



# San José Urban EcoPark

Proposal Prepared By:  
Department of Urban & Regional Planning,  
San José State University

Proposal Prepared For:  
City of San José  
Environmental Services Department

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## **Executive Summary**

The City of San José's Environmental Services Department (ESD) has proposed to develop an Urban EcoPark at 1608 Las Plumas Avenue in San José. Graduate students from the Department of Urban and Regional Planning at San José State University were tasked to develop a proposal for the Urban EcoPark that took into consideration the specific goals identified by ESD:

- To relocate a County-operated household hazardous waste (HHW) drop-off facility to the site;
- To co-locate with nonprofits that offer a beneficial community service, ideally diverting construction material from the solid waste stream and supporting re-use by others;
- To provide space for community members and organizations to hold meetings and classes;
- To serve as a central location for ESD to coordinate environmental education programs; and
- To serve as a leading example of sustainability through site design and operations.

The Urban EcoPark at Las Plumas Avenue will showcase green building design through the use of sustainably-harvested and re-used construction materials, solar energy production, energy-efficient design, onsite stormwater management, a living roof, waste reduction, and sustainable landscaping. The facility will focus on the community through opportunities for classes, gatherings, and an eco-playground. In addition, the facility's permanent and rotating occupants will provide a variety of much-needed services and programs for the local community and the wider region.

### **Key Facility Occupants**

A primary purpose of the Urban EcoPark is to maximize the use of the space in such a way as to provide a wide range of services for local residents. Our proposal suggests that the City consider two main categories of facility occupants: permanent and rotating.

There are six major types of permanent occupants who could make use of the facility. These include warehouse space to store donated reusable building supplies, warehouse space for sales of reusable building supplies, a green building education center, a lending tool library, a residential HHW drop-off facility, as well as an on-site facility manager's office. Appendix A shows a rough outline of how these various occupants could be located throughout the building while Appendices B-E show close-ups of different areas. Area 2 is approximately 5,500 square feet and is designed to store construction materials for use by non-profit organizations to renovate and improve homes for low-income residents. Area 3 consists of approximately 10,700 square feet that could be used as a retail area for sales of reusable building materials. In addition, exterior space (approximately 100' by 100' shown in Figure 4) is available on the west side of the building under the overhang currently proposed for the temporary HHW operations could be enclosed and used for lumber sales or other materials suitable for outside display. Customer parking would be provided on the west side of the facility and the operation would have access to the existing loading dock also located on the west side. Since a major goal of the EcoPark is to provide educational programs and opportunities, our proposal recommends providing approximately 1,325 square feet (Area 4) that would be used to showcase green building construction practices as well as space for classroom activities and administrative space. The

HHW program would occupy approximately 12,400 square feet at the rear (south) end of the warehouse. This area would incorporate an existing loading dock for material transfer and maximizes the opportunity for customers to queue on site during program operation. Office space would be available at the front (north) end of the building on the second floor for ESD to locate a facility manager in the office area on the second floor. Alternatively, ESD could utilize the elevated office space (Room 5 on Appendix A) located in the warehouse space for housing a facility manager. Our proposal also recommends the establishment of a lending tool library at the facility. Ideally, this program would be operated by the San José Public Library system using a model similar to that already in place in locations such as Berkeley, Oakland, and San Francisco. This type of service would be invaluable for local residents and would complement the other site activities. Area 1 (approximately 5,000 square feet) could be used for lending tool library, however, this is probably a larger area than needed. Alternatively, Area 1 could be used for another occupant meeting ESD's goals, or the space could be reconfigured to better suit the needs of the other tenants.

In addition to permanent occupants, we also propose to include space for occupants that would use the facility on a rotating or occasional basis. These occupants would primarily use space at the north end of the building on the first and second floors. We recommend that a multipurpose room be constructed at the northwest corner of the first floor (approximately 4,000 square feet) that could be divided into 2-3 smaller rooms using flexible dividers. On the second floor, the existing office area would be renovated to provide an open reception area (approximately 1,300 square feet), four individual office spaces (each approximately 125 square feet) surrounding a 400 square foot shared conference room, and an open space area (approximately 520 square feet) that could be transformed into space for office cubicles. In addition, a second shared conference room would be located south of the reception area. This conference room would be approximately 1,200 square feet and would incorporate flexible dividers in order to split the room into 2-3 smaller conference areas. Users of this space would have access to the shared facilities and would coordinate with ESD regarding use of the space. Environmental Services will take a lead role in coordinating access to these spaces. A large reception area (approximately 1,300 square feet) is planned for the second floor near the stair landing. This area could house ESD's facility manager as previously mentioned. Rotating tenants of the facility could also arrange to staff the reception area.

## ***Sustainable Infrastructure***

While the proposed services at the Urban EcoPark support the overall goal of sustainability, the site itself should also be an example of how to develop and operate a facility in an environmentally-responsible manner. A goal for this proposal is to encourage the City of San José to seek the highest possible LEED (Leadership in Energy and Environmental Design) certification. Ideally, our intention is to see the site achieve a Platinum-rating. As of May 2007, only 11 buildings in California have achieved this level. The Urban EcoPark will likely fall under the LEED-New Construction rating system since this will be a major reconstruction.<sup>1</sup> Our complete report uses the LEED checklist as a guideline for structuring the section on the sustainable site plan. As such, we focus on the following key elements: sustainable site

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<sup>1</sup> LEED-NC applies when fewer than 50% of building occupants remain on site during the reconstruction/remodeling activity. Since the facility is currently unoccupied, this appears to be relevant category. For more information, visit <http://www.usgbc.org/DisplayPage.aspx?CMSPageID=220>

(including options for alternative transportation, stormwater management, and heat island reduction); water efficiency (focusing on water-efficient landscaping, innovative wastewater technologies, and water use reduction); energy and atmosphere (emphasizing energy efficiency and renewable energy sources such as solar power); materials and construction (including the use of alternative materials, source reduction, construction and renovation waste management, recycling, and sustainable cleaning products); and indoor air quality (focusing on removing existing contaminants, daylighting, and efficient heating, ventilation, and air conditioning).

There are several key items in our proposal that warrant particular attention. These include our recommendations to develop an extensive living roof at the site, build an eco-playground surrounded by sustainable landscaping at the north edge of the site (along Las Plumas Avenue), construct a Native American Plant Garden along the southeast edge of the site that would showcase culturally significant plants used by the local Native American tribes, and provide a composting education area and greenhouse next to the Plant Garden.

Our roof design is ambitious and provides several opportunities to achieve points towards LEED certification. We propose to install a wide range of features including solar photovoltaic panels, skylights, and a rooftop garden using drought-tolerant and native plants. In addition, we propose to use the roof as an educational opportunity by allowing access to the area for visitors. To ensure safety, a five-foot fence will be constructed around the perimeter.

We hope that the Urban EcoPark becomes a popular destination for many members of the local community. To improve the aesthetic appeal of the facility, we propose to develop a large landscaped area along the northern edge of the site that would include space for an eco-playground and picnic area. The playground would be constructed using environmentally-friendly materials such as recycled tire, reused wood, and recycled plastic. Landscaping would focus on drought-tolerant and native plants and any irrigation system would utilize water-efficient design.

The Native American Plant Garden will provide an opportunity to educate local residents and support the American Indian Education Resource Center. The garden will showcase herbs, vegetables, and other plants used by Native Americans with a special section dedicated to the Ohlone tribe. Recycled materials will be used in the construction of the garden. Signage throughout the garden (and throughout other areas of the facility as well) will provide information on the environmental and cultural significance of the different plantings and materials.

Currently, the City of San José offers composting classes at several sites throughout the city. At the Urban EcoPark, we propose to locate a composting area so that ESD can run education classes and allow participants to view a composting area in action. This will be located next to a greenhouse that will provide plantings for the Native American Plant Garden and other site landscaping.

The Urban EcoPark presents a tremendous opportunity for the City of San José to develop an innovative facility that provides a wide range of beneficial community services and acts as a living educational tool for sustainability. It is hoped that this proposal will provide the City with many options to consider as they pursue development at 1608 Las Plumas Avenue.

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Michael Rhoades  
Matthew Weber

### ***Community Groups and Individuals***

Center for Training and Careers  
American Indian Education Center  
Individual participants at various community meetings

### ***San José State University, Urban and Regional Planning Department***

Hilary Nixon, Project Director  
Allen Mulch, Graduate Research Assistant  
Bridgette Carroll  
Gabriella Condie  
Jennifer Langfield  
Marja Marin  
Kim McAfee  
Anthony Merriett  
Matt Nelson  
Indira Penmetsa  
Tiffany Telles  
Marc Wiener

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## **I. Introduction**

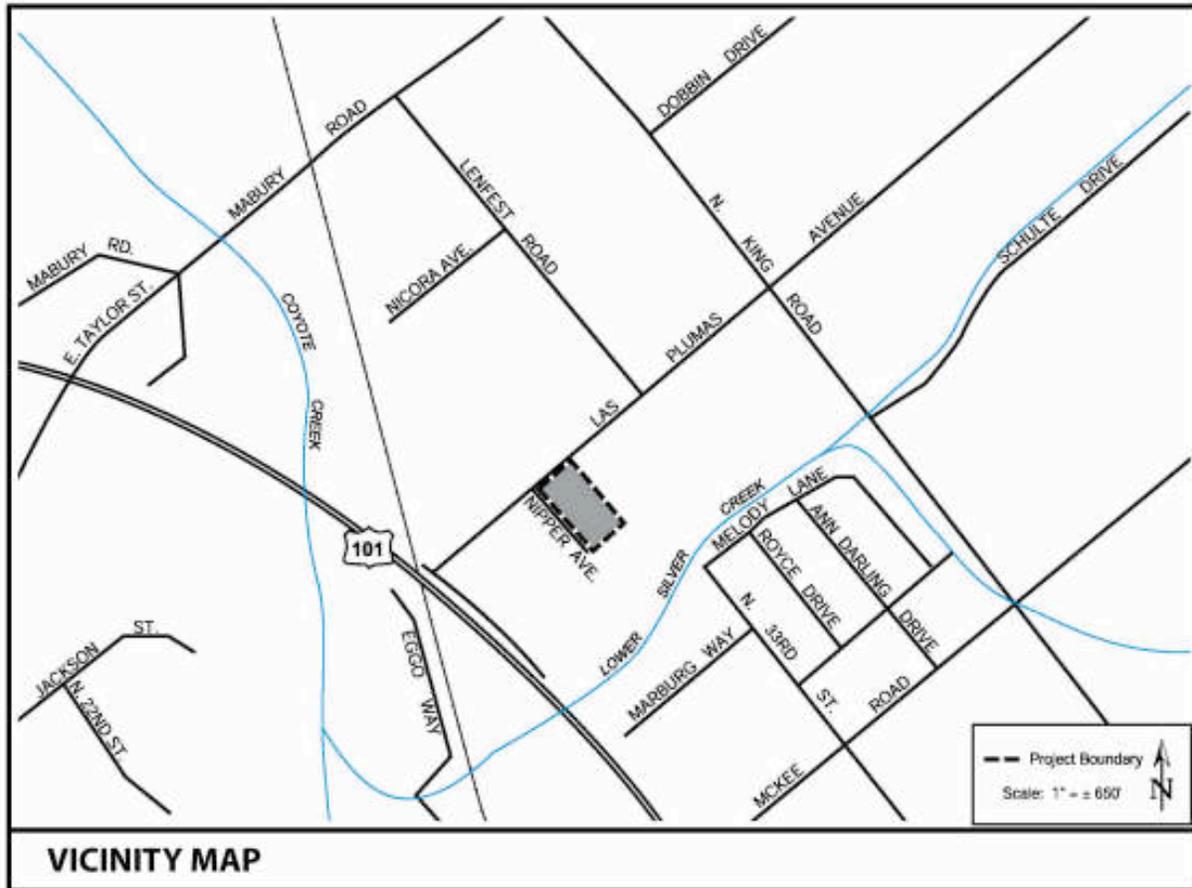
As Americans, we live within an economic system that exploits natural resources for goods that quickly end up in our landfills. An Urban EcoPark is an alternative model to this destructive system. In nature, nothing is wasted, as every level of the food chain feeds on the last one. An Urban EcoPark offers a system of efficiency, much like the one we see in nature. When materials are reused, recycled, or extracted from an ecological system that can replenish itself, a sustainable system has been created. Another principle of sustainability is using that which is available in near proximity, such as with water use, energy production, natural lighting, and material reuse. The Urban EcoPark at 1608 Las Plumas Avenue in San José demonstrates these standards of sustainability through the features of both its design and the functions on the site.

San José's Urban EcoPark, with its goods, services, and building features, is designed to protect natural resources. The following proposal for the EcoPark is a showcase in the latest green building design including sustainably-harvested and reused construction materials, solar energy production, energy efficiency design, onsite storm water management, a living roof, waste reduction, organic gardening and landscaping, and material reuse. Community use is also a theme of the park as there will be ample space for gatherings, classes, and space for children to play in addition to an abundance of educational opportunities. The proposed site will also be a place where residents can bring their unwanted household chemicals for proper disposal, a vitally important component of an effective and environmentally-responsible waste management program. While there, they can also purchase inexpensive building materials and attend environmental education classes. The Urban EcoPark is an informative, comprehensive model of sustainable living.

It is important to note that the proposal provides recommendations only and a final plan should take into consideration the final needs as determined by the Environmental Services Department. While our proposal provides ideas regarding space allocation in the building structure, these are only guidelines and could easily be reconfigured depending on the final decision regarding facility occupants. In addition, this proposal makes several references to "Phase I" as it relates to the temporary relocation of San José's household hazardous waste drop-off program. The City of San José plans to temporarily relocate their HHW drop-off program to the west side of the warehouse at 1608 Las Plumas Avenue in the near future. The program will operate up to eight days per month on Fridays and Saturdays. When renovation of the warehouse facility is completed, it is anticipated that the HHW program will relocate permanently to an interior area in the warehouse. More information about Phase I can be obtained directly from the Environmental Services Department

## **II. Project Location**

The proposed project site is an industrial property located at 1608 Las Plumas Avenue in the City of San José (see Figure 1). The site is bordered on the west by Nipper Avenue and on the north by Las Plumas Avenue. The surrounding area to the west, north, and east of the proposed facility consists primarily of industrial and manufacturing land uses. In addition, two non-industrial uses are located directly west across Nipper Avenue. Lower Silver Creek is located approximately 200 feet south of the proposed site. The project site is currently developed with an approximately 46,000-square foot vacant warehouse building.



**Figure 1: Vicinity Map of 1608 Las Plumas Ave.**

The project proposes to renovate the existing building to house a variety of entities, both permanent and rotating, that model sustainability through their emphasis on the diversion of construction and demolition materials from the waste stream as well as their environmental education program geared toward the local community.

### **III. Proposed Facility Occupants**

An essential element of the Urban EcoPark proposal is to maximize the use of the space in a manner that promotes principles of sustainability, creates linkages between the various occupants, and provides a variety of needed services for local residents. Our proposal suggests that the City consider two main categories of facility occupants: permanent and rotating.

#### ***Permanent Facility Occupants***

Our proposal identifies six main types of permanent facility occupants. During the initial development of this proposal, San José State University students met with a variety of organizations and individuals who expressed an interest in occupying the warehouse and office space at 1608 Las Plumas Avenue. Although this proposal may identify some organizations by name, this does not suggest or imply that the space has been specifically designed for these groups. This proposal is designed to provide some general ideas regarding how the facility could be used and does not advocate that any specific organization be allocated space.

## Household Hazardous Waste

Proper management of household hazardous materials is an essential component of a community's waste management program. A conveniently-located HHW drop-off facility provides a safe and legal way for residents to dispose of unwanted household chemicals and prevents potential environmental contamination and public health concerns associated with illegal dumping. Our proposal recommends locating San José's HHW drop-off facility at the south end of the warehouse where it would occupy approximately 12,400 square feet (see Appendix D). Residents using the program would queue in the parking lot on the wide side of the facility and, if necessary, extend along Nipper Rd. It is anticipated that an operating procedure similar to that used for the temporary (Phase I) HHW program would also work for the permanent program (see Figure 2 for an example of Santa Clara County HHW facility operations). Some modifications to the queuing pattern may be needed, but the change should be minor. A loading dock is currently located at the southwest corner of the warehouse, which would provide access for trucks to remove the household hazardous waste for processing.



Figure 2: HHW Operations, Santa Clara County (Source: [www.sccgov.org](http://www.sccgov.org))

## Warehouse Storage Space for Donated Reusable Building Supplies

Area 2 shown on Appendix B dedicates approximately 5,500 square feet of warehouse space in the midsection of the building. This area could be used for storage of construction materials for use in the renovation of low income housing throughout the Silicon Valley. These materials, both new and used, are often donated by developers and having a readily accessible area would be beneficial to ensure that as many materials as possible are diverted from landfills and made available for charitable housing renovation projects. Within the dedicated warehouse space, a small office area could be developed to allow the tenant to also conduct administrative operations from the site.

## Warehouse Space for Sales of Reusable Building Supplies

Shown on Appendix B, Area 3 allocates approximately 10,700 square feet of warehouse space for retail sales of reusable building supplies (see Figure 3 for example). In addition, exterior space along the west side of the building beneath the 100' by 100' canopy that is planned for Phase I could be used to store additional materials such as lumber or other bulky, weather-resistant items (as shown in Figure



Figure 3: Example of Area 3-type operations (Oakland ReStore, photo by H. Nixon)

4). In addition, an existing loading dock is located in the west side of the building. This will be useful for the tenant for both delivery trucks and customers. To our knowledge, there is no similar operation in San José. This type of tenant fits well with the overall EcoPark goals as it diverts material from landfills, encourages reuse of material, and provides residents with a low cost alternative for their home repair and renovation projects.



Figure 4: Model of Exterior Lumber Yard

### **Green Building Education Center**

The building and surrounding grounds at 1608 Las Plumas Avenue should not only serve as a model of sustainable building and landscape practices, but they should also serve as training and educational opportunities to teach others about these practices. One particularly effective way to engage the broader community is through the contracting and building profession. Area 4 (see Appendix C) devotes approximately 1,325 square feet for a green building education center. If designed as a flexible space, this area could showcase green building products and techniques; it could be used as classroom space to teach members of the construction industry and community members about the latest green building technologies; and it could also serve as office space for a group interested in spearheading this effort.

### **Lending Tool Library/Green Business Incubator Program Warehouse Space**

There are several possibilities that could be considered for Area 1 (approximately 5,000 square feet) on Appendix B. One of these is a lending tool library. This type of service is typically coordinated through the local library system and allows residents to rent tools for a nominal fee. It offers a variety of tools to the public, ranging from basic hand and garden tools to larger power

tools, and provides an opportunity for community members to fix up their homes without the expense of purchasing tools. In addition to the tool library, classes could be offered to residents on home repair and home improvement, possibly in coordination with the tenant in the green building education center (Area 4). Examples of the lending tool libraries in the Bay Area are available in Oakland, Berkeley, and San Francisco. The implementation of a tool library would complement the other permanent services that are recommended for the site.

Another option for Area 1 is warehouse/small manufacturing space as part of a green business incubator program. There are several successful examples of incubator programs in San José (see, for example, San José's Redevelopment Agency's Incubator Programs at [www.sjredevelopment.org/incubators](http://www.sjredevelopment.org/incubators)). This type of program provides tremendous opportunities for entrepreneurs to receive the start-up support they need to get their businesses off to a successful start. In addition to warehouse space, office space on the second floor of the building could be used to support the green business incubator program. During the community meetings to discuss the Urban EcoPark proposal, this idea was recommended by one of the participants as a way to engage the local community and provide opportunities for young environmentally-minded entrepreneurs.

### **Environmental Services Department Facility Manager**

The overall management and coordination of activities at the Urban EcoPark would be the responsibility of San José's Environmental Services Department. It is proposed that a full-time facility manager be located at the site. The specific responsibilities for the facility manager would be defined by ESD, but could include general building operations and maintenance as well as coordination of any environmental education classes or other use of the facility by community members. There are several possible locations within the building where the manager could reside including Room 5 (see Appendix A), a suspended office space of approximately 520 square feet in the warehouse area; one of the individual office areas on the second floor along the north end of the building; or in the main reception area also located on the second floor (see Appendix E).

### ***Rotating Facility Occupants***

The next portion of this proposal focuses on the first and second floor office/conference room space located in the front of the Las Plumas building (see Appendices C and E). The first floor would consist of an approximately 4,000 square foot multipurpose room with the ability to be divided into two or three smaller rooms. This multipurpose room will be located in the northwest portion of the building, adjacent to Area 3. This flexible space will be available to community groups through a reservation system managed by ESD. In addition, this space could be used for a wide variety of ESD-sponsored environmental education classes. The remaining portion of the first floor would consist of restrooms, with showers and dressing rooms, along with an approximately 400 square foot kitchen located near the east entrance of the building. It is recommended that the kitchen area serve as a showcase for residential green building techniques, possibly with the support of the tenant in Area 4.

The second floor consists of office and conference room space with a variety of possible configurations. Our proposal presents just one possibility. One option we have recommended and discussed previously is the development of a green business incubator program. The second floor office/conference room space would consist of an approximately 1,300 square foot reception

area, located in the northeast corner of the building. This area will primarily be used to showcase and display information about facility tenants and events taking place at the site such as composting or green building education classes. Immediately south of the reception area will be a conference room of approximately 1,200 square feet. This space should be flexible with the ability to convert into smaller conference rooms as needed.

The northwest portion of the second floor could be divided into four individual office spaces of approximately 250 square feet each, with a shared conference room (approximately 400 square feet) and an area for cubicle offices (approximately 520 square feet) located in the middle. Programming for this space would be managed and coordinated through ESD. Users of this space would also have access to the larger second floor conference room as well as the multipurpose room and kitchen area on the first floor.

During the community meetings held to discuss the Urban EcoPark, several organizations described how they could envision using the site. Although this proposal is designed to provide a very general idea as to how the facility could be used, we felt it would be of interest to have a better understanding of how some specific entities may be able to utilize the site's services. These are provided here as examples and do not necessarily reflect all of the possible options mentioned at the community meetings.

1. San José Search and Rescue is looking for immediate space to house their emergency response equipment. One possible option would be to provide access to the east side of the building next to the fire station for vehicle and equipment storage. This side of the building would not be accessible to the general public. It is possible that cargo shipping containers (possibly reused) could be used for storage (see Figure 6). Since no driveway is planned for the east side of the building, access to this area would depend on establishing access through the fire station which may or may not be a possibility.



**Figure 6: Shipping Container (Source: [www.dmvcontainers.com](http://www.dmvcontainers.com))**

2. The Center for Training and Careers (CTC) is a non-profit organization located next door to the Urban EcoPark at 1600 Las Plumas Avenue and they provide a variety of workforce training and placement services. Students attending their evening classes often make use of the additional parking available at 1608 Las Plumas Avenue and CTC would like to continue this arrangement. In addition, it is possible that CTC could make use of the multipurpose room area, kitchen, or conference room area for classes and community events through the ESD-managed reservation system. One other possibility for the site that we have not specifically included is an area to locate a utility pole that CTC uses as part of the WEMA (Women Empowered to Move Ahead) program that provides training for women interested in the building and construction trades. Depending on the space needs for the pole and coordination with other exterior elements of the site plan, it is possible that an area for the pole could be found along the south edge of the site. Additional research into the feasibility of this proposal would be needed. A major focus

for CTC is on job training. It may be interesting to pursue the possibility for vocational training and internship opportunities between CTC and the EcoPark tenants.

3. The American Indian Education Resource Center currently uses space at CTC. The Center houses a library and provides an after-school program. This organization may be interested in using the ESD-managed spaces (e.g. multipurpose room, conference room, etc.) for different events. It was also brought up at one of the community meetings that the site (in particular, the exterior parking lot area) could be used for community events such as pow-wows. Our proposal does not specifically address the feasibility of this type of event. In addition, we have designated in our proposal an area along the southern edge of the site for the purpose of siting a Native American Plant Garden. The garden's purpose would be environmental, cultural, and educational. In addition to comprising an important part of the site's stormwater management system, it would also provide an opportunity to display culturally significant plants for Native American tribes such as the Ohlone. For example, acorns were an important component of Ohlone culture as were berries such as blackberries, elderberries, gooseberries, and madrone berries.<sup>2</sup> These and other significant plants could be planted in the garden and identified with plaques or informational brochures explaining the significance as part of the diet or for medicinal use.
4. Another non-profit group that was identified at a community meeting was Heart of Chaos. The organization supports an artisan collective and has recently showcased artwork made of recycled and reused material at CTC (see Figure 7). In addition, this organization has participated in tree art workshops with the non-profit, Our City Forest. There are several possibilities for including this organization at the Urban EcoPark including: access to the reservation-based community rooms (e.g. the multipurpose room may be a suitable location for art classes that emphasize the use of recycled material) or providing space throughout the facility (both interior and exterior) to display artwork that uses recycled and reused material. If the art classes occurred on a semi-regular basis, a lockable storage cabinet could be placed in the multipurpose room to store art materials.



Figure 7: Recycled Art Exhibit (Source: [www.heartofchaos.net](http://www.heartofchaos.net))

<sup>2</sup> Source: "An Overview of Ohlone Culture." Santa Cruz Public Libraries. Available at <http://www.santacruzpl.org/history/spanish/ohlone.shtml>

## IV. Proposed Site Plan



## **V. Sustainable Site Plan Features**

An important goal of the EcoPark design at this site is to achieve a Leadership in Energy and Environmental Design-New Construction (LEED-NC) Platinum rating for green building excellence. The City of San Jose currently mandates that all new construction of City facilities as well as major retrofit projects (over 10,000 square feet) meet a minimum LEED certification level of Silver.<sup>3</sup> Our recommendation is that the City should strive to achieve the highest rating and thus become one of only a handful of projects (both public and private) certified as Platinum by the U.S. Green Building Council. The following sections of this report are generally structured to follow the LEED-NC Registered Project Checklist<sup>4</sup> version 2.2 although we have not specifically addressed every item on the checklist. In some cases, we have combined different checklist items or have some overlap. It is advised that ESD work with a LEED accredited professional to maximize the number of possible certification credits.

### ***Sustainable Sites***

#### **Sustainable Landscaping: Environmentally-Friendly and Drought Tolerant Landscaping Techniques**

In our opinion, a key component of the overall Urban EcoPark design will be the exterior landscaping and management plan. Currently, the site has very little in the way of green space. Our plan proposes to significantly increase the amount of vegetated landscape, not only for the aesthetic appeal, but also for the environmental advantages associated with on-site stormwater management, reducing the heat island effect, and decreasing the overall ecological footprint of the site. In addition, a visually appealing sustainable landscape can reduce overall maintenance costs and improve property values.<sup>5</sup> Our plan proposes to develop the north edge of the property (along Las Plumas Avenue) using sustainable landscaping techniques. In addition, the Native American Plant Garden on the opposite side of the site will also exemplify this concept. Bioretention swales in the parking lot will perform double-duty through the site's stormwater management program as well as an attractive and visually interesting element of the site plan. Finally, we propose an ambitious living roof plan.

#### **Native Plants and Trees**

Using native plants and trees is a vital step in developing an effective sustainable landscape. Once established, these species are typically low maintenance (e.g. pruning, fertilizers, etc.) and require minimal irrigation. In addition, they provide an excellent environment to support native birds and insects. The Urban EcoPark will provide an excellent opportunity to inform residents about the benefits of native plant landscaping. We recommend educational signage throughout the site highlighting these aspects. In addition, an information brochure, such as the one

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<sup>3</sup> For more information about the City of San José's green building policy, visit <http://www.sanjoseca.gov/ESD/natural-energy-resources/gb-policy.htm>

<sup>4</sup> For more information about LEED-NC, visit the U.S. Green Building Council's website at <http://www.usgbc.org/DisplayPage.aspx?CMSPageID=220>.

<sup>5</sup> Source: "Sustainable Commercial Landscaping." California Integrated Waste Management Board. For more details and links to additional information, visit <http://www.ciwmb.ca.gov/Organics/Landscaping/>.

developed by the Alameda County Water District could be used.<sup>6</sup> Some plant species native to Santa Clara County include;<sup>7</sup>

- Toyon (*Heteromeles arbutifolia*)
- Holodiscus
- Coyote Bush (*Baccharis piliularis*)
- California Fuchsia (*Epilobium canum*)
- San Francisco Wallflower (*Erysimum franciscanum*)
- Bush Lupine (*Lupinus albifrons*)
- Blue-eyed Grass (*Sisyrinchium bellum*)
- California Buckeye (*Aesculus californica*)
- Western Sycamore (*Platanus ramosa*)
- Blue Wild Rye (*Elymus glaucus*)
- California Fescue (*Festuca californica*)
- Idaho Fescue (*Festuca idahoensis*)
- June Grass (*Koeleria macrantha*)

## **Integrated Pest Management**

Integrated Pest Management (IPM) is an ecologically-sound pest management strategy that utilizes a variety of techniques to limit or completely avoid the unnecessary use of chemical pesticides and fertilizers to maintain a healthy landscape. It can be implemented in a wide range of settings from small-scale patio gardens to large commercial agricultural production. Since the publication of Rachel Carson's *Silent Spring* in 1962, we have become increasingly aware of the environmental and public health threat posed by synthetic pesticides and fertilizers. IPM uses biological control, habitat manipulation, modification of cultural practices, and use of resistant varieties to control pests and their damage.<sup>8</sup> The Urban EcoPark could serve as a learning laboratory for residents through educational programs on IPM and also by implementing these techniques on site.

## **Irrigation & Mulch**

Although the use of native plants can substantially reduce the need for irrigation, some site irrigation will be required. The system should be design for maximum efficiency, which will result in both environmental and economic benefits.<sup>9</sup> The use of drip irrigation for trees, shrubs, and similar vegetated areas can reduce evaporation losses; low-volume/low-angle sprinklers can be implemented in areas where lawn cover exists; weather-based irrigation control can be

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<sup>6</sup> The Alameda County Water District produces several brochures regarding native plant and drought tolerant gardening. In addition, the District has a drought tolerate demonstration garden that could serve as a model for the Urban EcoPark. For more information, visit <http://www.acwd.org/>. It is also recommended that the EcoPark provide information to visitors on programs such as Santa Clara Valley Water District's Water Efficient Landscape Rebate Program

([http://www.valleywater.org/Water/Water\\_conservation/Landscaping/\\_Water\\_Efficient\\_Landscape\\_Rebate.shtm](http://www.valleywater.org/Water/Water_conservation/Landscaping/_Water_Efficient_Landscape_Rebate.shtm)).

<sup>7</sup> Other California native plants and "water-wise" plants can be found at [http://www.valleywater.org/Water/Water\\_conservation/In\\_the\\_home/\\_Water-wise\\_plant\\_list.shtm](http://www.valleywater.org/Water/Water_conservation/In_the_home/_Water-wise_plant_list.shtm).

<sup>8</sup> Source: "University of California Statewide IPM Program." For more information, visit <http://www.ipm.ucdavis.edu/IPMPROJECT/about.html>

<sup>9</sup> Source: "Water Efficient Irrigation." Santa Monica Green Building Program. Available at <http://www.greenbuildings.santa-monica.org/landscape/landscapelab.html>.

installed to further increase system efficiency; recycled water can be used for irrigation (either collected on site or accessed through the City of San José's purple line if feasible<sup>10</sup>); and mulch can be used to minimize evaporation. The automated irrigation system installed at Adobe Systems in downtown San José resulted in a tremendous cost savings for the company. The system cost \$3,610 and results in annual cost savings of \$10,000 – a payback period of 0.36 years.<sup>11</sup>

Mulch protects the soil by helping it retain moisture, suppress weeds, and insulate plants from extreme temperatures. Materials such as recycled wood chips, straw, nut shells, paper, sawdust, leaves, seaweed, grass clippings or compost can be used as mulch. In addition, a product such as Rubberific Mulch® could be used which is comprised of recycled tire (see Figure 8).<sup>12</sup> The use of mulch can help to significantly reduce the need for irrigation and ongoing maintenance related to weeding.



Figure 8: Rubberific Mulch as landscape (Source: [www.internationalmulch.com](http://www.internationalmulch.com))

## Alternative Transportation

### Public Transportation Access

Public Transportation to this site is available through the Valley Transit Authority (VTA). Several bus lines, including Route 77, Route 36, and Route 12 pass the intersection of Las Plumas Avenue and King Rd., which is located just down the street from the Urban EcoPark.

### Bicycle Storage & Changing Room

For the purposes of providing alternative transportation, on-site bicycle parking should be provided. The east side of the building, near the recycling center, could be one option. A bicycle rack could also be provided along the west side of the warehouse near the parking lot. The first floor bathrooms currently have shower facilities, which could be retained. At a minimum, the bathrooms should provide sufficient space and privacy for changing.

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<sup>10</sup> The closest point to the Urban EcoPark along San José's recycled water line ("purple line") is located on the west side of Highway 101 at Watson Park (see Appendix X). It may not be currently feasible to connect to this line at the present time, however, the Environmental Services Department should keep this idea in mind for the future.

<sup>11</sup> Source: "Doing the Math: Adobe's San José building Goes LEED-EB Platinum Green." Available at [http://jetsongreen.typepad.com/jetson\\_green/2006/08/doing\\_the\\_math.html](http://jetsongreen.typepad.com/jetson_green/2006/08/doing_the_math.html).

<sup>12</sup> Rubberific Mulch® is manufactured by International Mulch (<http://www.internationalmulch.com/>). Other companies may produce a similar product.

## Low-Emitting & Fuel-Efficient Vehicles

Since a variety of organizations and individuals will make use of the Urban EcoPark, it is difficult to recommend a single strategy related to fuel-efficient vehicles. Our proposal presents several alternatives, which could be explored in more detail. It is likely that some of the organizations occupying the warehouse area will need to utilize a forklift. One way to avoid fumes generated by a propane-fueled forklift is to use a battery-operated electric forklift. This type of equipment often requires substantial energy usage and an assessment of such needs should be taken into account in the energy audit.

Although electric vehicles in California have experienced some controversy over the years, increasing attention is being paid to the role this type of vehicle will play in the future. The Urban EcoPark should consider installing a system for charging electric vehicles. The current trend appears to be toward electric cars and plug-in hybrids that can use an ordinary electric socket for charging. Some charging stations utilize solar energy such as the one depicted in Figure 9.



Figure 9: Solar Charging Station (Source: [www.physics.uiowa.edu](http://www.physics.uiowa.edu))

## Stormwater Design & Management

As a sustainable site and showcase for environmentally-sound construction and maintenance practices, great efforts should be made to mitigate stormwater runoff on site. Maximum abatement of storm water runoff is consistent with the projects goals of protecting the environment and setting an example of healthy environmental practices to businesses and the local community.

Stormwater runoff occurs when water from rain or melting snow passes over impervious surfaces and enters water channels, lakes, and oceans. Driveways, sidewalks, and streets are examples of impervious surfaces that prevent stormwater runoff from naturally soaking into the ground. Water that is allowed to soak through the ground is naturally filtered, where it flows into streams, lakes, and underground aquifers. When impervious surfaces are present the water will not filter and consequently drains directly into waterways carrying pollutants with it. These pollutants include oil, fertilizers, pesticides, and toxic minerals. This leads to an adverse effect on water quality and can have a significant impact on aquatic life. Good stormwater runoff practices attempt to reduce the amount of impervious surfaces created through land development. When impervious surfaces are the only option, a filtering system can be put in place that will treat storm water runoff before it enters waterways. The remainder of this section identifies various strategies that can be employed to achieve storm water runoff mitigation at the Urban EcoPark.

A reduction in the amount of impervious surface is a key strategy for mitigating stormwater runoff. With the incorporation of pervious or semi-pervious surfaces, stormwater will be allowed to soak into the ground where it can be naturally filtered. Some hard surface areas will need to be

impervious as these areas will be used for customers dropping off material associated with the HHW program. The remainder of the lot should be comprised of a pervious surface.

Since environmental education is a major aspect of the Urban EcoPark project, providing informational placards throughout the site to highlight and explain the stormwater management features is recommended. Also, the City may want to consider implementing more stormwater management features than are absolutely necessary from an efficiency standpoint, simply as demonstration projects.

## Pervious Surfaces

One type of surface that can be used is pervious concrete. Pervious concrete, also known as permeable pavement, allows the infiltration of water into the soil and assists the process by capturing rainwater in a network of voids and allowing it to percolate into the underlying soil (see Figure 10). Similar to conventional concrete, it is made from a mixture of cement, coarse aggregates, and water, but it contains little or no sand. The absence of fine aggregate (sand) permits pervious concrete to be composed of 15% to 20% void space, which allows storm water to pass through the pavement. The result is a permeable surface that water can readily pass through at a rate of 3-5 gallons per minute, which sufficiently reduces runoff and the pavement itself will act as a retention basin.<sup>13</sup> This surface would be ideal for the parking lot portion of the EcoPark where no HHW activities occur.



**Figure 10: Pervious Concrete**  
([www.perviouspavement.org](http://www.perviouspavement.org))

The north edge of the site along Las Plumas Avenue will be redeveloped to include a playground and green space with native vegetation. In addition to the vegetated areas, which will obviously be permeable, the playground area can also utilize permeable surfaces such as Rubberific Mulch® that will provide both stormwater management benefits and safety for playground users.

## Vegetated Swales & Bioretention Areas

The pervious surfaces within the Las Plumas EcoPark should also employ vegetated swales to assist in reducing storm water runoff. Vegetated swales slow and filter runoff and promote infiltration into the ground. This will result in reduced storm water runoff and a lower peak discharge rate. In addition, the runoff will be cleaner as well. Swales must be strategically placed to provide maximum efficiency in reducing runoff. The swales serve a dual purpose by providing decorative landscaping while mitigating the harmful effects of storm water runoff. The vegetation within the swales can consist of grass, shrubs and other native plant species.

Bioretention is another technique that will aid the site in filtering pollutants from runoff. The process was developed in Maryland during the early 1990s and typically consists of a shallow

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<sup>13</sup> Source: "How Pervious Concrete Works." Concrete Network. For more information, visit [http://www.concretenetwork.com/pervious/how\\_it\\_works.html](http://www.concretenetwork.com/pervious/how_it_works.html).

landscaped depression that receives runoff from impervious areas such as parking lots.<sup>14</sup> It is constructed with a layered design that consists of an underdrain, a permeable sand/soil mix layer that acts as a filter and a top layer of rock, and vegetation that slows the runoff. Water is retained in the depression of the bioretention area where it is filtered through the sand/soil layer and then empties into the storm drainage system. Bioretention areas are very effective at filtering out pollutants and provide another tool to help improve the quality of our water. One important consideration for any bioretention system the City pursues, is the depth of the water table. Given the proximity of Lower Silver Creek, additional modifications may be necessary.<sup>15</sup> Figure 11 shows a diagram of a bioretention swale.

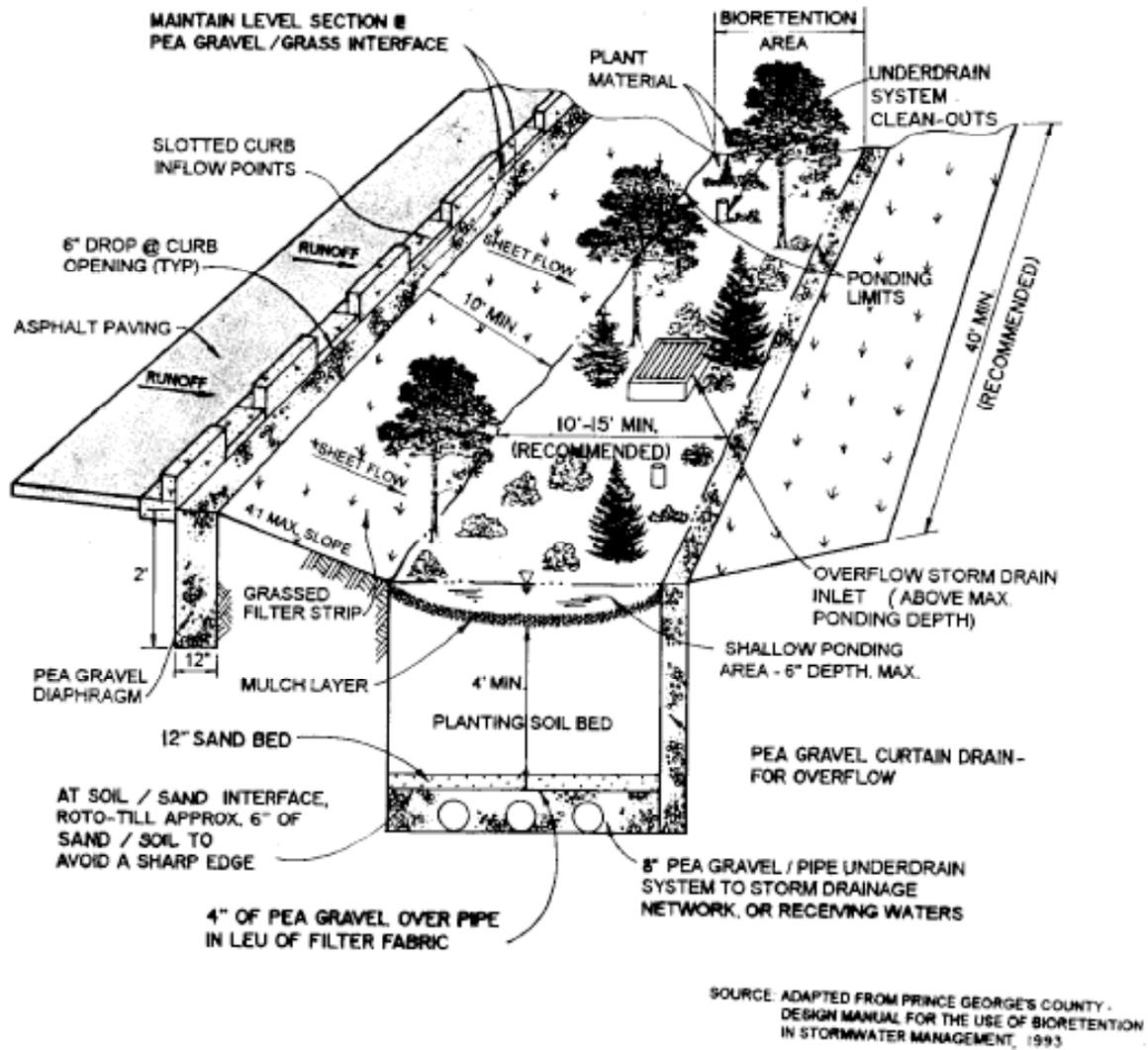


Figure 11: Bioretention Swale Diagram (www.georgiastormwater.com)

<sup>14</sup> Source: "Storm Water Technology Fact Sheet: Bioretention." U.S. Environmental Protection Agency. Available at <http://www.epa.gov/owm/mtb/biortn.pdf>.

<sup>15</sup> For more information, see the "Storm Water Technology Fact Sheet: Bioretention." This document indicates that bioretention is not appropriate where the water table is within 6 feet of the surface. Newer technologies and modifications may mitigate this, however.

## **Water Efficiency**

### **Water Efficient Landscaping, Innovative Wastewater Technologies, & Water Use Reduction**

San José's Urban EcoPark should strive to implement the most efficient and environmentally-sound water management system. As previously discussed, the landscape irrigation system should be designed to minimize evaporation and limit unnecessary watering. The City could also consider implementing some of the following innovative wastewater technologies.

#### **Composting toilets**

Composting toilets (also called biological, dry or waterless toilets) are systems that treat human excrement through biological processes, turning it into organic compost material that can be used to fertilize the soil. They are small-scale, complete sewage processing systems not connected to the main sewage system. The Chinese have been using composting toilets for hundreds of years, but only since the 1960s have they become popular in the rest of the world. Given the commercial nature of this site, this item may not be ideally suited for operational use. It could, however, form a component of an environmental education system.

#### **Brac Grey Water Systems**

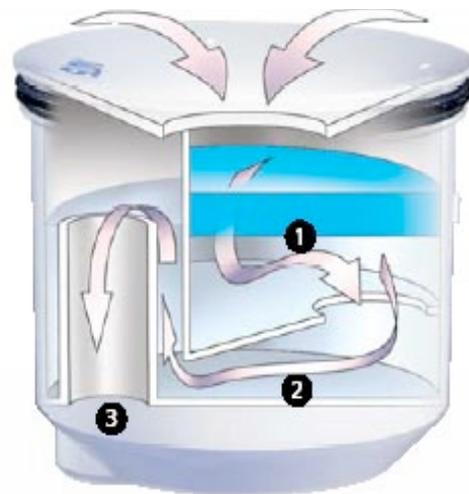
The Brac Grey Water System is a conservation system that recycles water from the shower, bath, and laundry, filters and cleans it, and reuses this water for the toilet tank, irrigation, or other non-potable uses. Once again, this is unlikely to be a viable option for the EcoPark facility, but could be an interesting demonstration project for the environmental education component.

#### **Waterless Urinals**

A more viable option for installation and use at the EcoPark is a system of waterless urinals for the men's restrooms on the first and second floors (see Figure 12). Several companies currently manufacture waterless urinals, which result in both cost savings and environmental benefits. Adobe Systems in downtown San José installed waterless urinals in their facility at a cost of \$35,374. Their annual savings are \$14,896 representing a payback period of approximately 2.4 years.<sup>16</sup>

#### **Dual Flush Toilets**

Dual flush toilets have been popular in Europe and other countries, including Australia, for



The cartridge acts as a funnel directing flow through the liquid sealant ①, preventing any odors from escaping. Next, the cartridge collects sediment ②, allowing the remaining waste to pass freely down the drain ③.

**Figure 12: Waterless Urinal Trap (Source: [www.snre.umich.edu/greendana/conservation/plumbing.php](http://www.snre.umich.edu/greendana/conservation/plumbing.php))**

<sup>16</sup> Source: "Doing the Math: Adobe's San José building Goes LEED-EB Platinum Green." Available at [http://jetsongreen.typepad.com/jetson\\_green/2006/08/doing\\_the\\_math.html](http://jetsongreen.typepad.com/jetson_green/2006/08/doing_the_math.html)

some time, but their popularity has not yet caught on in the U.S. A dual flush toilet works on the principle that one flush is for liquids and a second is for solids. Again, this may not be a suitable appliance for installation at the EcoPark, but could be considered as part of an environmental education program.

## **Other Devices**

In addition to these ideas and products, the City of San Jose should explore a variety of traditional and non-traditional water-saving features. For example, faucets at the EcoPark should be automatic. Evidence from Adobe Systems indicates that these are also both environmentally-friendly and provide an economic benefits (installation cost: \$110,000 – annual savings: \$24,000<sup>17</sup>). Low-flow showerhead should be used if showers are retained in the first floor bathrooms. If connection to the City's recycled water line is possible, this option should be explored.

## ***Energy & Atmosphere***

### **Daylighting, Ventilation, & Energy Production**

#### **Skylights**

The warehouse's interior space has numerous dark sections where sight is difficult and mold is plentiful. The interior space can be enhanced by providing portals for natural light. Skylights will bring natural light into the warehouse, allowing the building to save on energy usage in addition to decreasing the likelihood of mold. One design possibility for the skylights is a decagon-shaped device, similar to that located at the Lake Merritt BART Station in Oakland. The width of the skylight is around 15 feet across and it is installed at the sidewalk level, bringing light to the underground station. This type of skylight would offer a nice centerpiece to the roof design (discussed in more detail in Section X) at the Urban EcoPark. The heat generated by this window could be intense. However, if it is placed near a raised feature of the roof, such as the back raised portion or near a photovoltaic panel, the direct sun would not be as intense. Ventilation fans on the side of the building or the skylight itself are recommended.

Additional skylights in triangular form could also be installed as well. This type of skylight has a window set diagonally against a raised portion of the roof. The intention behind this design is to avoid direct sunlight below the window. The light comes through one side of the raised portion and hits the other side of the raised portion, which leads the light below.

Windows can be placed along the length of the building on the south/west side (located along the upper edge is one possibility to increase light without losing wall area for storage) to provide light into the warehouse space and the multipurpose room. Larger windows can replace the existing windows in the second floor office areas. The window day lighting solutions would be designed to allow the percentage of light required for maximum LEED points. Windows as tricky to design due to the temperature exchange that can pass through them. At the most basic level, controlling the amount of heat or cold that comes through the window is done through various glass glazing levels. Calculations will have to be made regarding orientation of the

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<sup>17</sup> Source: "Doing the Math: Adobe's San José building Goes LEED-EB Platinum Green." Available at [http://jetsongreen.typepad.com/jetson\\_green/2006/08/doing\\_the\\_math.html](http://jetsongreen.typepad.com/jetson_green/2006/08/doing_the_math.html)

windows and size. Based upon the calculations and proper choice of window system and glaze treatment, there would be little need for window treatments such as interior blinds or shades.

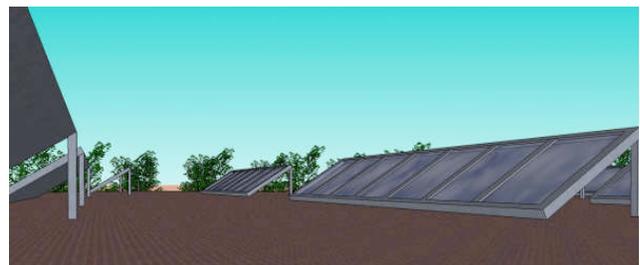
Another option to consider is the use of double-paned glass façades. While windows can be an avenue for heat and cool air, controlling where that air leads can be difficult. Double-paned glass façades have been designed into newly constructed buildings in Europe and a few have popped up in the United States. The double skinned façade has the built in mechanism to control air that has been warmed and divert it through louvered traps between the panes of glass. This solution would encompass building envelope, mechanical systems, and lighting design. Two layers of glass with a broad gap between them for air flow allows the outer layer buffer the outside elements of sun, wind, rain and sound, while allowing the inner layer of glass to act in the same fashion as a typical single façade including window elements and louver shades. In the summer time the outside layer will shield the interior from direct solar heat through particular glazes applied to the glass or by use of louver shades. In the winter the air between the two layers of glass prevents heat loss and is tempered before it enters the interior space year round.<sup>18</sup> An integrated HVAC system would be able to monitor the integrated system and sense when cooling or heating is necessary. Taking advantage of this natural form of cooling and heating would reduce the energy required by a typical non-integrated HVAC system. By replacing a portion of the South/West outer wall from the front of the building to the beginning of the second loading dock with a double skinned façade, day lighting could be enhanced.

## Ventilation

Ventilation units should be integrated according to the amount of heat generated by the sun's penetration. Allowing the building to "breathe" is good for both air quality and for airing out the wood used in the building. Every effort should be made to avoid the need for air conditioning. Given the height of the warehouse and the significant heat savings created by the green roof, we expect that the building will maintain a comfortable temperature. Further discussion of ventilation is located in the "HVAC" section of this document.

## Solar Energy Generation

There is ample space for the installation of a photovoltaic system. By placing a system on the ends of the roof, there will be more concentrated room for the garden to be one unit. Either the southern or the northern portion would be appropriate. The overhang planned for Phase I could also provide a suitable location for solar panels, as would installation on a shade structure over the parking lot area (see Figure 12). An energy audit would help the City make this decision.



**Figure 12: Model of Solar Panels on Overhang**

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<sup>18</sup> Source: Joann Gonchar, Peter Reina, "Glass Facades Go Beyond Skin Deep," ENR.com, Buildings: Curtain Walls. 10, February 2003.

## **Energy-efficient Lighting**

The City should explore a variety of energy-efficient lighting choices including compact fluorescent or high-intensity discharge (HID) lights. Halogen parabolic aluminum reflector (PAR) lamps are a good alternative to incandescent PAR bulbs wherever they are used, such as in track lighting or recessed lighting. They use 30% less energy than the incandescent lights. Compact fluorescents use about 65% less energy than standard incandescent light bulbs and last 10-20 times longer. Motion detector lights, which turn on when movement is detected, could be a useful energy saving source for both indoor and outdoor lighting as well as enhancing security. For HID lighting, motion detectors dimmer-switches are a better alternative than traditional off-on models since these fixtures can take a long time to warm up. Smaller solar powered lanterns could also be considered for landscape illumination.

## **Materials & Resources**

### **Storage & Collection of Recyclables**

#### **Facility Recycling**

Recycling areas for paper, glass, cardboard, and food waste should be provided on both the first and second floors of the building in conveniently located areas. Since community groups may use the multipurpose area and conference areas on an occasional basis, recycling containers should also be provided in these areas (with clear instructions regarding proper disposal and recycling practices). The main external waste management and recycling area is located on the east side of the facility, near Las Plumas Avenue for easy access to the road for collection as modeled in Figure 13. The on-site facility manager will be responsible for ensuring that the material is collected from the building and deposited in the waste management area.



**Figure 13: Model of Facility Recycling Center**

#### **Composting**

In addition to traditional office recycling, we feel it is important to include a composting area for food waste and suitable landscape or garden trimmings. We have established an area along the south edge of the site next to the Native American Plant Garden that would provide an excellent opportunity for a composting demonstration area (see Figure 14). Currently, the Santa Clara County Home Composting Education Program provides composting classes at various locations and the City of San José offers subsidized compost bins to residents and City employees. Having a permanent site to hold classes and set an actual composting site in action will be a benefit to the program. Composting is a natural way to turn food and yard waste into rich organic material that can be put back into the garden and kept out of the landfill.



Figure 14: Compost Demonstration Area Example (Source: [www.frontrangeliving.com](http://www.frontrangeliving.com))

## Building Materials, Reuse, & Recycling

The City of San José has an opportunity to demonstrate and exemplify best management practices through an environmentally-responsible retrofit and renovation at 1608 Las Plumas Avenue. Our proposal recommends that the Environmental Services Department thoroughly document the entire remodeling process and develop a case study that could be used by other communities wishing to follow a similar example. As part of the construction/renovation process, LEED-NC provides credits for maintaining portions of the existing structure. Our proposal entails a fairly significant remodel of the interior spaces, but with the assistance of an architect and structural engineer, it is likely that much of the existing structure can be retained, although certain elements, such as the roof will require major repair. During the renovation process, every effort should be made to reuse or recycle all materials. In certain cases, particularly if hazardous material such as asbestos or lead, are present, proper end-of-life management will be required. In the following section, we describe several non-standard construction materials that the City may want to consider either as part of the renovation process, or for incorporating into a green building education program sponsored by one of the tenants.

### Papercrete

Papercrete is a mixture of fibrous material (e.g. waste paper, but other products such as hemp, straw, wood fiber, etc. could be used), water, and Portland cement.<sup>19</sup> Other variations (such as paper adobe) exist, but these typically do not contain Portland cement and thus take considerably longer to dry and may have other structural concerns. Papercrete provides good sound absorption, is flame retardant, resists pest infestation, and is flexible (making it a suitable material in earthquake risk area). Papercrete is also a low cost construction material and thus may be an interesting candidate for the green building education component.

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<sup>19</sup> Source: "Living in Paper." Available at <http://www.livinginpaper.com/index.htm>.

## **Natural Fiber Insulation**

Increasing interest in environmentally-friendly construction materials has resulted in a wide range of different techniques and practices. Using natural fiber, such as straw bale construction or recycled cotton jeans, are some of the more familiar options available. The new dining facility at the Presentation Center in Los Gatos uses straw bale construction, as does the education center at Hidden Villa in Los Altos Hills. Recycled cotton insulation has many of the same insulating qualities as fiberglass, but is safer to install, less energy intensive to manufacture, and has other superior environmental qualities.<sup>20</sup>

## **Other Considerations**

There is a wide range of possible materials the City could consider during construction and renovation at the Urban EcoPark. If appropriate, salvaged building materials could be incorporated into the site. Any new wood construction should utilize sustainably-forested certified wood (Forest Stewardship Council – FSC certified). Recycled carpet or other environmentally-friendly flooring such as cork, sustainably-harvested bamboo, natural linoleum, or others. The California Integrated Waste Management Board maintains an information directory on green building materials which may be a useful resource.<sup>21</sup> In addition, several organizations and agencies in the Bay Area provide a similar service.<sup>22</sup> Water-based paints with low or no VOCs (volatile organic compounds) should be used throughout the facility. One option to consider for painting is to use paint recycled from the HHW program after it has been processed.

## **Indoor Environmental Quality**

The heating, ventilation, and air conditioning system (HVAC) within the building is a major source of energy use with lighting demands a close second. HVAC systems in the past have had central controls that manage whole sections of buildings. Systems would be on and servicing the entire wing even if only one third of the controlled space was in use, allowing energy to be wasted. A system of sensors that detect when a room is occupied is one of the main elements of a successful integrated building design. Sensors would monitor heating, cooling, air quality, and lighting. Taking advantage of innovations in building operations, mechanical systems and design will bring 1608 Las Plumas up to current green building standards.

As mentioned previously, the window day lighting solutions would be designed to allow for the percentage of light required for maximum LEED points. Placement of windows is tricky due to the thermal exchange from exterior to interior. Orientation of windows and size of windows are taken into consideration when choosing a type of glaze for the glass. The amount of light and heat that are transmitted through the glass depends on the type of glaze chosen. For example to retain heat within a building a low-emissivity (low-e) glaze would be an appropriate choice.<sup>23</sup> A

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<sup>20</sup> Source: "Cotton Insulation." Build It Green. Available at [http://www.builditgreen.org/resource/index.cfm?fuseaction=factsheet\\_detail&rowid=9](http://www.builditgreen.org/resource/index.cfm?fuseaction=factsheet_detail&rowid=9).

<sup>21</sup> "Sustainable (Green) Building: Green Building Materials." Available at <http://www.ciwmb.ca.gov/GreenBuilding/Materials/>.

<sup>22</sup> See, for example, Build It Green at <http://www.builditgreen.org/index.cfm> or RecycleWorks from the County of San Mateo at <http://www.recycleworks.org/greenbuilding/index.html>.

<sup>23</sup> Source: "Energy Efficiency Window Glazing Systems for Commercial Facilities," PG&E. Available at [http://www.pge.com/003\\_save\\_energy/003c\\_edu\\_train/pec/info\\_resource/pdf/GLAZSYS.PDF](http://www.pge.com/003_save_energy/003c_edu_train/pec/info_resource/pdf/GLAZSYS.PDF).

reflective glaze would shield heat from entering the building. An overhang above the windows would be another piece of the integrated building design for energy efficiency.

Windows are great for allowing daylight inside, but they provide little control of solar and thermal transfer to the interior of a building. Standard facility operations rely heavily on support from heating and cooling systems to control thermal comfort. A building with a double skinned glass façade could address these areas of a facility operations needs: increased daylight for the interior, which will reduce the electrical lighting requirements, add control of solar and thermal transfers from outside elements and will allow for natural ventilation. These are all points involved in providing interior comfort to the occupants.

The type and design the HVAC system can be chosen once the building envelope including window systems have been confirmed and signed off. The load or strength requirement of the HVAC system per room should be known at this point. If the renovation has been designed with efficiency in mind the HVAC system should be a smaller system using less energy than a similar building not utilizing sustainable green design methods and materials.

Controlled lighting systems would help in reducing the amount of electricity used for facility lighting. Approximately 40% of energy consumed in commercial buildings is used for lighting.<sup>24</sup> Occupancy sensors with a combination of fluorescent lighting systems would add to total building efficiency as discussed previously. Light emitting diode (LED) lighting for the building exterior, although more expensive than fluorescent lighting, would last longer and fair better in outdoor conditions. Solar lighting systems could be used within landscape with no utility cost to operations.

Sensor networks serve many purposes within a building such as monitoring maintenance and operational conditions and can be utilized outside a building for sensing and timing of exterior lighting, security purposes, and landscape maintenance. Controlled use of resources using networked sensor systems is smart and environmentally sound.

Air quality can be an issue for any building. A sensor system can be implemented to gauge the quantity of unwanted chemical components are in the air. Some of the causes could be internal through the use of materials and equipment brought into the space or they could come in through openings within the building envelope (i.e. windows, doors, and ventilation ducts, if not sealed properly). Some structural materials found within renovation and materials used for equipping offices have potential to release amounts of chemicals into the air that could be harmful to human health. Adding this type of sensor system will provide consistent air quality monitoring.

## **VI. Additional Site Features**

### ***Roof Design***

The roof of the warehouse at 1608 Las Plumas Avenue provides an opportunity to exhibit the latest ideas and technology in using the roof as an additional and useful platform for the building. The warehouse can display a roof showcase that offers energy efficiency features, energy production, water conservation, and wildlife habitat. Such an ambitious roof plan would gain

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<sup>24</sup> Source: Jaspal S.Sandu, Alice M. Agogino, Adrian K. Agogino, "Wireless Sensor Networks for Commercial Lighting Control: Decision Making with Multi-Agent Systems. March 3, 2004. Available at [http://best.me.berkeley.edu/pubs/04\\_0301\\_P.pdf](http://best.me.berkeley.edu/pubs/04_0301_P.pdf).

significant point credit towards LEED certification. We propose the installation of a multitude of features including solar photovoltaic panels, skylights, and a rooftop garden with drought tolerant and native plants (see living roof example in Figure 15). Any remaining space on the roof, including the back portion located on the southern end of the roof, will be painted white in order to deflect the heat potentially absorbed by the sun.



**Figure 15: Green Roof at Chicago City Hall Source: [www.hrt.msu.edu/faculty/Rowe/Green\\_roof.htm](http://www.hrt.msu.edu/faculty/Rowe/Green_roof.htm)**

To make the roof friendly to educational purposes, stairways should be properly installed for the public to access the roof. A horizontal door to the roof is located on the office side of the building where a temporary ladder is installed. This entrance would be an ideal place for a comfortable and safe stairway leading visitors up to the roof. This area is close to the multipurpose room and office portion of the building, making it visible with easy access to visitors who are onsite for educational purposes. The roof is flat, which provides an easy foundation for this design. Currently, there are two ladders (one from the inside and one on the outside of the building.)

However, these entrances need to be safe for public access. In addition to renovating these entry points, a fence of at least five feet should be installed around the roof's perimeter for security.

The integration of skylights, photovoltaic panels, and the living roof portion should be connected by a meandering walking path where visitors can access all the features up-close. To avoid predictable angular design, a curvaceous design configuration, is proposed, of the various sections with posted signs pointing out important educational features.

## **A "Cool Roof" Design**

One of the main intentions behind this roof design is to decrease the heat generated from a rooftop's reflection by creating a "cool roof." Cool roofs are highly reflective and emissive materials that stay 50 to 60 degrees Fahrenheit cooler in the summer sun, thereby contributing to the reduction of urban heat islands and associated smog. The term "heat island" refers to urban air and surface temperatures that are higher than nearby rural areas. Many U.S. cities and suburbs have air temperatures up to 10°F (5.6°C) warmer than the surrounding natural land cover. Solar photovoltaic systems, roof garden implementation, and white colored surfaces all contribute to the cooling of a roof.<sup>25</sup>

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<sup>25</sup> For more information, visit [http://www.pge.com/res/rebates/cool\\_roof/index.html](http://www.pge.com/res/rebates/cool_roof/index.html).

## Green Roof

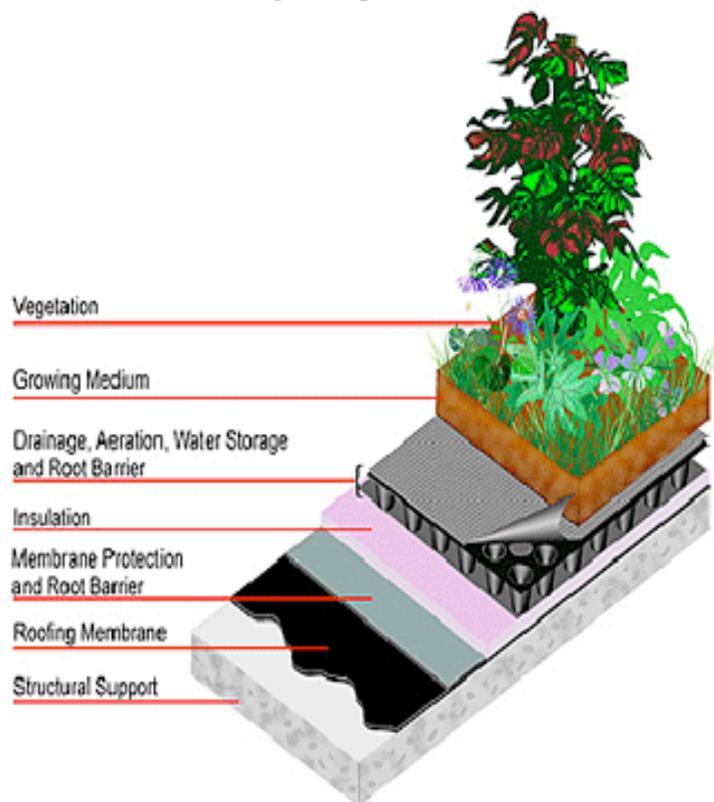
A rooftop garden is an opportunity to “reclaim the land below covered by the building’s footprint.”<sup>26</sup> In order to install a “green roof,” a large portion of the roof will need to be replaced due to the necessary holding capacity for the weight of soil and water required in maintaining a green roof. The alternative to replacing the roof would be to implement a very simple green roof system where only a thin layer of soil and vegetation are required.

A green roof, otherwise known as a “living roof,” is characterized by a rooftop garden where a layer of soil lies directly above the roof material (see Figure 16). The layers of foliage, soil, and drainage material absorb, filter, and detain rainfall. Green roofs offer numerous benefits to energy usage, wildlife, and water conservation. Advantages of a green roof include:

- By having the plants and soil absorb heat from the sun, the building stays cooler.
- Water is absorbed on site, alleviating stormwater runoff. This happens through absorption through the root zone, the capturing and holding of precipitation in the plant foliage, and slowing direct runoff by extending the flow path through vegetation.
- Increasing the available natural habitat for birds and insects.
- The layer of organic material insulates the building and provides thermal mass. This thermal allows for further efficiency with the internal heating and cooling of a building.

Living roofs can reduce heating and cooling needs by 25-50%, by reducing the rooftop temperature by as much as 50-75 degrees. When the outdoor temperature is 95%, a regular black tar roof surface can reach 175 F – while a green roof will be only 100 F.<sup>27</sup>

Additional benefits of a green roof may also include savings on stormwater-related fees, fulfilling mitigation needs for eliminating open space, and saving on requirements to reduce loads on combined sewer systems (CSSs). The vegetated rooftop cover also protects the roof membrane from the elements, adding to the lifespan of the roof.



**Figure 16: Green Roof Cross-Section (Source: [www.countyflatroofing.com](http://www.countyflatroofing.com))**

<sup>26</sup> Source: “Architecture goes green” Sisters’ renovated retreat center in California is a model for ecological design. Mark F. Massoud. Dec. 29, 2006. [http://ncronline.org/NCR\\_Online/archives2/2006d/122906/122906s.php](http://ncronline.org/NCR_Online/archives2/2006d/122906/122906s.php).

<sup>27</sup> Source: “LEED Gold Certified Welcoming Center Living Roof Overview” Los Gatos, CA. [www.presentationcenter.org](http://www.presentationcenter.org).

By using native plant species in a green roof, this site may support the local ecosystem by providing habitat for birds, insects, and microorganisms native to this region. A combination of drought and frost tolerant species in addition to native grasses would provide an easily maintained garden. Birds are expected to transplant seeds into the garden as well. This will eventually create an evolved garden with species that thrive in our environment. A local landscape architect could assist in choosing the most appropriate plants to begin with in addition to offering guidance on whether the site should have an intensive green roof (a deep layer of dirt allowing for an elaborate roof garden with larger plants) or an extensive green roof (a thin layer of dirt with easy-care plants.)

If an intensive green roof is possible, then a theme garden would grab the attention of visitors. The Native American nonprofit across the street expressed interest in having a garden that honors plant species that are culturally and historically significant to Native American tribes. We can integrate this theme into the roof garden as well. One idea is to have sections of the garden displaying various geographical regions of the state and the plants used by the respective tribes of those areas. This would require an examination of what can be grown in an intensive green roof at the Las Plumas Site. However, this investigation would be worth the educational value provided by such a demonstration. Again, educational signs, identifying the species and its historical human use, would accompany the various sections.

### **Irrigation for the Green Roof**

There is a minimal drainage system already installed within the roof. This system will need to be reoriented so that water is directed toward the garden, in addition to some slope manipulation. Because of the abundant water in the basement, a cistern with a filter and a pump directing basement water up to the roof could allow for a more elaborate garden. This water could be used for other irrigation purposes such as the garden on the ground floor outside. A gravity-fed spring for the water tank could pump water underground up to the ground garden and/or the roof garden. A rainwater cistern onsite could also provide additional water. It is in the City's best interest to use onsite water as much as possible. This would demonstrate a major principle of sustainability: using onsite resources. Designing the site, with the intention of using rainwater and stored groundwater, also supports the city's greater goals of storm water runoff control.

### ***Eco-Playground***

An eco-playground could be located on the north edge of the site, near the corner of Las Plumas Avenue and Nipper Avenue (see Figure 17). According to the Consumer Products Safety Commission (CPSC), the playground must contain protective surfacing six feet in all directions from play equipment, swing spacing, entrapment openings less than 3.5 inches or bigger than nine inches, no protrusions or catch-points, no pinch or crush points, elevated surfaces with guard rails, and no lead paint. Recycled and ecologically sustainable building materials should be used during construction including paints with no or low-VOC. In a sustainable playground, the environment is kept in mind throughout. Unless it is a valuable teaching aid, every component of the playground should be "green." In addition, the area should contain an informational placard listing the green materials used in the playground for educational purposes.

Why should the City provide a playground for the community? Every play activity in a playground, whether it be swinging, sliding, or climbing, develops its own skill set, emotional expansion, and strength development opportunities. Children take turns, solve problems, and

learn to play together. Meanwhile, they elevate their heart rate, and get valuable physical exercise. Playgrounds are also great meeting spots for adults in the community to get to know each other.



**Figure 17: Model of Eco-Playground**

The playground area should be about forty feet wide and fifty feet long, but also be enclosed by a recycled plastic or salvaged wood four-foot fence. The main attraction of the playground would be a tree-house made out of recycled steel framing and wood. It has an elevated surface with a ladder extending down through a hole, slide, and play stage. Most of the elevated surface would be surrounded by a three-foot tall rail. The levels leading up to the play stage would be made out of straw

bale and plaster, demonstrating one type of green building technique. Underneath these levels, would be various connected ‘caves’ over two feet in diameter to give the children a glimpse of the straw bale through clear plastic. A protective ground cover made out of recycled waste tire can keep children from injuring themselves if they fall. The area also includes monkey bars, a balance beam, and space for ball-playing, running or jumping.

Other activities could take place in the fenced-in area. Under parent supervision, children could water plants using grey water provided by a contraption near the warehouse. A sand and pebble pit help to build finger dexterity. The pits should be separated and enclosed, containing small shovels, rakes, etc. The site could also contain a birdhouse, ant-farm, weather station, and a stationary bicycle showing how much energy it takes to turn on a light bulb<sup>28</sup>. Finally, a three-foot tall magnifying glass could be permanently placed next to some plants for child observation.

### ***Native American Garden and Greenhouse Area***

As previously mentioned, along the southern edge of the site, we propose to locate a garden that showcases Native American culture from the region (see Figure 18). The garden will provide educational opportunities for local residents and contribute to the stormwater runoff plan for the site. It is anticipated that the American Indian Educational Resource Center, located at CTC, would take an active role in developing the garden, maintaining the garden, and using the garden for educational programs for the local community. It is possible that families in the area would like to sponsor elements of the garden such as benches.

The garden will contain plants and vegetables of cultural and historic importance to the local Native American tribes, particularly the Ohlone. Throughout the garden, signs should indicate what the plants are, and how they were used by Native Americans. Also within the garden could be a meditation area where visitors can sit and enjoy bird watching or simply an opportunity to

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<sup>28</sup> Hidden Villa in Los Altos Hills has connected a stationary bicycle to a platform that displays a fluorescent and incandescent light bulb. By riding the bike, you can see how much energy it takes to light up the different bulbs.

reflect. By locating the garden on the far side of the site, any traffic noise from Las Plumas Avenue will be minimized.



**Figure 18: Model of Native American Garden**

If the garden is actively used as an outdoor classroom, a place for people to gather and sit in the shade would be helpful. Seating areas could be constructed using cob. Cob is an ancient building material that is composed of sand, earth high in clay, straw, and water. If the seating area is designed in a circular shape, then a simple shade awning can be built with dried reeds or bamboo. These materials are tied together at a point in the middle of the structure, providing a ceiling for the gathering area. Furthermore, vines growing along the structure attractively provide shade for the sitting area below.

As much as possible, recycled materials should be used when constructing the garden. Paths in the garden could use recycled concrete from the site or other recycled materials from the local region. During site visits, wooden trusses, possibly designed by the early 20<sup>th</sup> century architect, Julia Morgan, were identified on site. Although the wood in these trusses is likely not suitable for structural construction, they could be incorporated into the garden as decorative features.

Located between the Native American garden and the composting center is a greenhouse. The structure should be locked, but the onsite City employees would have a key. Along with the composting area, it could serve as a demonstration site for education on green building materials, efficient energy use, and sustainable native plants. The greenhouse could serve as a nursery for Native American plants, California native plants, and salvaged plants. The building structure should reflect green building practices and incorporated recycled or salvaged materials and could possibly be used to demonstrate some of the green building techniques showcased in the green building education center. Possibly, the tenant who will be located in Area 4 in the warehouse may like to take a leading role in developing the structure. Irrigation for the greenhouse plants may come from the onsite water system, which may be filtered grey water or collected rainwater.

Heating a greenhouse is a critical function. During the day, the greenhouse can store excess heat provided by the sun in thermal mass substances (stones, water tanks, compost pile for example) for release at night. The north wall could be insulated with a compost pile and stones could be mixed into the concrete foundation to increase the thermal mass. High temperatures can be maintained at night with insulated glazing and movable shutters. The greenhouse could feature photovoltaic (solar-electric) panels on the roof, which would provide energy to run fans and vents. There could also be a rainwater harvesting system set up to make more efficient use of water. Mint could be planted outside the south wall of the greenhouse and composting area

because it thrives in sunny, wet conditions, will catch excess water shed by the roof, and prevent erosion. In addition, its strong insect-repelling aroma can deter white flies and other pests.

## VII. Final Thoughts

The City of San José has a tremendous opportunity to develop an environmental education resource center at 1608 Las Plumas Avenue. This proposal just touches on a few of the elements the City may want to consider during project development. In addition to the physical construction and renovation of the facility, we would like to encourage the City to take a long-term, holistic view of the Urban EcoPark and utilize best practices in terms of ongoing maintenance and upkeep. In it one thing to construct a sustainable building, but to truly strive for sustainability requires ongoing thought and emphasis on everything from cleaning products used on site to ensuring that occupants and visitors to the site do everything possible to engage with the facility in a sustainable manner.

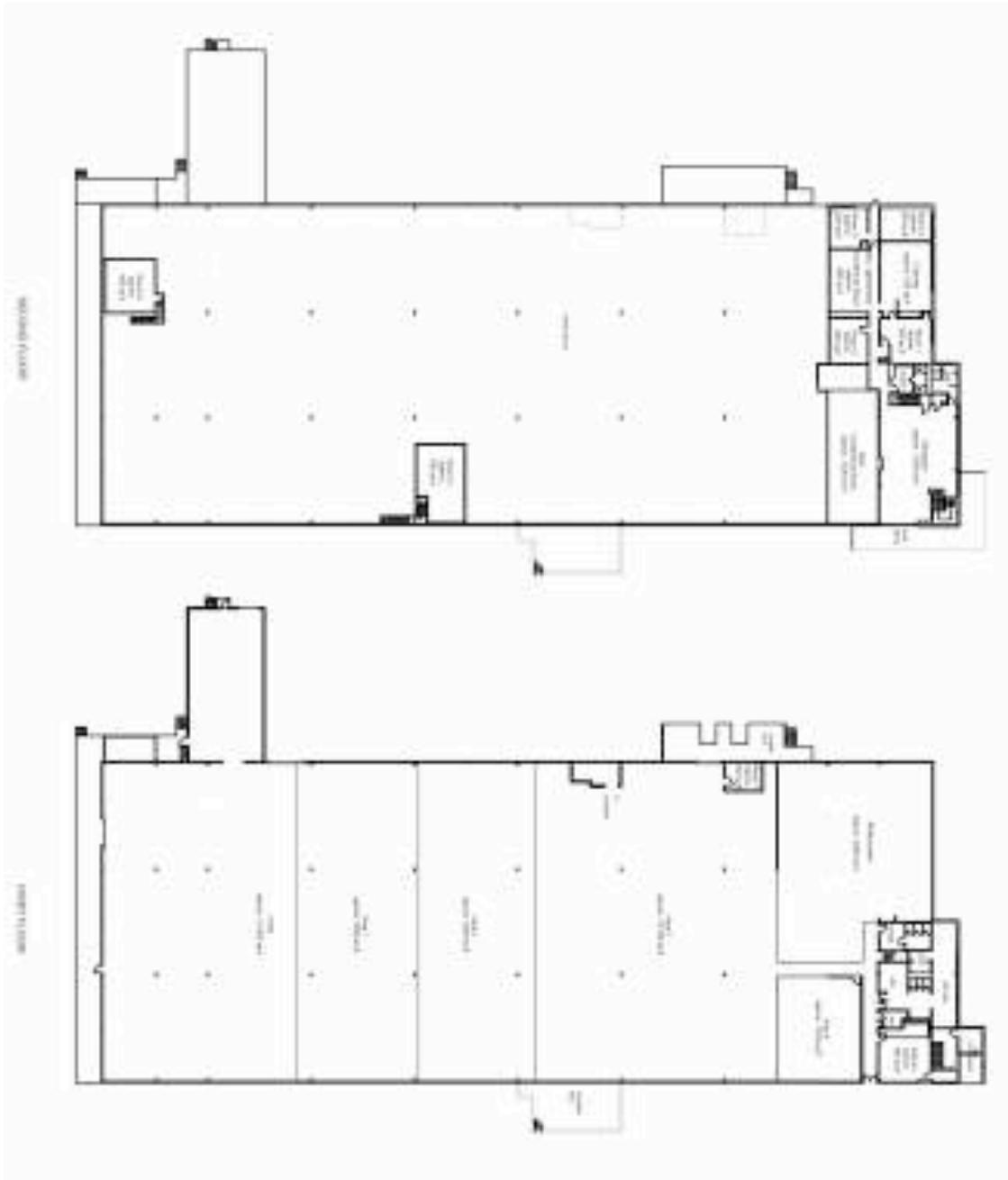
As communities strive to reduce their ecological footprint and educate their residents on ways to promote a sustainable lifestyle that is both environmentally and economically responsible, the Urban EcoPark can demonstrate San José commitment to this and future generations and the City's leadership on environmental issues.



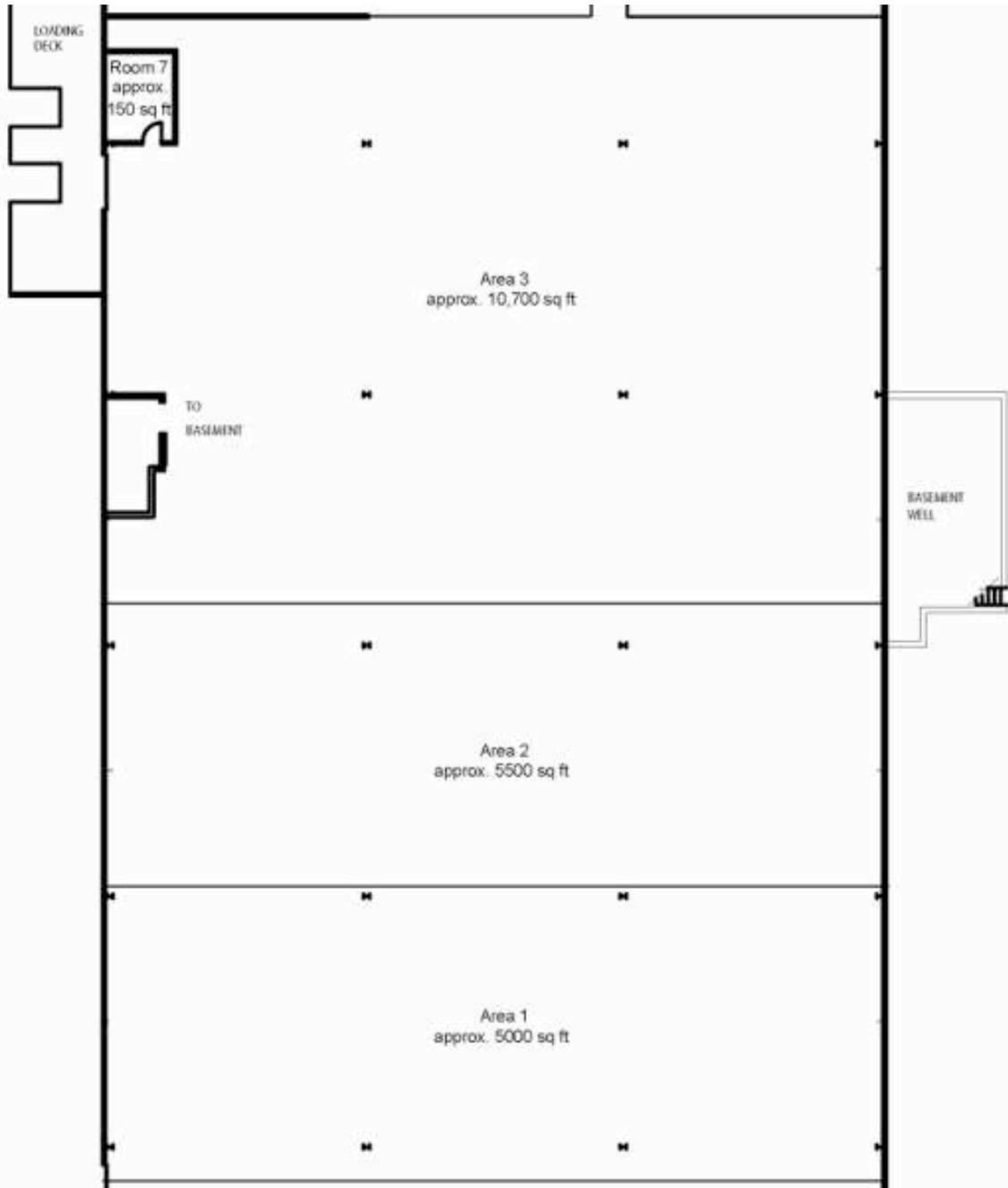
**Graduate Students and Faculty Advisor, San José State University, Environmental Planning Studio**

# Appendices

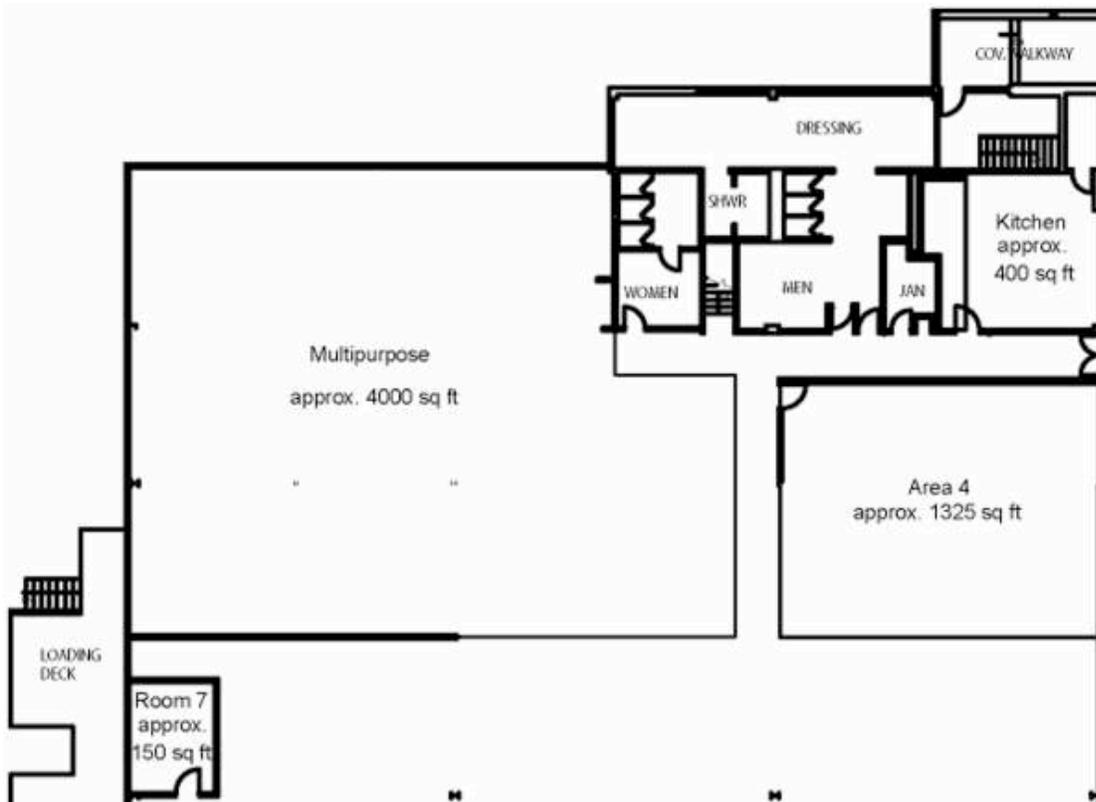
**Appendix A: Warehouse and Office Area, Tenant Locations**



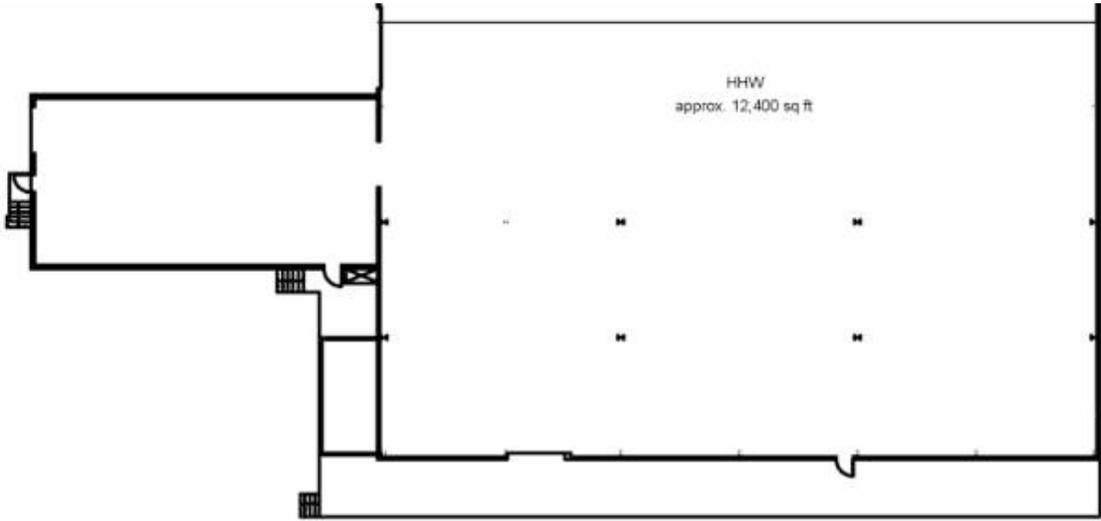
**Appendix B: Warehouse 1<sup>st</sup> Floor, mid-section**



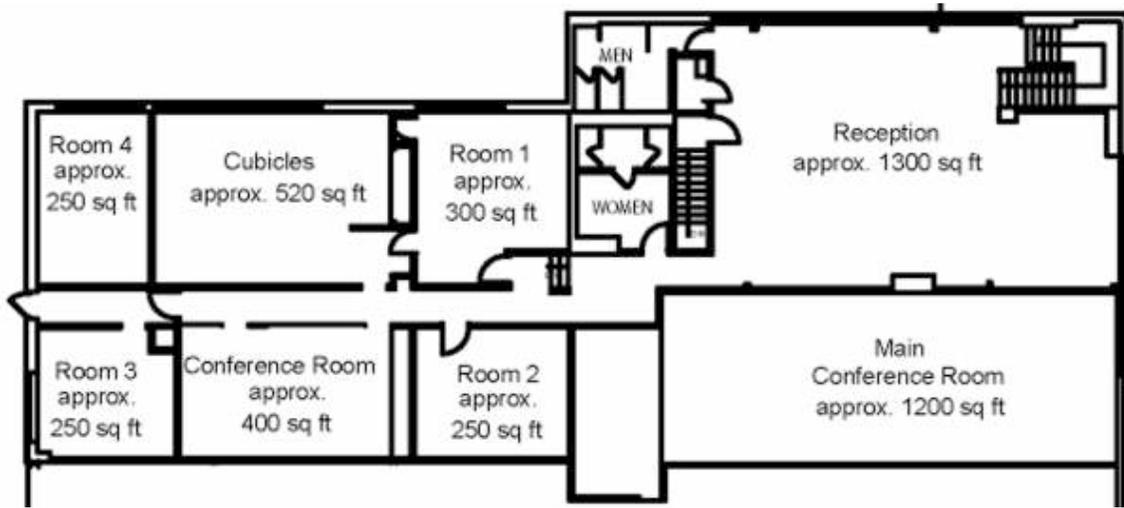
**Appendix C: Warehouse 1<sup>st</sup> Floor, front section**



**Appendix D: Warehouse 1<sup>st</sup> Floor, rear section**



**Appendix E: Warehouse 2<sup>nd</sup> Floor, front section**



**Appendix F: Additional Images of EcoPark Site Plan**



**View from Las Plumas Avenue, showing recycling center & front entrance**



**Overview showing roof design, solar panels, parking area, and green space**



View of south end, showing Native American Garden, greenhouse/compost area, parking, and rear loading dock for HHW program



Visitors to San José's Urban EcoPark