## Health and Safety Impact Review

# Transitional Shelter Community for Veterans

**June 2017**

CLACKAMAS COUNTY

Health, Housing & Human Services
Center for Public Health Advancement, Public Health Division
Healthy Safe & Clean Places, Public Health Division
Department of Transportation and Development

Images by Flickr user Inhabitat, Tiny Home Village in Washington D.C.

# Transitional Shelter Communities for Houseless Veterans

## Shelter is health

All community members deserve an affordable, safe and healthy place to live. Shelter is critical to life (Maslow, 1943). Shelter is a protective factor that keeps people safe from harmful exposures, provides a sense of privacy and stability, helps people avoid contagious diseases, and supports individuals in being better able to manage chronic illness (Housing and Health, 2011). Lack of adequate shelter or living in poor quality housing can lead to injuries, infectious disease, and other health problems (Shaw, 2004).

## This report

Clackamas County is planning and implementing an innovative strategy to provide temporary shelter to houseless veterans. In partnership with H3S's Community Development Division and Clackamas County's Department of Transportation and Development, H3S's Public Health Division conducted a Health & Safety Impact Review (HSIR) on a Clackamas County transitional shelter community concept located in the North Clackamas Health Equity Zone.

## The review process

A HSIR is intended to improve the efficiency and quality of county decision-making processes by assessing if a proposed policy, project or program will impact the health and safety of a community. The goal is to provide objective information that decision-makers can use prior to the policy, project or program development process. It is similar to a rapid Health Impact Review (WA, 2017) and uses adapted methods of a rapid Health Impact Assessment (NRC, 2011), although it is unique in that it takes place well in advance of a proposal, during the pre-planning phase.

The HSIR provides decision-makers with alternative options, recommendations or strategies they can adopt to maximize the benefits, or reduce the harms, of their proposals. The HSIR provides a description of the potential linkages a transitional community can have on long-term health and safety outcomes (See **Appendix 2** at the end of this report).

Transitional shelter supports the health of houseless veterans. (Image source by Flickr user Dona Ana Community College.)

## Houseless veterans in Clackamas County

Clackamas County does not have enough affordable housing or transitional shelters to meet the needs of its population. The number of people without housing has been climbing over the years (HHH, 2017). (See **Figure 1** to the right). This problem affects communities across the state. Between 2007 and 2013, the number of houseless veterans increased in Oregon (Almanac,

**"Clackamas County does not have enough affordable housing or transitional shelters to meet the needs of its population."**

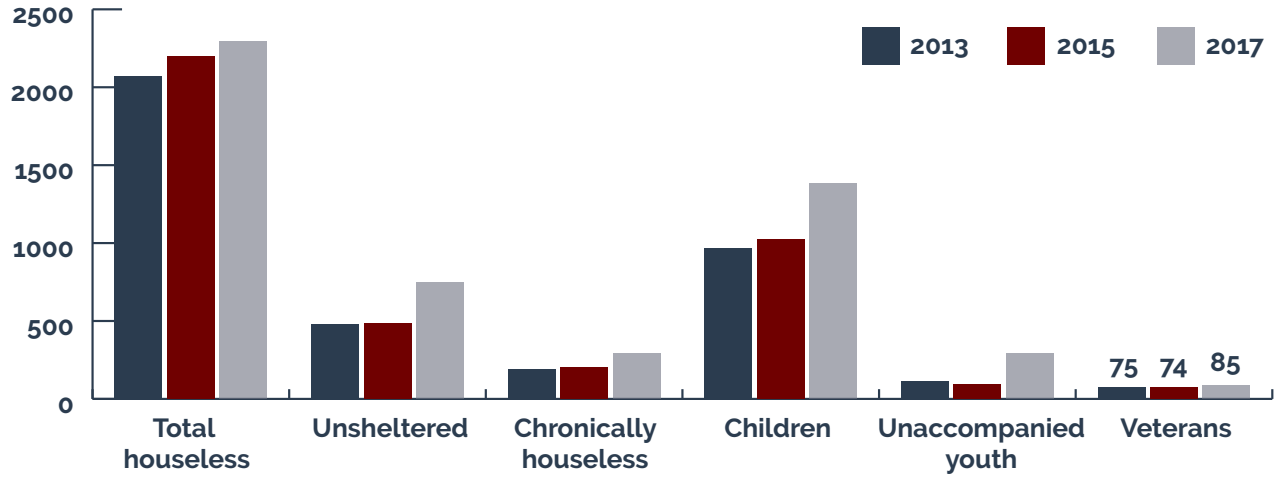
2015). The Veterans by Name Registry lists houseless veterans that are known to Clackamas County service providers. Combined with data from Clackamas County's Coordinated Housing Access system, 110 houseless veterans have been identified as of May 1, 2017. Of these, 17.7 percent are age 62 and over.

## Referring houseless veterans to the transitional community

The Coordinated Housing Access System in Clackamas County will work with referred veterans to support their move from being houseless to living in the transitional shelter community. Houseless veterans will be able to refer themselves; and county outreach workers, the federal veterans agency, meal sites and 10 other non-profit organizations will be part of a system of referrals. Veterans will be given the opportunity to decide if this optional transitional living situation fits their immediate needs.

This process responds to an emergency situation in order to provide increasing stability to houseless veterans. Currently, there are approximately 60 permanent housing sites available. These housing resources are dwarfed by the scale of the need, and many houseless veterans can remain on waiting lists for housing for extended periods. The development of this transitional community addresses this need and furthers one of the objectives of Clackamas County's strategic housing plan, to fill the gap between houselessness and permanent affordable housing through the development of a continuum of shelter and transitional housing resources.

**Figure 1**: Houselessness Point-In-Time count in Clackamas County




(Source: Clackamas County Department of Health, Housing & Human Services)

## Questions to Answer

1. How will the referral process explain the housing transition to manage expectations that transitional sheltering will not be a permanent home and that the site may move?
2. How will the referral process ensure that the most vulnerable veterans have access to permanent housing first?
3. How will the referral process explain to houseless veterans the conditions of the transitional shelter site specific to any chronic conditions that may be exacerbated from the location such as PTSD or respiratory illness?
4. How long will people likely wait for permanent housing while living in temporary shelter?

# Social Service Access and Health

## Social, behavioral and physical health supports for houseless individuals

Houseless people have higher rates of premature death, a greater burden of acute and chronic physical health conditions, a higher prevalence of psychiatric and addictive disorders, and a higher risk of being sexually or physically assaulted than people who have a home (S. B. Kertesz, 2016) (Noska, 2017). Approximately 54 percent of houseless veterans have some form of disability, which includes substance abuse, mental illness and physical disabilities (Balshem, 2011) (Alliance, 2015). When compared to housed veterans, houseless veterans are also disproportionately affected by infectious diseases like HIV and hepatitis B and C (Noska, 2017). Given that veterans are disproportionately impacted by a number of clinical and social problems, it is critical that they have access to appropriate social, behavioral and physical supports. (See risk factors in **Figure 2** to the right).

**"Approximately 54 percent of houseless veterans have some form of disability, which includes substance abuse, mental illness and physical disabilities."**

Because houseless individuals have such complex medical and psychosocial problems, one strategy to improve their quality of life is to integrate supportive services into their housing. Supportive shelters encompass a range of approaches and service levels, and can be achieved in both temporary shelter and permanent housing models. The focus of the proposed shelter site is "shelter first," then supportive services follow. This section highlights methods to create stronger supportive housing linkages between social service, health care and mental health providers.

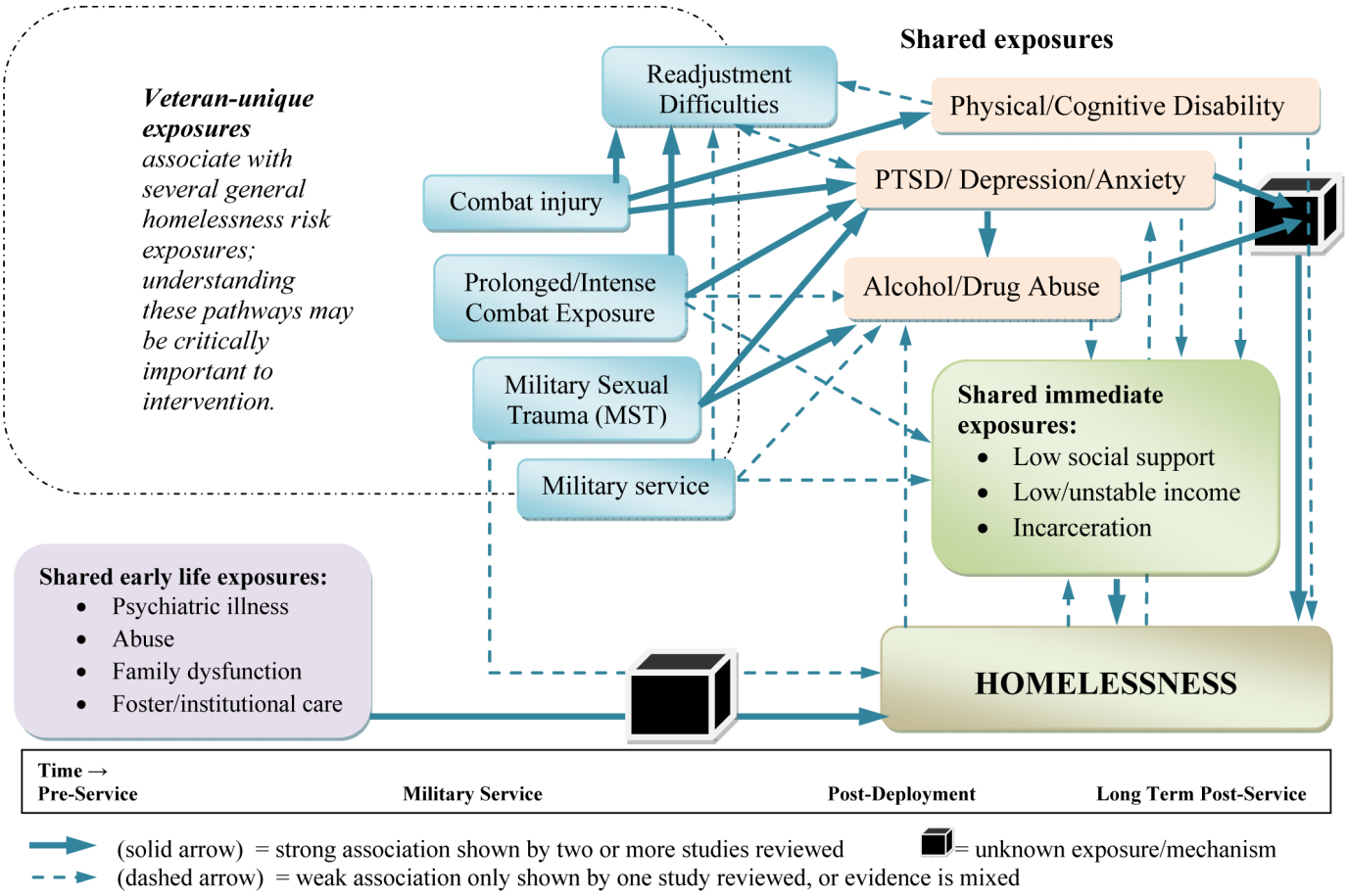
## Potential care models

The participants in this project will have access to various social, behavioral and physical supports through involvement in the Homeless Veteran Coordination Team and Coordinating Housing Access System. In addition, because houseless veterans receive their physical health and mental health care through the Veterans Affairs system, Homeless Patient Aligned Care Team (H-PACT) clinics are available to them.

**"Because houseless individuals have such complex medical and psychosocial problems, one strategy to improve their quality of life is to integrate supportive services into their housing."**

H-PACT clinics co-locate medical staff, social workers, mental health and substance use counselors, nurses, and homeless program staff in an outpatient clinic (V. Affairs N.D.) (O'Toole, 2016). Along with comprehensive clinical care, the program provides them with needed social services and programs. These social supports include hygiene care (on-site showers, hygiene kits and laundry), bus passes and other transportation assistance and on-site clothes pantry, food pantry, meals or other food assistance. While the H-PACT model integrates the social determinants of health into primary care — rather than into housing — the results of the program are promising and highlight several key social supports that improve the health and quality of life for houseless veterans (O'Toole, 2016).

**Figure 2**: Risk Factors for Veteran Homelessness: Conceptual Model (Balshem, 2011)




## Questions to Answer

1. While being housed in a shelter is better than being houseless, how will the site contractor ensure appropriate access to physical and mental health care services?
2. What is the county's role in ensuring appropriate access to physical and mental health care services?

## Recommendations

1. Consider having the site contractor provide laundry and hygiene kits, in addition to on-site showers and cooking facilities.
2. Consider having the site contractor work with partners to provide a food pantry or other food assistance.
3. Consider developing a plan that specifies how social service, health care and mental health providers will be linked.

# Supporting Relationships in a Transitional Space

This section highlights potential methods to create socially-cohesive temporary shelter for veteran populations.

## Reinforcing social relationships

Houseless individuals are often socially isolated, have low levels of social support and, it is argued, their lack of social resources compound their existing health problems (Hwang, 2009). These observations suggest the need to strengthen social relationships among people who reside in transitional shelter. While houseless veterans are exposed to many of the same risk factors as other houseless individuals, veteran houselessness is unique in that some factors generally believed to be protective, such as being better educated or having better social support, do not appear to have the same effect in the veteran population (Hwang, 2009) (Balshem, 2011). The majority of veteran-specific research studies identify social support in terms of individual relationships, with less attention paid to social capital/social support at the institutional level. None of these studies investigated what type of social capital is most likely to support the transition of veterans into stable housing (Balshem, 2011).

**Six Components of a Successful Transitional Shelter Community:**

**1. Shelter:** Individual structures of 400 square feet or less

**2. Common Building(s):** Shared facilities and resources to supplement structures

**3. Self-Governance:** Involvement of residents in decision-making and management

**4. Village Meeting:** Residents meet as a community at least once a month

**5. Community Agreement:** A basic code of conduct that all residents agree to abide by

**6. Non-Profit Sponsor:** An entity that provides ongoing administration, oversight and support

(Source: Square One Villages)

**"Houseless individuals are often socially isolated, have low levels of social support and, it is argued, their lack of social resources compound their existing health problems."**

## Community-building

Intentional communities support social integration by providing a space in which individuals regularly interact with one another. These intentional communities occur in both transitional shelter and permanent housing facilities. The design of intentional communities is based on the needs and values of their residents, which is a valuable feature given the unique social needs of veterans.

## Self-governance case studies

Three notable intentional communities for houseless people — Opportunity Village, Rest-Stop and Right 2 Dream Too — are located in Eugene and Portland (Workshop, 2015). All three communities have various

levels of self-governance and at a minimum, a set of rules that focus on keeping their residents healthy and safe. The concept of social capital, where residents cooperate as a group and take collective action for the good of the community, also exists at all three sites.

> **"The units in this village for veterans will need to have the ability to house people with physical disabilities."**

Early evaluation outcomes from Rest-Stop and Opportunity Village indicate that residents feel safer, more confident and more independent. Residents also have more self-confidence, are better able to provide for themselves, and feel as though they are part of a community (Workshop, 2015).

### Mobile structures can address access needs

Many villages for the houseless are on blocks. The units in this village for veterans will need to have the ability to house people with physical disabilities. For example, removable ramps, grab bars and wider doorways can be installed to help accommodate those who use wheelchairs or other mobility devices. The same will be true of the community center which will need to be built aligned to American Disability Act (ADA) requirements. There are transitional shelter site plans that are ADA compatible, however there is no toolkit or guide for this specific use. Instead, we recommend examining Aging in Place toolkits to help contractors align shelter structures with the needs of those with physical disabilities.

## Recommendations

1. Consider having the non-profit shelter contractor specify how they will ensure social integration and community continuity given the temporary nature of the site.
2. Consider involving the county's Homeless Veteran Team to review any proposed methods of self-governance or site policies.
3. Consider involving potential participants in the consulting process for design planning.
4. Explore best strategies to address needs of those with disabilities.

# Developing an Industrial Site for Temporary Sheltering: Considerations

## Potential site balances existing industry with emergency shelter

Site development plays an important role in the creation of a "safe place" for people to have refuge from the elements and access to showers, restrooms, cooking and eating facilities in a safe and supportive environment. Stress and continuous long-term exposure to the elements has many negative outcomes. Creation of a "safe place" to regroup and rebuild can be the first step on a path to secure housing.


**Map 1:** Potential site location for transitional community.

The proposed site, located off of SE Jennifer Street at the south end of SE 115th Avenue in unincorporated Clackamas County, has a flat usable area of approximately 1.2 acres. (See **Map 1**). The land is zoned General Industrial per the Clackamas County Comprehensive Plan. The upper (northern) portion of the site is flat with a gravel/soil surface with vegetation and tree cover. The southern portion of the site drops to a creek area. Adjacent land uses include a concrete plant to the west, car repair shop to the north and a truss manufacturer and storage yard to the north and east. The site is over 600 feet from the busier Jennifer Street. Land uses to the south are limited and include vegetation and tree cover.

Locating transitional sheltering in an industrial area calls for consideration of an environmental scan including past land uses, and any presence of contamination or hazardous materials in the soil or water. In this case, monitoring wells were placed on the site due to possible chromium contamination. (See attached DEQ letter in **Appendix 3**). The wells have since been removed. Air quality and noise are other considerations that impact health determinants such as lung distress and anxiety. This location is over 600 feet from Jennifer Street, meaning less noise. Businesses may not operate 24/7 so night time noise levels may be similar to typical city levels. Day time noise levels will likely be higher due to surrounding business activity.

As part of creating shelter that is affordable to construct, site layout is critical. Utilities such as power, potable water and sanitary sewer need to be provided to the site. How units are configured, such as the presence of power, water, and sewer, will substantially impact development costs. Surface water treatment and management, including detention, is required for impervious surfaces that are added to the site in order prevent downstream flooding issues.

> **"Creation of a 'safe place' to regroup and rebuild can be the first step on a path to secure housing."**

Site security such as fencing, and amenities like landscaping, are also key elements. Each shelter unit and common bathroom, shower, kitchen and gathering facilities are subject to building code standards to ensure the safety and health of the occupants. In addition, industrial user concerns will need to be addressed as related to residential uses near, or adjacent to, their

operations, which may create safety and/or environmental health concerns. The zoning and development standards that will be developed and adopted into the Clackamas County Zoning and Development Ordinance will set the standards for both land zoning and site development.

### Potential size and capacity

Facility sizing and the number of occupants related to the parcel size needs to be determined. The International Association of Venue Managers and the American Red Cross note that a minimum of 40 square feet per person is necessary in an emergency shelter setting (IAVM, 2010). Several case studies indicate a minimum parcel size of approximately one acre and a maximum of 50 people for community stability. In one Seattle transitional community, the Othello Village, a policy requires encampments have at least a 25-foot setback from residentially zoned lots, be at least 5,000 square feet and have at least 100 square feet per occupant (Seattle, 2015).

### Public health considerations for a transitional site

Common shared facilities such as the bathroom, shower, kitchen, food preparation and gathering areas are at higher risk for infectious disease outbreaks. Site development standards need to include requirements such as sanitation, hygiene standards, food handling and preparation, and hand washing stations at the site.

## Questions to Answer

1. What is the optimal number of people who can be safely accommodated on this site?
2. Is the site safe for human habitation based on an environmental assessment of the site?
3. Will zoning allow the site to be developed as a long-term permanent transitional shelter site, or should the site be planned for dismantling at a specific date?
4. What is the cost to bring utilities to the site including power, sanitary sewer, water and storm drainage?
5. How can the site be developed to minimize impervious surface and meet accessibility and low barrier requirements?
6. Based on zoning criteria to be developed, what standards should exist for parking, lighting, level of accessibility, surfacing types and other relevant elements to create a safe place for users of the site and adjacent businesses?
7. What building codes should apply to shared and common areas and individual shelter units?

## Recommendations

1. Review DEQ documents associated with work completed by the Clackamas County Development Agency.
2. Work with Clackamas County Planning & Zoning staff to evaluate the proposed temporary sheltering in an industrial zone to determine best land use policies within this zoning district.
3. Complete a preliminary cost estimate to bring all public utilities to the site.
4. Examine site configuration scenarios that minimize impervious surface and provide low barrier and accessibility in alignment with the project objectives.
5. Develop complete site design options for layout of units and common areas.
6. Collaborate with the county's Building Codes Division to maximize safety for the facility users.

# Land Use and Zoning Considerations for Emergency Shelter on Industrial Land

## Incorporating emergency shelter in an industrial zone

Zoning helps city and county planners determine how land can be used. (See **Map 2**). The Zoning and Development Ordinance (Clackamas County, 2017) implements the goals and policies of the Clackamas County Comprehensive Plan (County, Clackamas County Comprehensive Plan, 2017). Chapter 4 of the comprehensive plan addresses land use goals and policies including industrial lands, and Chapter 6

**"The Zoning and Development Ordinance implements the goals and policies of the Clackamas County Comprehensive Plan."**


**Map 2:** Zoning designations near the proposed industrial site for development.

addresses housing and housing goals related to land use (County, Chapter 4: Land Use, 2017). These documents provide the regulatory and policy frameworks in alignment with countywide strategic priorities. Health and safety are well embedded into these documents. Given the absence of allowed residential uses in industrial areas, the zoning code to be developed will consider the use, number of tenants, environmental and site standards, roadway standards and building standards.

For example, our industrial-based employment relies on having sites in order to conduct their business. These sites are often noisy and sometimes operate 24 hours a day. The economy of the county depends on these critical family-wage jobs in industrially zoned areas.

**Zoning Options Involve Tradeoffs**

**Working** to meet the county strategic priorities of Healthy People, Safe Roads and a Vibrant Economy

**Balancing** the intended use of industrial lands with emergency need for housing

**Adoption** of flexible site development standards such as setbacks and landscaping while still meeting zoning requirements

**Duration** of property use including long-term versus a time limitation such as three or five years

**Applying** necessary building codes to protect the health and safety of the users

## Questions to Answer

1. What form of emergency sheltering on industrially zoned land should be allowed, and for what duration?
2. Should each site have a date certain time for use for emergency shelter?
3. Should there be a maximum time for residents to stay at this shelter?
4. How does the County Housing Plan incorporate this zoning consideration?
5. Who should use the shelter site?
6. What development standards should be set for use of a site?
7. What building standards should be set for the common area and each shelter unit?
8. What process will be required to determine the environmental and health suitability of any given site including noise, pollution and public health components?

## Recommendations

1. Collaborate with the county's Planning and Zoning and Building Codes divisions to develop land use and building requirements.
2. Review code revisions from other cities and counties to accommodate similar transitional shelter for houseless communities, including Eugene and Seattle.

# Ensuring Transportation, Safety and Access

## Transportation access is a lifeline to social service access

The transportation system serves a critical link between the site and access to medical services, healthy food and social interaction beyond the community. The safety of all users traveling the roadways and pathways is a primary health concern. Injury from a transportation-related crash can lead to poor health outcomes. Busy roads with truck traffic have higher pollution concentrations near the roadway (HEI, 2010).


**Map 3**: Potential site off SE Jennifer St. and SE 115th Ave.

The site is located over 600 feet south of SE Jennifer Street at the end of SE 115th Avenue. Jennifer Street carries 10,000 vehicles per day with 18 percent of this volume in truck traffic. Pollution levels typically decrease considerably as you travel more than 50 meters from a busy road (HEI, 2010). (See **Table 1** for more information on traffic flow.)

> **"The safety of all users traveling the roadways and pathways is a primary health concern."**

The roadway system in this area serves industrial use employers and commuters. Roadways are two to three lanes with speed postings of 30 to 40 miles per hour. Sidewalks and bike lanes are complete on SE 122nd Avenue and partially complete on SE Jennifer Street. SE 106th Avenue has no bike lanes and just a few short sections of sidewalk. SE 115th Avenue, which provides access to the site, is a very low volume roadway with

**Table 1**: Roadway data near proposed site

| Street Name | Functional Classification | Average Daily Traffic (ADT) | Truck % | Sidewalk | Bike Lane | Posted Speed (mph) |
|---|---|---|---|---|---|---|
| SE Jennifer Street | Minor Arterial | 10,000 | 18 | Partial | Partial | 40 |
| SE 106th Avenue | Local | 2,500 | 16 | No | No | 30 |
| SE 122nd Avenue | Minor Arterial | 2,000 | 20 | Yes | Yes | Not posted |

(Source: Clackamas County Department of Transportation and Development)

no sidewalks or bike lanes. Street lighting is limited. SE 106th Avenue and SE 122nd Avenue have much lower car volumes and truck percentages in excess of 18 percent. By comparison, Highway 212 carries over 16,000 vehicles per day and I-205 carries over 136,000 vehicles per day.

### Existing transportation access

Existing transit access exists on Highway 212, a 0.6-mile walk from the site. TriMet Line 30 operates along Highway 212 with 30-minute service on weekdays, one-hour service on Saturdays and no service on Sundays. TriMet Line 79 operates along 82nd Drive and provides 30-minute service. The nearest grocery store, Fred Meyer, is approximately 1.9 miles away and there is a Plaid Pantry about 1 mile from the proposed site (see **Map 3**).

### Roadway infrastructure protects from injuries and falls

Non-motorized users of the transportation system rely upon a network of sidewalks, bike lanes and pathways for safe navigation to destinations. Longer walks or bike rides to transit or stores is helpful in terms of physical activity and can also be a considerable barrier for those with disabilities. As part of the site assessment, the presence of such facilities is important to consider as part of the site review process. Narrow facilities or the lack of areas to walk or bike can be especially difficult to navigate with the presence of large trucks, especially by those with disabilities. Measures can be taken by individuals to increase their visibility such as wearing reflective or bright-colored clothing.

## Questions to Answer

1. How can access to necessities such as food and medical needs best be provided given the longer walking distances to transit?
2. How can safety for those who access the facility using the roadway system be maximized?
3. Are there critical sidewalk or ADA connections that should be accomplished with this project?
4. What can be done about the lack of roadway lighting that can make travel during periods of darkness more hazardous.
5. Can TriMet access be improved by adding more bus stops or adjusting service times and frequency of adjacent routes?

## Recommendations

1. Consider shuttle service from the site to basic needs such as grocery stores and medical access. Sources for this may include TriMet, Transportation Reaching People, Ride Connection and Vets Driving Vets.
2. Provide reflective vests for all residents and strongly encourage them to use them at all times when walking or cycling around the roadway system.
3. Assess potential transportation routes and consider possible improvements such as sidewalks and ADA accessibility.
4. Consider additional street lighting where feasible and/or consider limitations for travel by foot or bicycle during period of darkness.
5. Coordinate with TriMet to review bus stop locations along Highway 212, and consider feasibility of a route adjustment to travel down a portion of Jennifer Street to serve the site.
6. Consider involving the county's Homeless Veteran Team to review and provide input on the site design planning process.
7. Consider involving future potential participants in the planning process.

# Air Quality, Light at Night, Vibration and Noise

## Protecting residents from industry activity

Everyone deserves a safe place to call home. A temporary shelter community that responds to an emergency need requires the same attention as any permanent dwelling. Approximately one in five veterans in the U.S. experience some form of a disability (Factfinder US Census, 2015); hearing loss and Post-Traumatic Stress Disorder (PTSD) are among the most common (U. D. Affairs, 2016). This section provides an overview of ways to ensure veterans are buffered from industrial activity in the proposed location.

## Air quality

Living near a major road or freeway has risks because of exposure to air pollutants (see **Table 1** on page 12).

Health risks from exposure to different pollutants depend on the type, concentration and distribution in the environment. Criteria pollutants such as total suspended particulate matter, fine particulate matter, sulfur dioxide, ozone and nitrogen dioxide contribute to respiratory illness and can worsen existing respiratory conditions (Brook, 2010). These same pollutants can contribute to cardiovascular disease and its symptoms, such as chest pain (Brook, 2010) (Delfino, 2002). Exposure to particulate matter is also associated with different types of cancer (Delfino, 2002).

Research indicates that living within 50 meters of a major thoroughfare involves the greatest exposure to air pollutants (HEI, 2010). If residences are too close to traffic-related and industry-related air pollution, these exposures will need to be mitigated. Research is also emerging that trees can remove pollutants (Tallis, 2011), including nitrogen oxides (Rao, 2014) (Delfino, 2002) and particulate matter (Brook, 2010) from the air. Planting trees or other vegetation as a buffer (Zhang, 2010) can help reduce the amount of certain air pollutants that might reach this planned shelter site (EPA, 2015).

## Noise and vibration related to Post-Traumatic Stress Disorder

Noise and vibration related to street traffic and industry can be more than a mere annoyance. For example, research indicates that traffic noise contributes to a risk of cardiovascular disease (Ndrepepa, 2011). Post-Traumatic Stress Disorder can be exacerbated by loud noises and accompanying vibrations (VA, 2017). Any industry activity near the site that can produce very loud noise and related vibrations that might cause flashbacks of combat or other traumatic experiences will need to be managed. For example, during the 4th of July holiday, veterans may request neighbors be courteous and mindful about unexpected firework blasts in a neighborhood (Military with PTSD, 2017). For veterans sheltering on this site, knowing when a sound may occur can help prepare them to better manage any emotional stress responses.

**"Approximately 1 in 5 veterans in the U.S. experience some form of a disability."**

## Light at night

Humans are adapted to a 24-hour cycle of light and dark, with different ratios of the two based on season and geographic location. Disruption of sleep from nighttime light or noise exposure can induce insomnia, add to existing stress and contribute to depression (Fonken, 2011). It is important to understand the light exposure from industry and provide methods to reduce it at night.

## Questions to Answer

1. What are the current industries directly next to the site?
2. What type of air pollutants do the industries near the site include?
3. What is the estimate of diesel particulate matter exposure near the site from the roadway, based on current traffic and percentage of diesel trucks?
4. What is the current level of tree canopy surrounding the location where shelter will be located? Can existing trees be retained and new ones be added?

## Recommendations

1. Consider siting the shelter community at least 50 meters away from the busiest road.
2. Consider adding trees along the roadway entrance to the site and retaining existing tree cover in the perimeter of the community as a buffer for particulate matter and nitrogen oxides.
3. Consider providing light block-out curtains or shades in all shelter units.
4. Consider providing ear protection (such as ear plugs) to all participants.
5. Consider including sound insulation in the shelter units.
6. Consider developing a good neighbor agreement with the surrounding industries that encourages regular notification to the community when loud booms and high vibration will occur during the day.

# Appendix 1: Images of the Proposed Site

**Image 1:** View south on SE 115th Avenue; note the lack of sidewalks.

**Image 2:** Looking southwest across site.

**Image 3:** Looking south at the end of 115th Avenue.

**Image 4:** Looking northwest with CalPortland concrete plant in the background.

# Appendix 2: Health Determinant Pathways

Health determinants are the various social, economic and physical factors that influence our health (HP2020 2017). Health determinant pathway diagrams are types of logic models that map the linkages between a new plan, project or policy that help identify the immediate, intermediate and long-term effects of the new effort. The purpose of a diagram, like the one below, is to help practitioners from different sectors such as housing, land use, transportation or planning explore how various actions can affect long-term health outcomes (Braveman, 2014). This helps collaborative teams identify ways to prevent harm, manage unintended consequences and maximize potential health effects.

**Diagram A** below focuses on the long-term health outcomes related to houseless veterans living in an intentional transitional community. The small delta symbols (triangles) indicate that there could be a change — either positive, or negative, or a mix of both effects.

**Diagram B** on the next page focuses on the long-term health outcomes related to a transitional shelter community located on an industrial site. The triangles indicate that there could be a change — either positive, or negative, or a mix of both effects.

## **Diagram A**: Long-term health outcomes in an intentional transitional community.

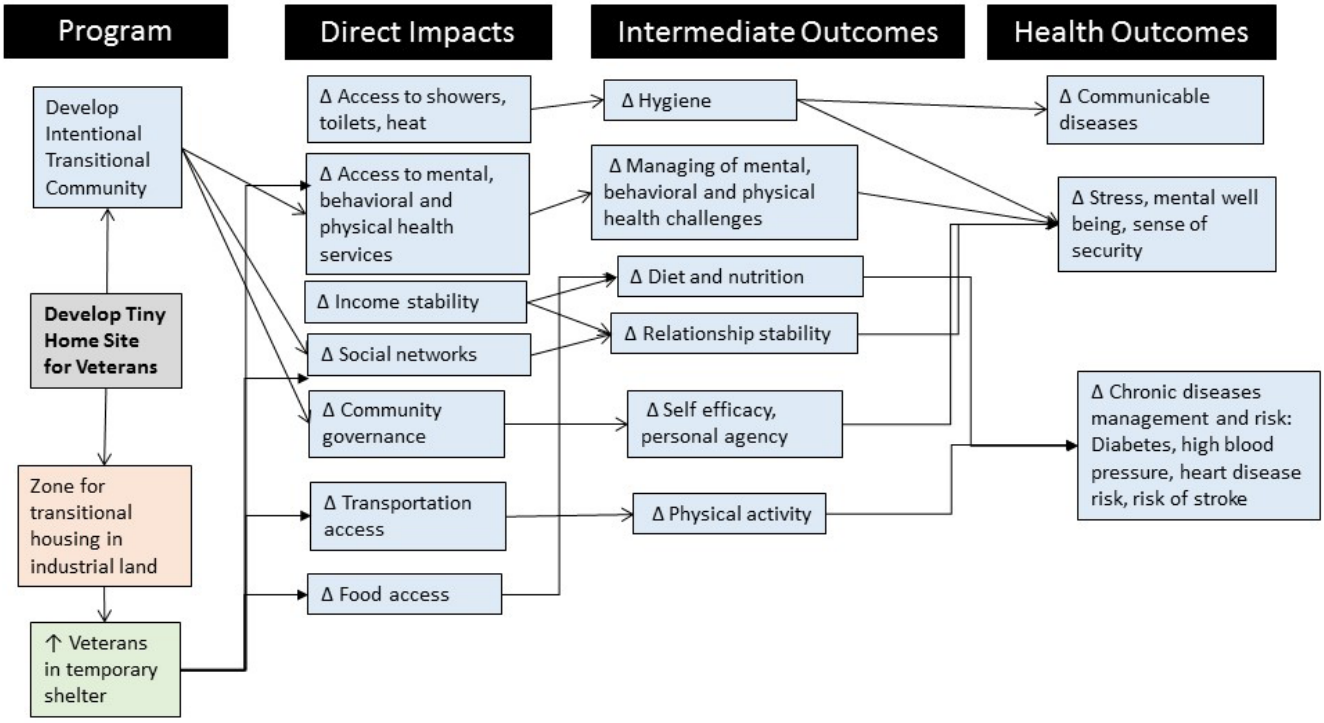
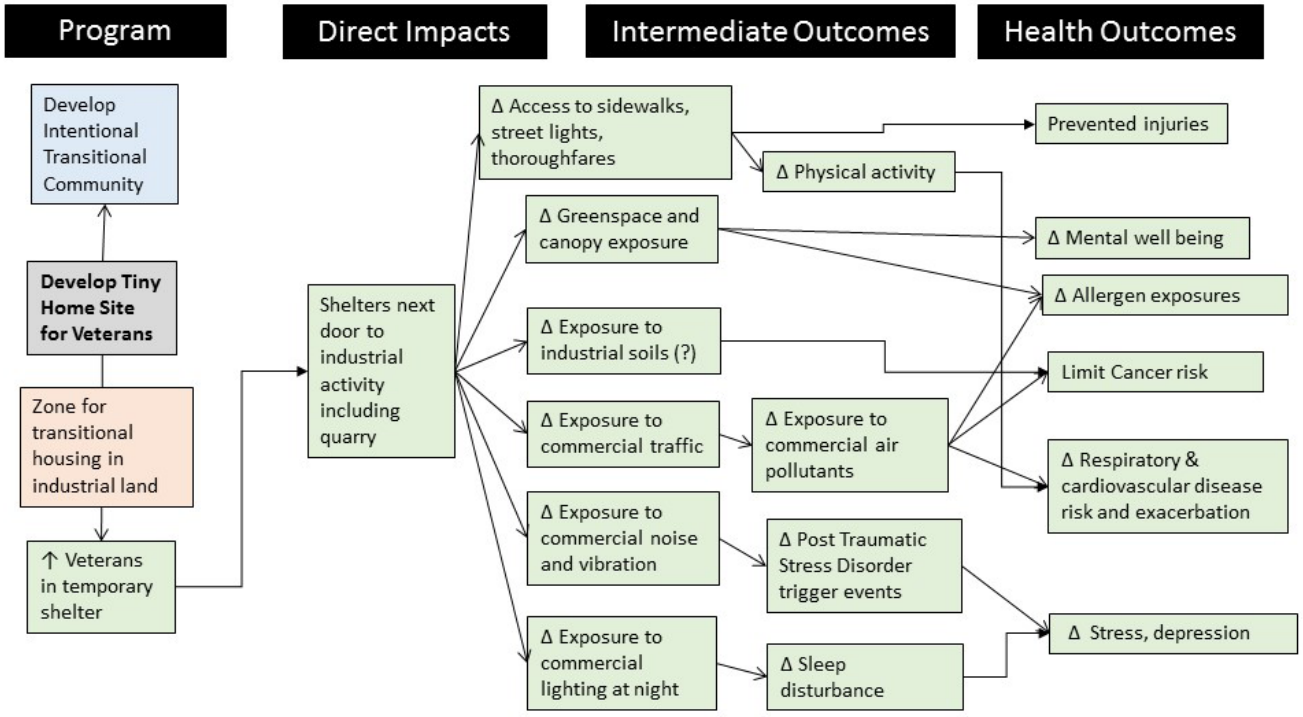


**Diagram B**: Long-term health outcomes in a transitional shelter community on an industrial site.



# Appendix 3: Letter excerpt from Department of Environmental Quality

## (Available on Request)

November 30, 2016

Oregon Department of Environmental Quality
Northwest Region
700 NE Multnomah Street, Suite 600
Portland, Oregon 97232

Attention: Mr. Mark Pugh

Re: Completion Letter
Former Surgichrome Site
Groundwater Treatment System Decommissioning and Well Abandonments
16569 SE 115th Street, Clackamas, Oregon
Task Order 20-13-54
1450-02

### INTRODUCTION

Apex Companies, LLC (Apex) is pleased to provide the Oregon Department of Environmental Quality (DEQ) with the following Completion Letter documenting the recent work completed at the former Surgichrome site (the Site, shown on Figures 1 and 2). Historical activities previously completed at the Site included the installation of monitoring wells and a groundwater treatment system (GTS) that was used to remove chromium from extracted groundwater. As recent work indicated that this system is no longer necessary, this completion report documents groundwater sampling, well abandonment, GTS decommissioning, disposition of system equipment, characterization and disposal of wastes generated during the decommissioning activities, and photo documentation.

### GROUNDWATER SAMPLING

Apex collected two water samples from the Surgichrome water supply well (Figure 2), via the exterior faucet located on the west side of the on-Site building. The water supply well, which is located immediately adjacent to the north exterior wall of the site building, was not abandoned as part of the Surgichrome decommissioning activities. Prior to sample collection, the water was allowed to run for a minimum of 10 minutes to ensure that the sample was representative of conditions in the aquifer at the time of the sampling. The samples were submitted to the State Price Agreement laboratory (ESC Lab Sciences) for hexavalent chromium analysis per U.S. Environmental Protection Agency (EPA) Method 218.6. The laboratory results were comparable between the two samples, with chromium concentrations of 0.736 microgram per liter (µg/L) and 0.737 µg/L (Attachment A). These concentrations are more than two orders of magnitude below the EPA maximum contaminant limit (MCL) for total chromium in drinking water, which is 100 micrograms per liter (ug/L), but above DEQ's risk-based concentration for drinking water under an occupational exposure scenario for hexavalent chromium (0.90 ug/L). However, as noted by DEQ the detected concentrations appear consistent with naturally occurring concentrations of hexavalent chromium in regional groundwater.

Based on the results of this groundwater sampling, it appears that use of the on-Site supply well does not present an increased risk to human health and the environment under the current and reasonably likely future use of the Site for commercial and light industrial activities. A change in land use to a residential scenario appears to be unlikely given the preponderance of business activities in the neighborhood around the Site.

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## MONITORING WELL ABANDONMENT

**Preparatory Activities.** Apex coordinated with the respective property owners prior to decommissioning of on-site and off-site wells. DEQ made initial contact with property owners to secure access. Apex was responsible for subsequent communication and coordination with property owner for access and utility locating. Apex contracted with Applied Professional Services, Inc. (through a competitive procurement process) for utility locating at all on-site and off-site locations where drilling and excavation activities were scheduled. Also, Apex engaged Pacific Fence and Wire to remove and reinstall fencing that had recently been installed along 115th Street in the area of wells DW-6 and MW-5; the location of the fence would have otherwise prevented the abandonments of these wells. In addition, Apex coordinated with KG Investment Properties (KGIP) and their environmental consultant, Terracon, which provided oversight on behalf of KGIP during the abandonment of wells DW-4, DW-5, MW-7, and MW-9.

**Well Abandonment.** Under subcontract to Apex (procured through a competitive process), Environmental West Exploration (EWE) abandoned twenty-one groundwater treatment system wells and monitoring wells (the locations of which are shown on Figure 2) between August 16 and 27, 2016. Well abandonments were performed in accordance with the Oregon Water Resources Department (OWRD) well abandonment rules (as specified in OAR 690-220-0060 and DEQ guidance: *Groundwater Monitoring Well Drilling, Construction, and Decommissioning*, dated August 24, 1992). In general, the monitoring wells were decommissioned by over-drilling and backfilling the borehole with either bentonite grout or bentonite chips. Details regarding the backfill used in each well are presented in the abandonment logs (Attachment B). The wells having 2-inch casings were initially constructed in borings having a 6-, 8-, or 10-inch diameter, while the 4-inch casings were installed in borings having a diameter of 8-, 10, or 10.75 inches. Consequently, EWE employed various tooling to overdrill each borehole with a bit having a slightly larger diameter than the original boring. For each of the over-drilled well abandonments, the decommissioning activities included:

- Removal of the security seal and well monument;
- Removal of the well casing, filter pack, and well seal by over-drilling the well bore with a sonic drill rig; and
- Sealing of the borehole with bentonite grout or chips from the bottom of the borehole to a depth of 1 foot below the ground surface (bgs) and a gravel surface.

Overdrilling was complicated by the local alluvial geology, including gravels and cobbles from just below the surface to the full depth of the deepest wells. Also, EWE's sonic drill rig experienced a mechanical problem during drilling and was swapped out with a second rig. In addition, an OWRD drilling inspector visited the Site several times to monitor the well abandonments. An Apex representative was on-site to observe and document the decommissioning activities at each well. Copies of the driller's well abandonment logs are included in Attachment B.

## GROUNDWATER TREATMENT SYSTEM DECOMMISSIONING

Apex subcontracted with Stratus Corporation (procured under a competitive process) to decommission the groundwater treatment system and provide general environmental services including support for the well abandonment activities. Stratus performed the following decommissioning activities:

- Removed the equipment from the GTS shed (leaving the shed in place for potential future use by the property owner);
- Decommissioned the associated infiltration gallery (discussed further below);
- Grouted on-site portions of buried tubing that formerly connected to off-Site extraction wells, while the off-Site tubing was removed from trenches on adjacent properties, which were backfilled and compacted to grade; and
- Disconnected and plugged the sanitary sewer service at the GTS shed.

In addition, Stratus provided coordinated support to EWE for well abandonments, including:

- Removal of vegetation around well locations to allow driller access for well decommissioning;
- Transfer of well monuments and vaults to a construction waste drop-box; and
- Backfill of surface depressions created by the removal of the monuments and vaults, as well as compaction to grade.

In accordance with the DEQ UIC Program Rules, Apex prepared a Pre-Closure Notification Form and UIC Closure Work Plan for the decommissioning of the infiltration gallery (copies of which are included in Attachment C), which was registered as UIC #13473. The Work Plan was reviewed and approved by the DEQ UIC Program and implemented by in the field. Stratus decommissioned the GTS infiltration gallery by injecting controlled density fill (CDF) into the piping. The CDF was pumped into the gallery through the existing connection at the injection vault. Completion of the infiltration gallery decommissioning was based on the injection of 65 gallons of CDF, which was calculated from the volume of the piping and an estimated 10-percent loss through the slotted screens. Upon completion of the grouting, the surface of the CDF in the injection vault standpipe was monitored, but it did not recede due to settling and loss of material through the screened piping – indicating that the injection volume was sufficient to saturate the gallery piping. The injection vault was removed and the resulting excavation was backfilled to match the existing subgrade and asphalt. The backfill and asphalt patch were compacted to a visibly non-yielding condition with a plate compactor.

## WASTE CHARACTERIZATION AND DISPOSAL

Waste materials associated with GTS decommissioning and well abandonments were segregated as investigation-derived waste (IDW), construction waste, and refuse. Stratus arranged for the rental of three drop-boxes from West Coast Marine, two of which were used for IDW and one for construction waste and refuse. The IDW included the drilling cuttings from the well abandonments, which Apex collected samples of and submitted to ESC Lab Sciences for analysis of RCRA total metals and corresponding analysis for metals under the Toxicity Characteristic Leaching Procedure (TCLP). Significantly, the TCLP metals results were non-detect, which supported landfill disposal of the cuttings as non-hazardous solid waste. Stratus arranged for disposal of the IDW, construction waste, and refuse at Waste Management's Hillsboro Landfill. Attachment D presents the laboratory report and waste profile for IDW characterization, as well as the landfill receipts for disposal of wastes.

Photographs of the GTS decommissioning and well abandonment activities are presented in the attached Photograph Log (Attachment E).

Please let us know if there are any questions regarding the GTS decommissioning and well abandonment activities.

Sincerely,


Gary Walvatne, R.G.
Senior Associate Geologist

Mike Stevens, P.E.
Senior Associate Engineer

# Appendix 4: Transitional Housing Case Studies

Updated: March 2017

SquareOne Villages

TOOLBOX | **Village Case Study Matrix**

| | Dignity Village | Opportunity Village | Quixote Village | OM Village | Community First Village | Nickelsville (22nd & Union) | Emerald Village |
|---|---|---|---|---|---|---|---|
| **Location** | Portland, OR | Eugene, OR | Olympia, WA | Madison, WI | Austin, TX | Seattle, WA | Eugene, OR |
| **Non-profit** | Dignity Village, Inc. | SquareOne Villages | Panza | Occupy Madison, Inc. | Mobile Loaves & Fishes | Low Income Housing Institute & Nickelsville | SquareOne Villages |
| **Open Since** | 2001 | 2013 | 2013 | 2014 | 2016 | 2016 | 2017 |
| **Housing Type** | Transitional | Transitional | Permanent Supportive | Cooperative | Permanent Supportive | Transitional | Permanent Low-Income; Cooperative |
| **Land Ownership** | City | City | County | Private (non-profit) | Private (non-profit) | Private (church) | Private (non-profit) |
| **Land Area (acres)** | 1.15 ac | 1 ac | 2 ac | 0.3 Acres | 27 ac (phase 1)<br>24 ac (phase 2) | 0.2 ac | 1 ac |
| **# of Units** | 43 units, maximum of 60 residents. | 30 | 30 | 9 | 250 (phase 1)<br>350 (phase 2) | 14 | 22 |
| **Zoning** | Transitional Campground | Homeless Shelter | Permanent Homeless Encampment | N/A | N/A | Transitional Encampment | Multi-family Residential |
| **Land Use Tool** | State Ordinance (ORS 446.265) | Conditional Use Permit | Municipal Code (Ch. 18.50); Conditional Use Permit | Planned Unit Development | Planned Unit Development | Municipal Code (23.42.056) | Built to Code w/ Variance |
| **Building Foundation** | Pier blocks | Pier Blocks | Poured Piers | Trailer | Various | Pier Blocks | Poured Slabs |
| **Building Size** | 120 sq. ft | 60-80 sq. ft. | 144 sq. ft. | 99 sq. ft. | 121 - 300 sf | 96 sq. ft | 160-280 sq. ft. |
| **Building Cost** | Largely Used and Donated Material; in-kind labor | $2,400/unit materials; in-kind labor | $25,000/unit; contractor labor | $5,000/Unit materials; In-kind labor | $15K - $25K | $2,200/unit | $15,000/unit materials; mostly in-kind labor |
| **Infrastructure** | Plumbing/Wiring to Common Buildings | Plumbing/Wiring to Common Buildings | Plumbing/Wiring to Each Unit | Plumbing/Wiring to Common Building | Various | Wiring to Each Unit; Plumbing to Common Building | Plumbing/Wiring to Each Unit |
| **Project Cost (Capital)** | Largely in-kind materials and labor | $100,000 plus in-kind materials and labor | $3m | $110,000 for land, $160,000 for improvements, in kind material and labor | $14.5m (phase 1) | N/A | $1.5m (projected) |
| **Operating Cost** | $3,000/month; which includes all utilities and liability insurance. Does not include on-site social service support. | $4,000/month | Project based Section 8 | $2,000/month (includes debt payments) - Micro-enterprises operated by residents pay for half the monthly operating costs | N/A | $3,523 a month | N/A |
| **Resident Payment** | $35/month "insurance", plus $10/month utility "charging fee" plus 10 hours/ week "sweat equity" | $30/month; plus 10 hours/week "sweat equity" | 30% of Income | None, but cooperative model that expects work hours | $225 - $380 | $90 | $250 - 350 |
| **Website** | https://dignityvillage.org/ | http://www.squareonevillages.org/opportunity | http://quixotevillage.com/ | http://occupymadisoninc.com/ | http://mlf.org/ | https://lihi.org/tiny-houses/ | http://www.squareonevillages.org/emerald |
| **Detailed Case Study** | | http://www.ecobuilding.org/code-innovations/case-studies/transitional-micro-housing-at-opportunity-village-eugene | http://www.ecobuilding.org/code-innovations/case-studies/permanent-subsidized-housing-in-a-light-industrial-zone-at-quixote-village | | https://drive.google.com/open?id=0B2jI5OLqYdyYbVh0WjNySEtvSGc | | |

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