

May 1, 2018

Memo: Cannabis Cultivation – Mixed Light Facility Analysis and Standards

To: Law and Legislation Chair Schenirer and members of the Law and Legislation Committee

A request from Councilmember Guerra to Current Planning asked that we provide additional information as to concerns that have arisen over alternative building types proposed for cannabis cultivation facilities and their appropriateness for communities as well as adaptive reuse options. This memo summarizes our research and recommendations as to this building construction type and its suitability for cannabis cultivation and suitability as a building for other future uses.

Concerns expressed focused on:

- Light emission with any translucent surfaces.
- Security of the building envelope; ability to resist penetration, panel destruction and panel displacement.
- Concealment of interior product – degree of opaqueness.
- Positive odor control both in venting and envelope sealing.
- Degree/feasibility of adaptive reuse of buildings for other purposes if not used for cannabis.

Planning had established general criteria for “buildings” proposed for cannabis use. They included a permanent foundation, code compliant seismic resisting elements as required for commercial buildings and code compliant utilities connection.

In addition to new and repurposed warehouse buildings, some of concrete or concrete block construction, metal /frame/skin buildings and wood frame buildings, we have also received proposals for buildings with translucent skins for walls and roofs, generically referred to as “greenhouses”. It is these buildings that have raised the aforementioned concern as to suitability.

Planning has continued to research best practices for cannabis structures that have been developed in states that have lengthier experience with commercial growing and processing. From that research we have narrowed the definition of an acceptable building type using natural daylighting to a type referred to as “Mixed Light”. We currently feel it is equal to, if not superior in many ways to conventional construction. The following is a description of the Mixed Light building typology; materials, systems, energy consumption, sustainable reuse opportunities and economic advantages in the industry. It is the recommendation of Planning that these standards be incorporated into building requirements for this use.

### **Mixed Light Building Features**

Mixed light facilities generate their name from the combination of the use of natural daylight and artificial light. Plant growth cycles are controlled by the period of light a plant receives in a 24-hour cycle. In an outdoor grow with 100% natural light, one crop is produced per year because budding is triggered by the shorter daylight hours of Fall. Mixed light facilities control the “natural yearly light cycle” of the vegetative and flowering states and thus generate 4 – 5 crops per year.

### **Light Intrusion into the Community**

Light control is critical to efficient and quality crop production. To accomplish this, the walls of the building are opaque, typically with wall panels of a metal skin inside and out with a center layer of insulation and the roof is a translucent structure to allow natural daylight. However, to control the “day length” of natural light there are layered light deprivation curtains of three reflective layers that open and close on a computer-controlled automated system. These curtains travel on tracks and completely block out all external light. With this system there is no internal artificial light escaping to the exterior that would create a “glow” into the community.

### **Building Security**

The insulated metal walls provide a security layer at the perimeter equivalent to other conventional building systems. This wall system would be in addition to typical security measures employed at these facilities; security personnel, fences, motion detectors, video cameras and alarms systems. With this Mixed Light wall system, as with any other building system, the weakest point of defense remains the doors.

### **Building Opaqueness for Product Privacy**

The roofs of the buildings are a panelized, two-layer cellular polypropylene or polyethylene material and can be either clear or translucent. For Sacramento city projects we would limit the roof panels to translucent. A translucent material effectively blocks a view of interior product or activities. Because only the roofs are translucent they would need to be viewed from above by a drone or airplane, and the translucent material will effectively mitigate this opportunity.

### **Odor Control – Building Envelope**

The building walls are weatherproof, precluding rain intrusion and are sealed to the exterior environment which provides them with protection against odor escaping through the wall surfaces. The walls are either prefabricated insulated metal panels with gasketed joints or lapped metal panels with a center layer of continuous insulation and a sealed inner metal layer. The top and bottom of the wall panels are contained in a U channel that is sealed for air infiltration and odor control in addition to providing security of the panels. Roof panels are secured from the interior in a rubber gasketed channel system that clamps the panels in place providing for positive weather and odor sealing as well as making them vandal proof.

### **Odor Control – Exhaust**

Most projects submitted to Planning have proposed charcoal filters as part of the odor management system. Mixed Light facilities are proposing a different approach due to the cost of charcoal filter systems used on an industrial scale. Colorado, Washington and Oregon have found that operators of facilities have, on occasion, not changed the charcoal filters as required for odor control due to their expense and only do so when there is a complaint or inspection requirements.

The odor of cannabis is not unique as all plants have odors. Terpenes, or terpenoids, are the compounds in cannabis that give the plant its unique smell. THC and the other cannabinoids have no odor, so marijuana's compelling fragrance depends on which terpenes predominate. As an alternative odor control system, some applicants have submitted an exhaust ventilation air atomization system with the chemical treatment, Ecosorb, introduced externally at the vent louvers. Unlike charcoal filtration, the Ecosorb is inexpensive and the dispersion system is electronically tied to any call for an exhaust cycle thereby prohibiting an exhaust cycle without odor control. It is an odor neutralizer, is biodegradable, safe for humans and all environments and has no measurable flash points. The proposed odor dispersion system systems have independent laboratory testing and validation and published case studies that included legal reviews and neighborhood validation.

### **Adaptive reuse**

A legitimate concern arises over the adaptive reuse of buildings dedicated to cannabis cultivation if and when the market either overbuilds or retracts. Upgraded conventional warehouse buildings would be an easy and attractive reuse. However, this issue does not ask the question as to what buildings will be the most desirable in the long term for cannabis use if there is an industry retraction. As will be explained in detail later in this report, Mixed Light buildings, due to infrastructure and operating costs, have been shown to produce a marketable product at around \$200 a pound while conventional facilities cost between \$1,00 and \$1,500 a pound. In the long term the Mixed Light facilities have an economic advantage and are more likely to survive a market downturn.

From a reuse standpoint Sacramento has a unique Farm to Fork movement, growing locally and sustainably. However, agriculture has traditionally required large tracts of land as well as fertilizers, herbicides and pesticides that negatively affect both the farmland and adjacent urban use land. They also contribute to a large water use and challenging and stressful working conditions. The concept of hydroponics brings agriculture indoors providing for larger yields, year-round grows, contained use of water, no pesticides or herbicides and better working conditions. It would appear that Mixed Light facilities, if not used for cannabis, would provide a unique marketing and industry activity for Sacramento and an alternative use in industrial zoned areas of our City.

### **Operational Advantages and Benefits**

Electrical use is significant in cannabis production. A Mixed Light facility uses zero supplemental light from May to the end of August vs year round supplemental light in a conventional facility. In an electrical use comparison for the Toko Agro project of 26,500 sf of grow area, annual electrical use was estimated at 339,033 KW hours. Comparing that to the same size conventional building with 100% supplemental light, the use would be 4,645,945 KW hours, a percentage increase of 1,370% of SMUD electricity.

A side effect of the higher light load in conventional facilities is a larger heat load that must be mitigated with cooling and ventilation equipment. This energy savings is significant and results in a lower impact on our publicly operated utility and is in alignment with and supports our General Plan sustainability goals.

Water use in a conventional facility is ten times greater than in a Mixed Light facility due to higher temperatures created by lighting thereby increasing evaporation and greater ventilation needs.

In a Mixed Light facility, the entire growth “season” is fully automated and computer controlled. Supplemental lighting, light blocking curtain operation, temperature and humidity control, Co2 production, watering, fertilization and odor monitoring and control are all on automated systems.

The interior environment is completely sealed from the exterior not only for odor control but for environmental purity of the plants and Co2 containment. If the plants are exposed to any prohibited herbicides or pesticides entire crops are destroyed and therefore these facilities go to great lengths to provide environmental isolation.

The Mixed Light building puts less load on utility infrastructure and natural resources making it a more environmentally responsive structure, has a lower initial capitalization cost, operates at a lower annual cost and as such is a more cost competitive facility.

### **Building Integrity**

As mentioned we have defined what constitutes a “building” and this Mixed Light building typology meets those standards. In addition, they are designed to withstand a 110-mph wind load, far in excess of our regions requirements and the cellular translucent roofs are walkable for maintenance purposes.

**Proposed Standards**

In summary “greenhouses” are not appropriate based on concerns expressed unless they meet the following criteria of Mixed Light facilities.

- A permanent foundation
- A seismic and wind resisting structure that meets local codes
- Code compliant utilities connection
- Solid insulated building walls that are environmentally sealed and positively attached to the building structure.
- A walkable translucent, gasket sealed two-layer roofing system.
- Positively attached wall and roof panel systems that are tamperproof.
- An automated light deprivation curtain system to preclude by design light emitting from the building at night.
- An automated and performance-controlled odor neutralizing system.

Sincerely,

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