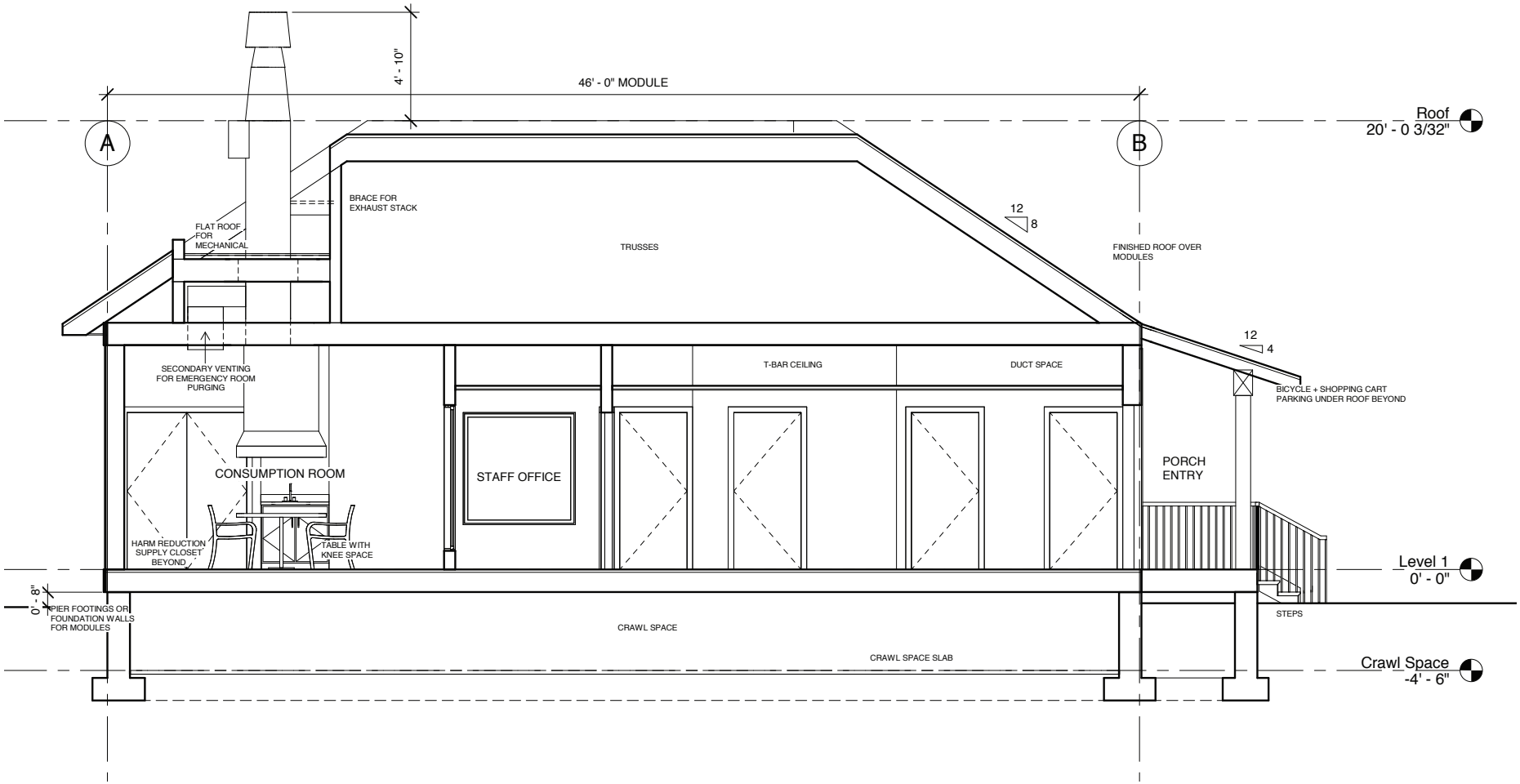
Floor Plan:


A
B
1
2
3
LOCKED
HARM REDUCTION
SUPPLY CLOSET
SINK
OUTDOOR MECHANICAL CLOSET
MECHANICAL
ELECTRICAL
ACCCESSIBLE
WC FOR STAFF
PORCH
VESTIBULE
CONSUMPTION ROOM
LOCKED STORAGE
LONG
SECTION
DN
WAITING AREA
STAFF OFFICE
EMERG.
ONLY DR
RECEPTION
DN
RAMP
POSSIBLE FUTURE
INJECTION BOOTHS
12' - 0" MODULE
12' - 0" MODULE
46' - 0" MODULE
SHORT
SECTION

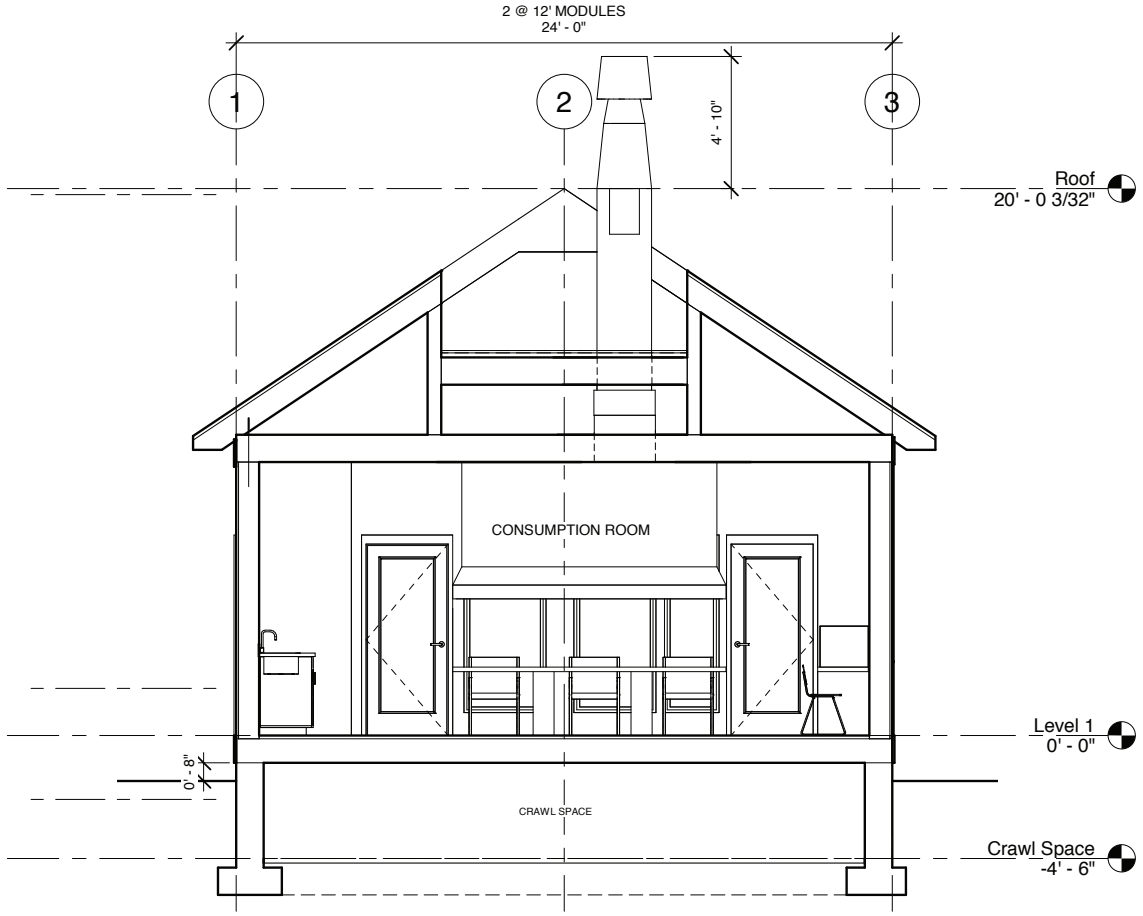
Roof Plan:


46' - 0" MODULE
2' - 0"
ROOF OVERHANG TYPICAL
7' - 0"
9' - 0"
3' - 6"
DENOTES 3'6" x 8'0" x 7'0"
FLAT ROOF PORTION
CONSUMPTION
TABLE
BELOW
2 @ 120" MODULES
24' - 0"

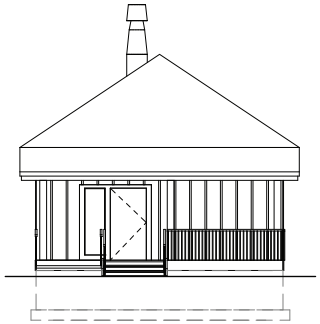
Long Section:



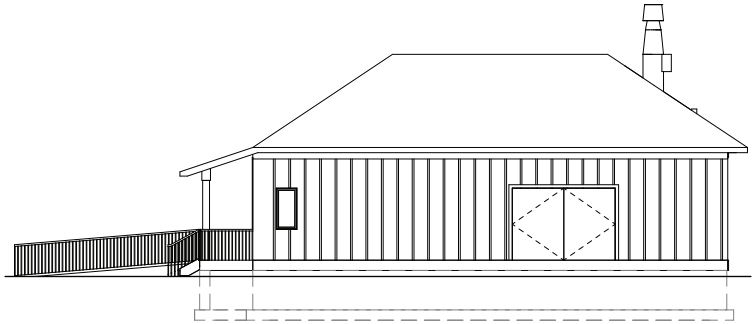
Cross Section:



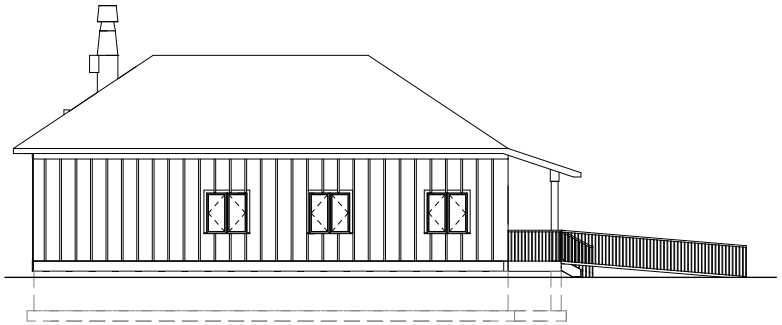
Elevations:



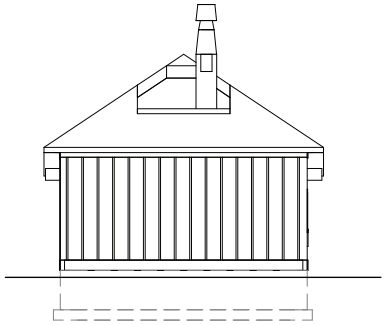
EAST ELEVATION



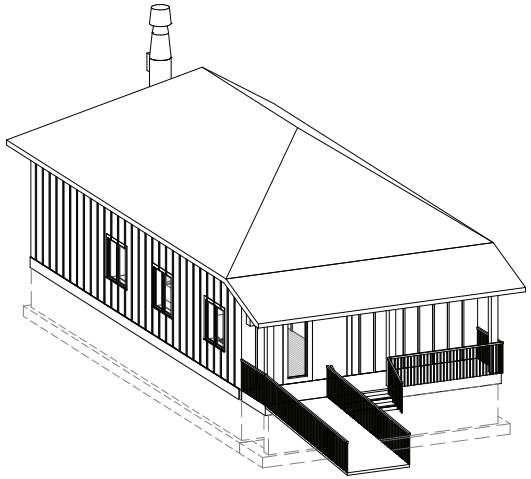
NORTH ELEVATION

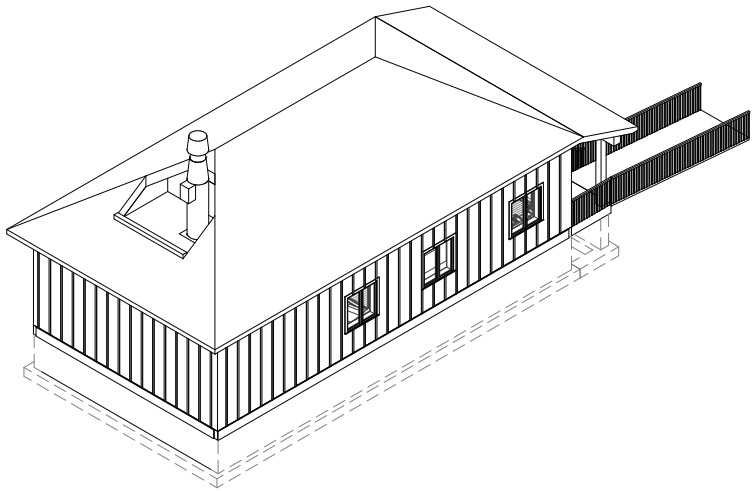


SOUTH ELEVATION

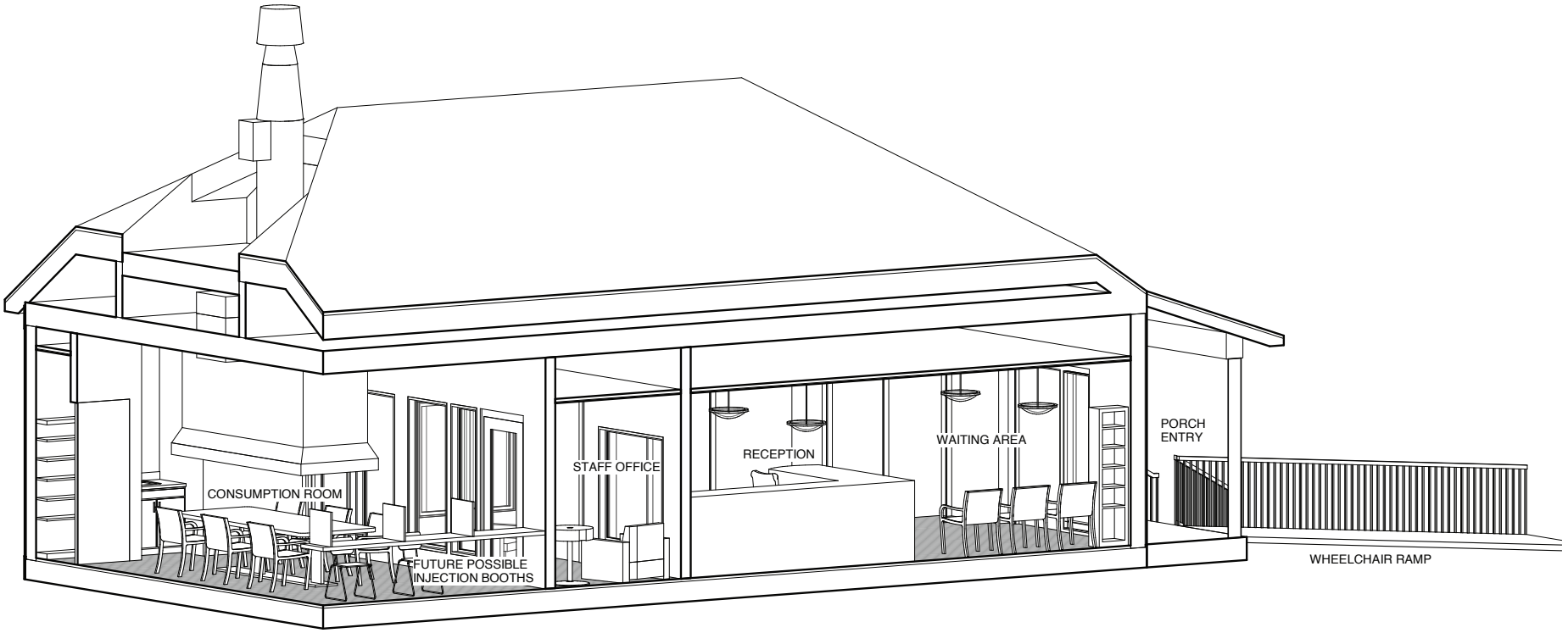


WEST ELEVATION

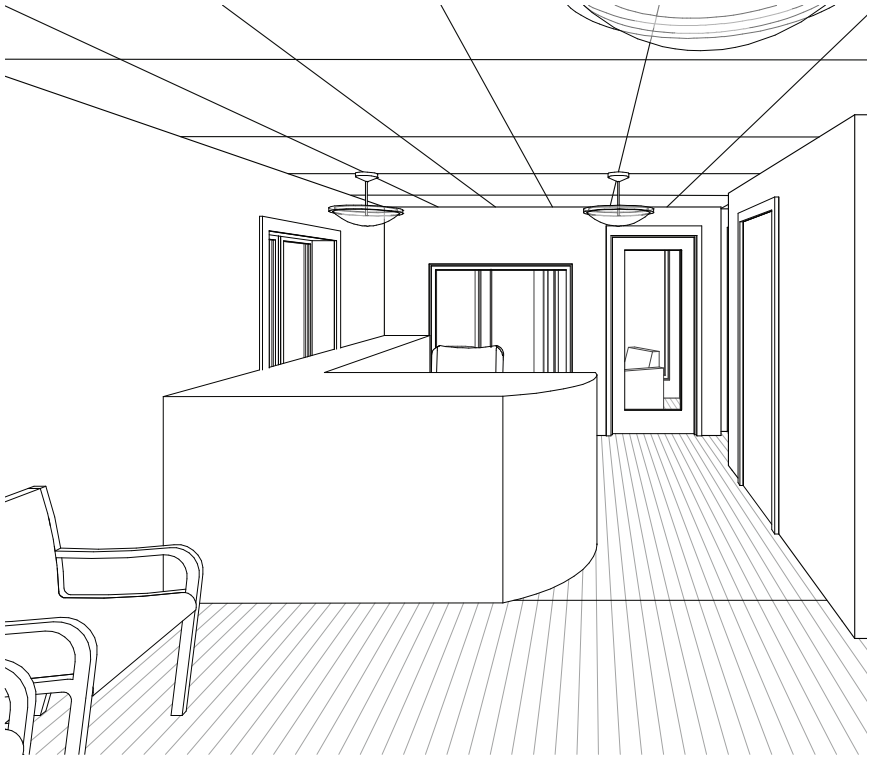


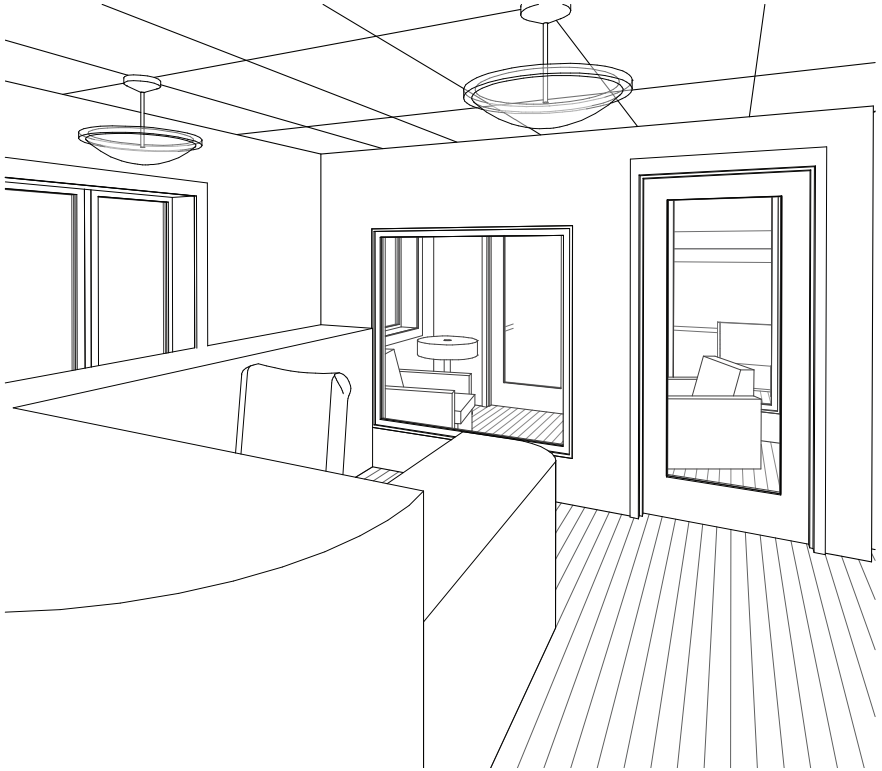


Interior System
3D View:

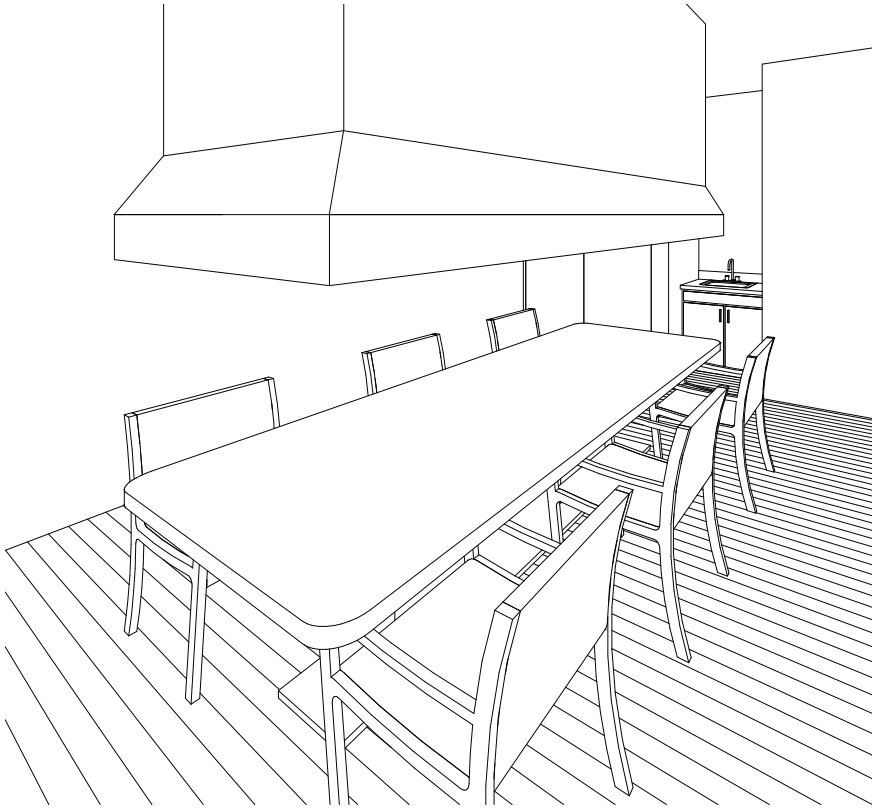


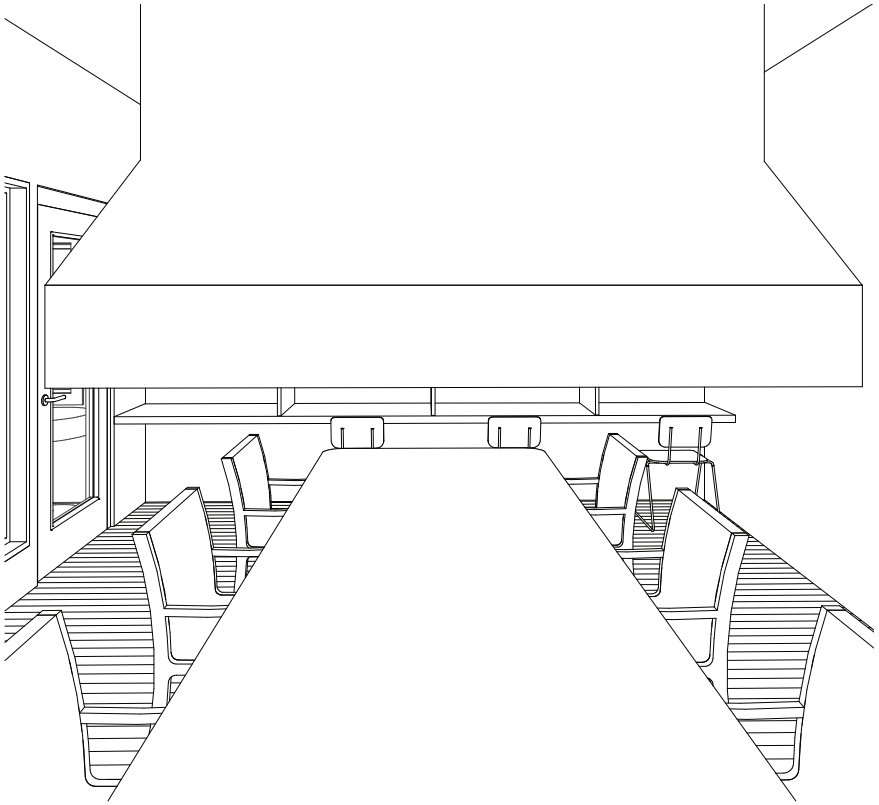
Reception Area:





Consumption Area:





6 Mechanical System Design

Performance Specification for Mechanical System Design

When the Inhalation Room Prototype is housed in a larger building, its ventilation system must be separate from that serving other spaces in the building, including the staff observation spaces adjacent the Inhalation Room.

Burning and consumption of drugs will take place by participants sitting together around a common table. It is preferable that all smoke be directed immediately at source to an exhaust canopy. It appears that a large Canopy Fume Hood located over the drug consumption table is the optimal means of collecting smoke. Review whether equipping the Canopy Fume Hood with baffles might improve air flow around the perimeter of the hood, and improve exhaust air velocity at specific locations under the hood.

Given the hazardous nature of vapours and residue resulting from the burning of drugs, especially fentanyl, it is greatly preferred that any hazardous air-borne particulates or residue, be collected as close to source as possible. In this case at the entry point to the exhaust ducting associated with the Canopy Fume Hood. A filtration system at this entry point is required.

The filter system should feature easy-to-change filters, that limit any potential exposure to hazardous materials by maintenance workers. The design would most likely involve some type of filter box at the exhaust point of entry, that features pull-through type filter packages. The filters should be relatively inexpensive, to limit operational costs. The goal would be to remove all hazardous airborne particulates out of the exhaust air at source; the exhaust air itself would be free of contaminates.

Changing of filters should also allow for bagging of used filters without exposure of the filters to maintenance workers. Filter bagging at source without exposure, also facilitates sending non-contaminated materials to the lab for drug residue testing.

The exhaust ductwork itself leading to the exhaust grille location should be smooth- surfaced and easy to clean. PVC ductwork is the probable choice. Easily removable access pieces in the ductwork should be provided to allow cleaning of any dust or residue that builds up in the ductwork past the filter box location.

The exhaust system should have a Variable Air Volume [VAV] operation, with the following features:

1. A standard or “standby/low velocity” operation mode that continually exhausts air. In low velocity mode the system should run as quietly as possible, and with reduced energy consumption. Size ductwork and provide acoustic duct insulation to minimize noise.

2. A high exhaust mode, operated by staff from a staff station outside the room, which provides for a greater level of exhaust when needed.

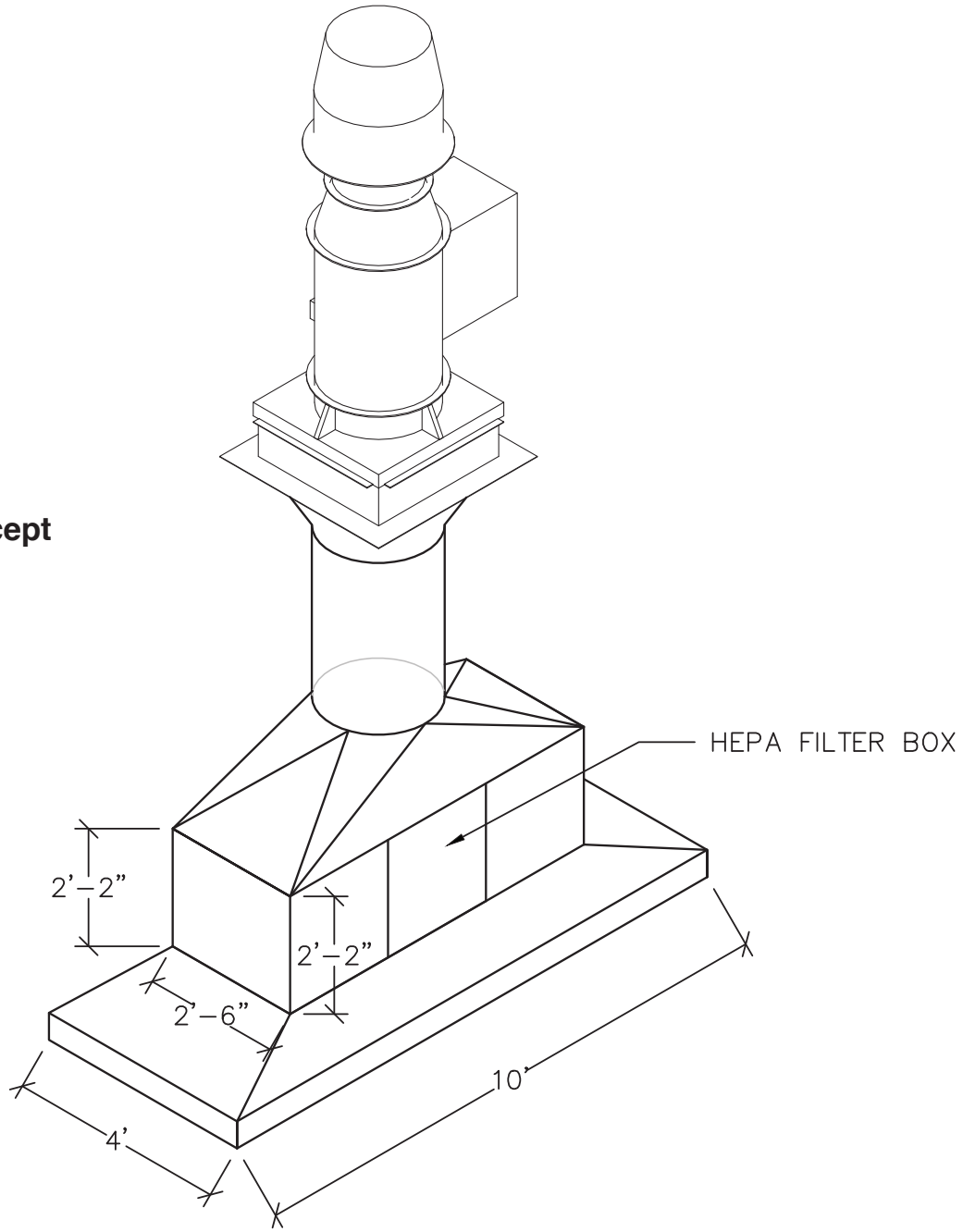
3. An “Emergency Purge” mode, operated by staff, that allows for a complete air change for the Inhalation Room within ten seconds, so that staff can enter and address an overdose or similar emergency.

4. Make-up air for the Inhalation Room’s ventilation system should be tempered. Consider installing a heat recovery ventilation [HRV] type system to temper the fresh make-up air with heat drawn from the exhaust air.

Mechanical Engineering Concept

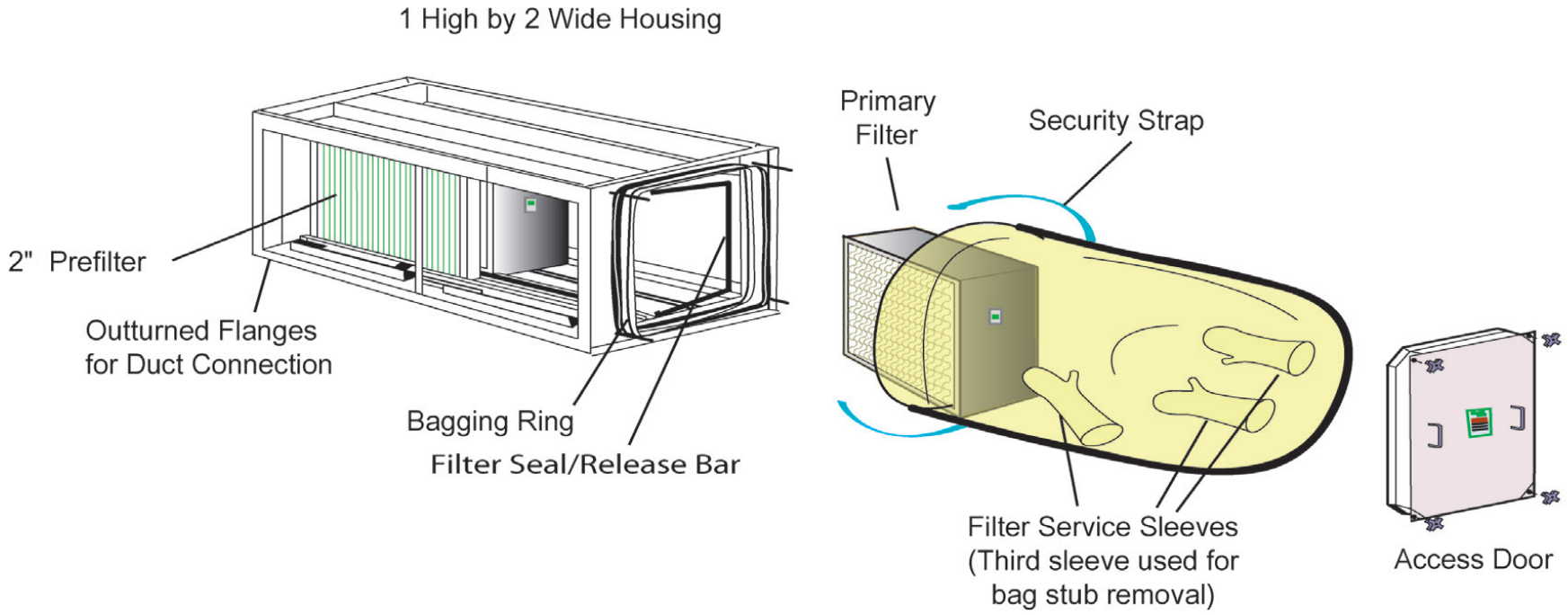
The following design was provided by
Flow Consulting Group Inc., Mechanical Engineering.

Consumption Room Canopy Exhaust Concept

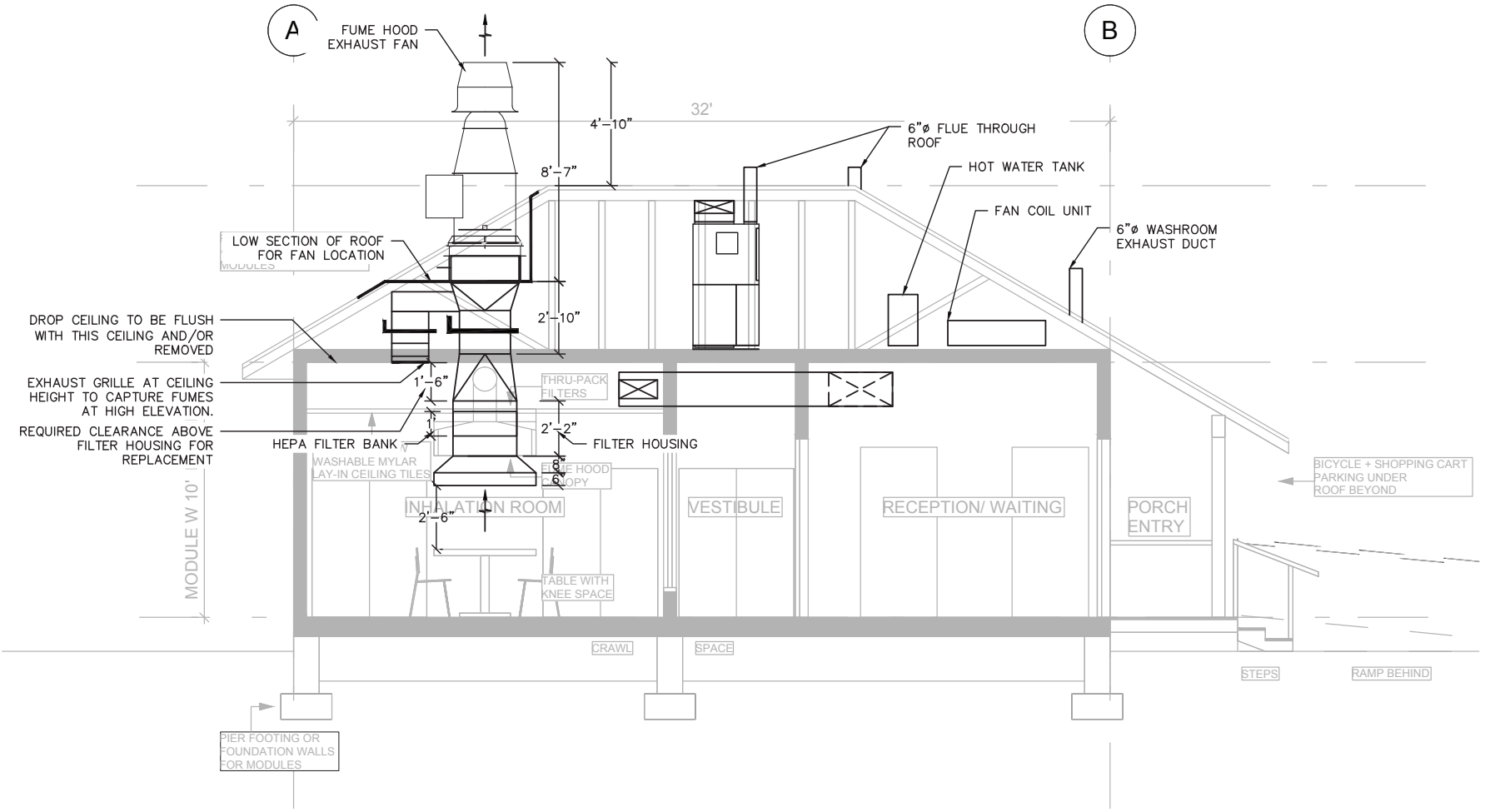


Filter Bag System

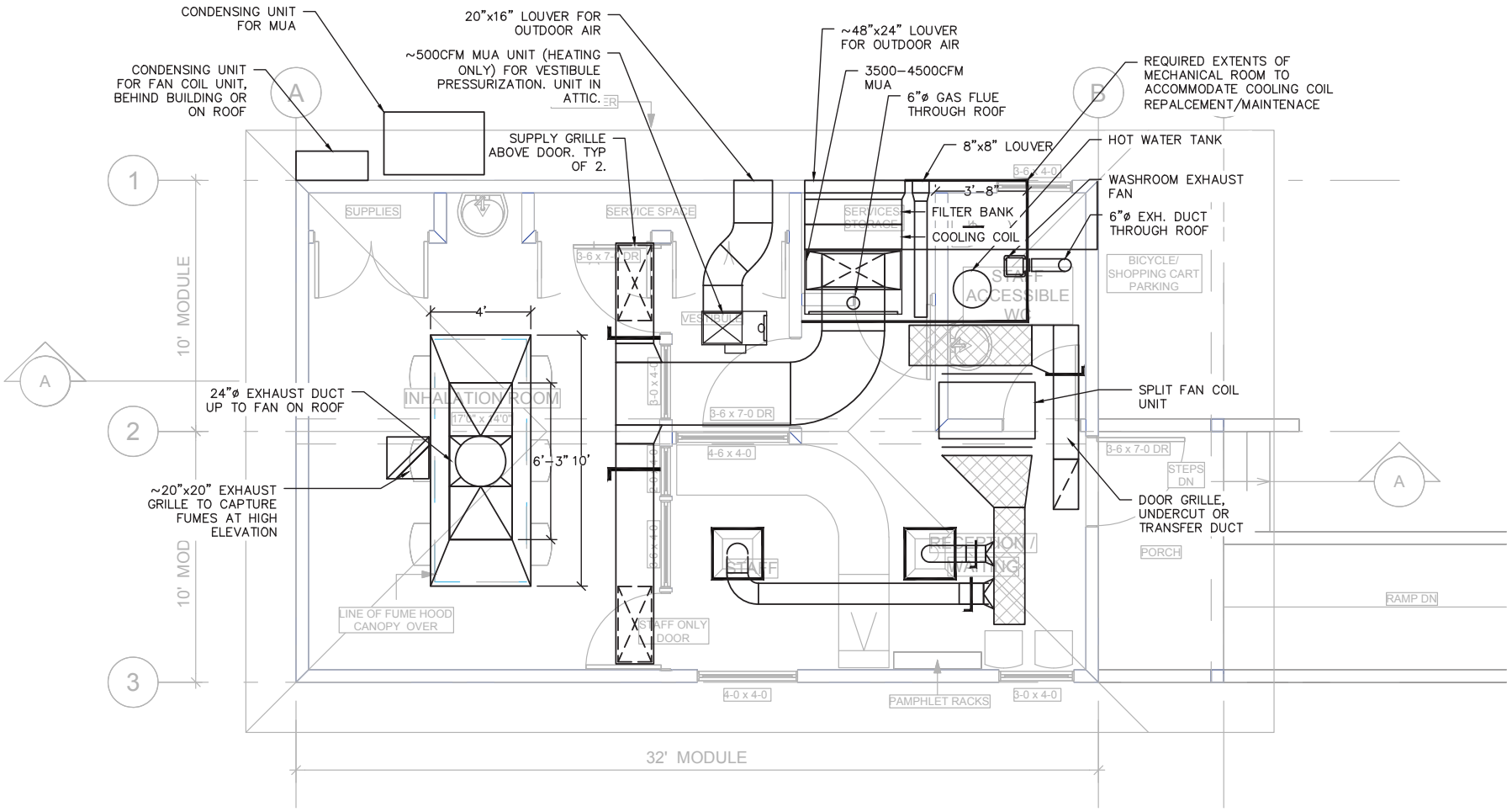
These photos and diagram illustrate the CamContain™ GB Housing system suggested by the mechanical engineer.



Mechanical Design Concept - Section



Mechanical Design Concept - Plan



7 Cleaning, Monitoring, and Environmental Testing

by Dr. Marcus Lem

Inhalation Room Provisional Cleaning Protocol

- 5-10% hydrogen peroxide solution will be used for cleaning.
- The initial frequency of routine cleaning of all accessible surfaces (walls, windows, floor, chairs, table, etc.) will be once a week. This frequency may increase or decrease depending on the ongoing monitoring results of when surface levels reach the proposed OEL.
- The frequency of cleaning of the ceilings will be determined by the monitoring results.
- Walls will be washed top to bottom.
- Furniture should be chosen to have minimal surfaces and no cushioning to facilitate cleaning of all exposed surfaces.
- Spills should be cleaned immediately as per regular SCS/ OPS guidelines.
- Cleaning cloths should be disposed of as hazardous waste. Some cloths will be tested for residual fentanyl.

Environmental Sampling and Monitoring Plan

The purpose of environmental sampling and monitoring is to ensure the ongoing safety of both clients and workers and to establish whether the levels of fentanyl in the air and deposited on surfaces are maintained at levels which below the proposed OELs, especially when workers are in the room. It is anticipated that during use, aerosol fentanyl levels in the room will exceed the proposed OEL but it will be useful to get a range of levels to help correlate air levels and surface deposition. Fentanyl will be the focus of the initial monitoring plan because it is the most common opioid in circulation in BC. Some samples will be submitted to the lab for testing for other substances. The initial sampling and monitoring will consists of an surface cleaning trail prior to the start of operations and sampling and cleaning arms over 3-6 months of operation. Based on the results and ongoing monitoring protocol will be determined.

1

Determination of the most difficult surface to clean

A sample of standardized size of each surface material in the room (e.g. painted drywall, linoleum, Perspex window, laminate countertop, sitting surface, etc.) will be submitted to the lab for testing. Each surface will be spiked with a known concentration fentanyl solution which will be allowed to dry. Each surface will then be cleaned with a single swab/wipe with 5-10% hydrogen peroxide solution. The swab/wipe will be tested for fentanyl recovery and the surfaces retested for residual fentanyl. The surface retaining the most residual fentanyl will be designated the “most difficult surface(s) to clean” (MDSC) and will be the focus of the surface monitoring plan.

2

Surface Monitoring Plan

Two sets of numbered MDSC tiles (composed of the same materials and surfaces as the room and furniture construction) will be cut and positioned close to other monitoring apparatus to aid consistency of exposure and correlation of measurements. Depending on the schedule of operation of the room, the same numbered tiles from each set will be removed and sent to the lab for fentanyl surface accumulation testing at predetermined intervals for the commencement of operation (e.g. 4 hours, 8 hours, 2 days, 7 days, 14 days, 28 days, 56 days, etc.). Results approaching the proposed OEL may trigger changes in cleaning frequency so the surface testing schedule may be altered depending on the ongoing results of analysis and changes in cleaning schedule.

3

Air sampling inside the room

Air sampling inside the room will be conducted using a stationary air sampler for a standardized duration and air volume. Filters will be changed at the end of each day/shift and sent to the lab for quantitative fentanyl analysis. Some filters may also be sent for more comprehensive detection panels. A direct-reading particulate/smoke detector with a data recorder will be placed adjacent to the air sampler. Staff will log the number and times of clients using the room over the course of the day/shift. The collected data will be used to determine maximum occupancy/utilization of the room and to calibrate a smoke detector alarm thresholds which correlates to levels including the provisional OEL
for air.

4

Other air sampling

At the recommended service interval, the filter for the entire room’s ventilation will be removed and replaced. A section of the filter will be sent for quantitative fentanyl analysis. More comprehensive detection panels may also be performed. Staff will log the hours of operation and the times on various settings for the ventilation system.
Partial secondary and tertiary filters may also be placed inside the ductwork and at the point of exhaust to determine if any fentanyl is penetrating the primary filter or ending up in the finished exhaust air outside.

8 Order of Magnitude Cost Summary

1 Construction Costs (including design and engineering costs)

Site Servicing Costs:	
Including City and Hydro Servicing and Hook-Up Charges	$ 85,000
Module Base Building Costs:	
Including all fit-out and exterior and interior finishing [Including contractor's overhead and profit] [Not including Mechanical Exhaust or Testing Equipment]	$ 390,000
Mechanical Exhaust Equipment and Associated Electrical	$ 150,000
Allowance for Testing Equipment / Filters and Fit-Out	$ 75,000
Subtotal Order of Magnitude Costs	$ 700,000
Contingencies at 20%	$ 140,000
Total Order of Magnitude Costs	$ 840,000
Say,	$ 850,000

Note: A more detailed preliminary costing will be available once design development of the modular Inhalation Room facility is undertaken, and a complete Outline Specification is provided.

2 Operational Costs (for one year)

For the Operational Costs we worked with a 12 month fiscal model based on a staffing analogous to current Overdose Prevention Sites that see a similar projected through-flow of people who use drugs. This model is intended to be amenable to scaling it into 3-month, 6-month or 1 year proposals. At this point in the planning process we are assuming that our toxicity testing program will require 3 to 6 months of data.

The project will be very successful so it is important to have an exit strategy aimed at the community. For this reason the budget is scalable to one full year or a portion of.

Wages	$ 221,891
Benefits	$ 41,270
Repair and Maintenance	$ 12,000
Other Facilities Costs	-
Telephone and Data Costs	$ 1,200
Food and Beverages	-
Ongoing Training Costs:	$ 6,000
Program Supplies	$ 2,000
Computer and Equipment	$ 5,000
Administration Charges	$ 32,148
Total Operating Charges for this Period:	$ 321,508

9 Staffing Model

This Staffing Model is based on a 12 month period analogous to current Overdose Prevention Sites that see a similar projected through-flow of people who use drugs.

STAFFING MODEL	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Total
Project Manager (9am-5pm)	4	4	4	4	4			1,040
Mental Health Worker (7AM - 3PM)	8	8				8	8	1,672
Mental Health Worker (7AM - 3PM)			8	8	8			1,248
Peer Supervisor (8 hrs/day)	8	8	8	8				1,664
Peer Supervisor (8 hrs/day)					8	8	8	1,256
Peer Worker (8 hrs/day)	8	8	8	8				1,664
Peer Worker (8 hrs/day)					8	8	8	1,256
	52.00	52.00	52.00	52.00	52.00	52.00	53.00	365.00

10 Next Steps

The next steps consist of the following:

1. **Site**
Secure a site to enable construction and testing of the prototype. Note: if the site can be secured on a temporary basis only, the modular nature of the construction lends itself to the building being able to be moved to another more permanent location.

2. **Funding**
Secure funding to enable construction and testing of the prototype

3. **Design Development**
Provide a detailed architectural and engineering design and specification. This will allow a more accurate delineation of project costs, and allow for permit applications for project approvals once a site has been identified.

4. **Permit Approvals**
Time required for approvals varies from jurisdiction to jurisdiction. Zoning and development, and building permit approvals would have to be obtained.

5. **Tendering and Construction**
The project would have to be tendered to award the construction contract to a general contractor or construction manager.

6. **Occupancy and Fit-Out**
The project would be turned over to the operating authority. Furnishings and office equipment would be installed. Staffing up would be completed and operational protocols would be established.

7. **Use and Testing**
Clients would be invited and use of facility would begin. Testing protocols for smoking residue and hazardous material build-up would be undertaken to establish the appropriate testing periods to track residue concentrations.

Test results would allow for data interpretation by qualified professionals to measure impacts on health from residue created by the burning of opioids.

11 In Focus: Community Consultation - People With Lived Experience

On 11 March 2019, the Inhalation Room Design Team presented the results of this study to a group of about twenty peer support workers and staff at the Overdose Prevention Site at 68 East Hastings Street in Vancouver.
The group included fifteen people who use drugs, and seven individuals attending stated that they inhale drugs as their preferred form of consumption.

Those attending the presentation, typically strongly support the concept of Supervised Inhalation Consumption spaces, and thought that the stand-alone Test Prototype could be a very useful addition to the range of facilities offering safer drug consumption spaces.

It was noted that indoor safe consumption spaces at present only serve people who use intravenous drugs, and that the delivery of supervised inhalation services now is confined to outdoor locations in tents, which limits the effective delivery of safe services.

Points raised during the presentation of the Design Prototype included the following:

- It was positive that staff spaces were separate from consumption spaces.
- The idea of a group consumption table, rather than individual consumption booths, was for the most part positively received. The notion that users around a table could more quickly notice a fellow user in overdose distress, than if all users were in their own separate consumption booth, was positively acknowledged.
- A concern was expressed about safe injection booths being accommodated in the same room as the safe inhalation setting. However, it was thought that if the exhaust canopy was effectively removing smoking vapours at source, and that there was limited second-hand smoke sitting in the room, then it might be possible to have injection booths in the same room as the consumption table.
- There was a concern about a lack of security for an individual's drug supply, if all users sat at the same table. There was a suggestion that each table position should have its own "private" drawer, or that trays could be handed out to each user, to hold drugs and smoking paraphernalia.
  Another suggestion was that the table could feature glass partitions on the table top to define the individual consumption setting.
- There was strong support for allowing cigarette smoking in the consumption room, as well as drugs.

appendix

Survey of Select Existing Inhalation Rooms

by Hannah Leyland

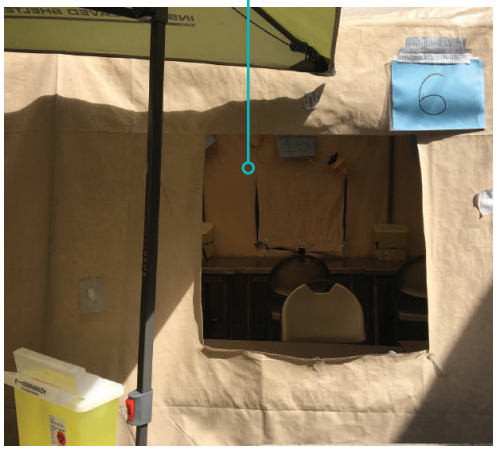
This section consists of a selected survey of Inhalation Rooms developed elsewhere in Canada and Europe. These examples can assist to inform the design of a Prototype Inhalation Room for the British Columbia context.

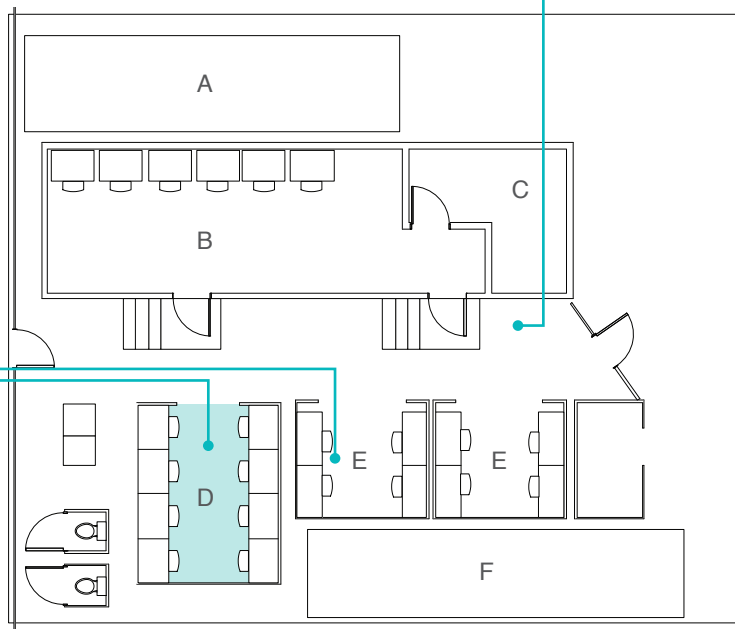
The majority of the information is observational since there is little published data available. The diagrams and dimensions are based on photo observation.

Canadian Examples:

Overdose Prevention Society, Vancouver, BC [opened 2016]

- 3 outdoor tents and 1 trailer for injection consumption only
- Only outside smoking permitted





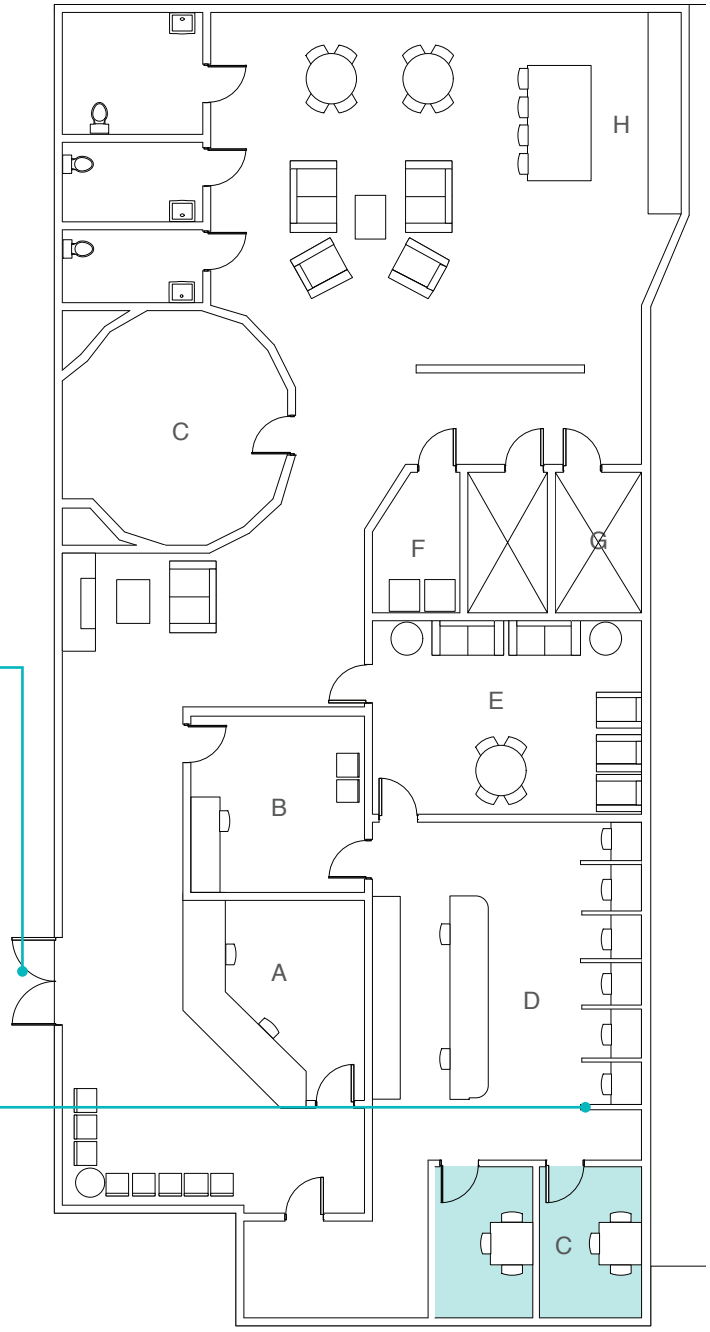
A. STORAGE TRAILER
B. INJECTION TRAILER
C. SUPPLIES
D. INHALATION TENT (OUTDOOR)
E. INJECTION TENT (OUTDOOR)
F. STORAGE TRAILER

TOTAL: 2000 sq. ft.
INHALATION AREA: 180 sq. ft.
INJECTION AREA: 400 sq. ft.

ARCHES, Lethbridge Alberta [opened 2018]

- 10,000 sq.ft. Safe Consumption facility in a stand-alone renovated building.
- 6 injection booths and 2 independently ventilated inhalation rooms for 3 people
- Drug counsellor and nurse stay outside the rooms.
- Inhalation room air can be exchanged with a push button in 10 seconds
- Support health services provided

A. RECEPTION
B. NURSE CLINIC
C. SMOKING AREA
D. INJECTION AREA
E. OBSERVATION AREA
F. LAUNDRY
G. SHOWERS

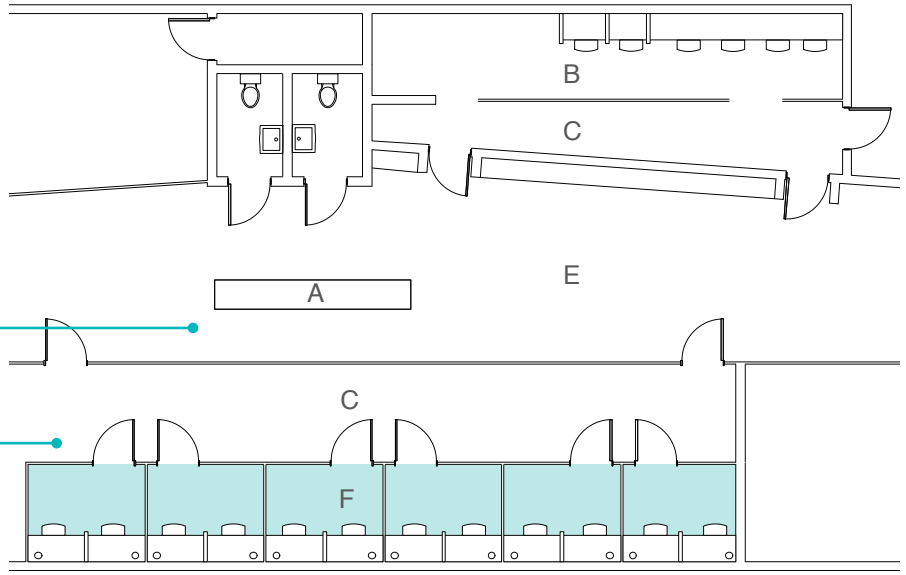


TOTAL: 21,000 sq. ft.
INHALATION AREA: 200 sq. ft. **INJECTION AREA:** 200 sq. ft.

European Examples:

H17, Copenhagen Denmark

- 24 consumption booths,12 of which are in a glazed-in area for smoking
- Social supports and health services provided

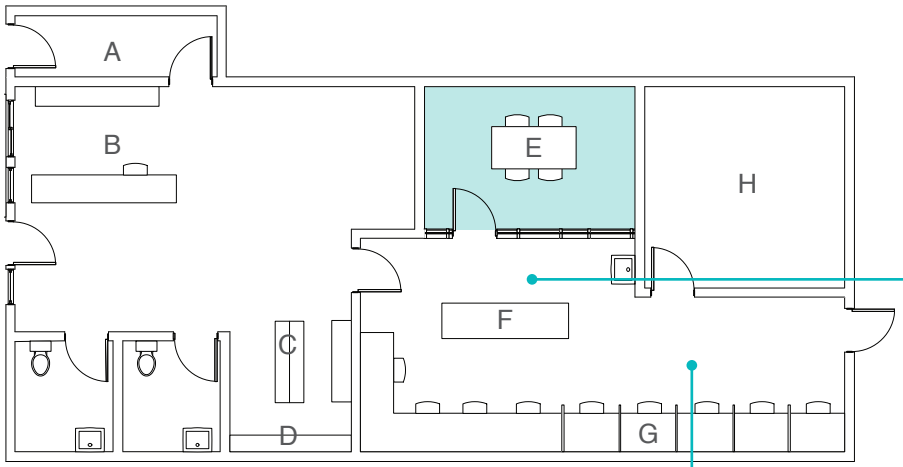


A. RECEPTION
B. INJECTION AREA
C. VESTIBULE
E. MAIN HALLWAY
F. INHALATION ROOMS

TOTAL:10,700 sq. ft.
INHALATION AREA: 500 sq. ft.
INJECTION AREA: 400 sq. ft.

ESPACE GAIA, Paris, France

- Connected to a hospital
- Table and four chairs in a smoking room separated from a nursing station by a glazed wall

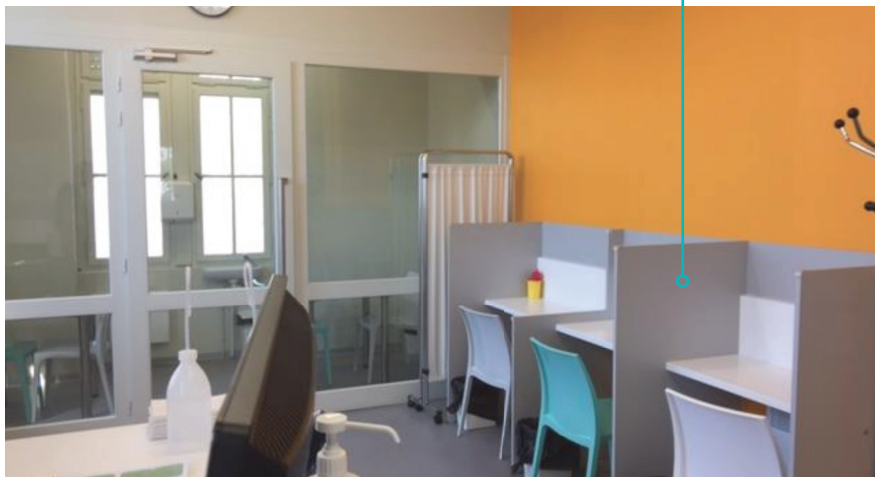


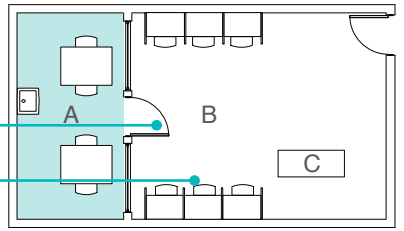
A. STORAGE
B. RECEPTION
C. WAITING AREA
D. LOCKERS
E. INHALATION ROOM
F. STAFF/ SUPPLIES
G. INJECTION AREA
H. CLINIC

TOTAL: 1600 sq. ft.
INHALATION AREA: 160 sq. ft.
INJECTION AREA: 350 sq. ft.

ARGOS, Strasbourg, France

- 6 injection booths in a room with a nursing station, with a glass wall creating a separate smoking room with 2 tables, each with 2 chairs



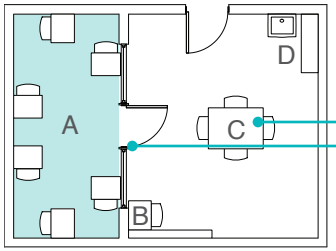


A. INHALATION ROOM
B. INJECTION AREA
C. RECEPTION

TOTAL: 520 sq. ft.
INHALATION AREA: 150 sq. ft.
INJECTION AREA: 160 sq. ft.

Ragazza e.V, Hamburg, Germany

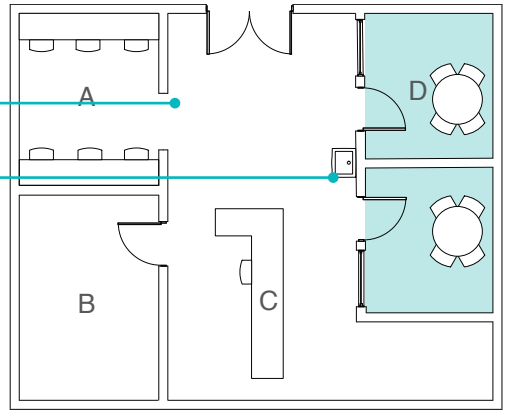
- Women only
- Connected to a shelter that provides emergency housing, medical support, and counselling



A. INHALATION ROOM
B. STAFF AREA
C. INJECTION AREA
D. SUPPLIES

TOTAL: 420 sq. ft.
INHALATION AREA: 150 sq. ft.
INJECTION AREA: 150 sq. ft.

ABS, Lausanne, Switzerland

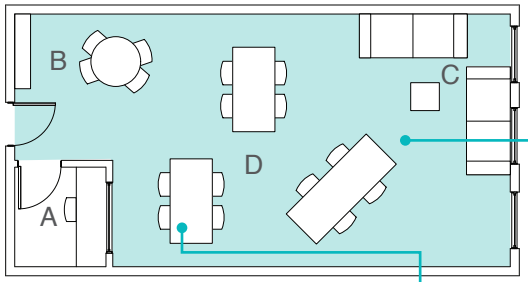


A. INJECTION AREA
B. CLINIC
C. RECEPTION
D. INHALATION ROOMS

TOTAL: 1000 sq. ft.
INHALATION AREA: 230 sq. ft.
INJECTION AREA: 150 sq. ft.

AMOC, Amsterdam, The Netherlands

- Integrated with drop-in centre and emergency shelter. Referred to as a “social-oriented drug consumption room”.
- 4 tables (2 for injection and 2 for inhalation) and other settings for drug consumption; 18 seats total.
- Users face each other; staff observe from a glazed-in enclosed space.
- Air handing system is separate from that of the rest of the building.
- Furnishings are “lounge-like” all with washable surfaces (wall paint, furniture, floors etc.). The lower 1.5m of the wall is made of Plexiglass for durability. The health authority checks the space every 3 months.



A. STAFF AREA
B. SUPPLIES
C. LOUNGE
D. INHALATION/ INJECTION AREA

TOTAL: 720 sq. ft.
INHALATION AREA: 620 sq. ft. **INJECTION AREA:** 620 sq. ft.