

Survey and Analysis of C&D Recycling Programs



Presented to:
City of San José
Environmental Services Department



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1.0 Introduction

The City of San José (City) began a Construction and Demolition Deposit (CDDD) program in 1998 as a means to divert construction and demolition materials (C&D) from landfills in San José through economic incentives. At the time, more than 30 percent of disposed materials in San José landfills were C&D material.

Since 2001, the CDDD program has provided an economic incentive for recycling by requiring contractors¹ to pay a deposit before being issued a building permit. Contractors receive their deposit back if material is reused or taken to one of the 21 City-certified recovery facilities.

An important characteristic of the CDDD program is the emphasis on obtaining the highest and best use of material and phasing out C&D material used as Alternative Daily Cover (ADC). The phase out began in 2001 and concluded in 2004. Consequently, no use of C&D material for ADC is attributed to a certified facility's diversion rating. The diversion requirements for certified facilities are 50 percent for new construction and demolition projects.

R3 Consulting Group (R3) was engaged by the City of San José (City) to provide assistance with evaluating the City's CDDD Program. This letter report focuses on comparing the City's CDDD program to other C&D programs and identifying potential CDDD improvements as the City considers the next steps in the CDDD program evaluation. It is anticipated that the evaluation of the CDDD Program will be completed in June 2009, with potential changes to the CDDD program becoming effective in 2010

2.0 Methodology

To assist with the identification of potential changes / improvements to the CDDD program, information was compiled on C&D programs in more than 100 jurisdictions. That information included various program characteristics such as required diversion rates, deposit requirements, and project thresholds.

The information obtained was reviewed and various jurisdictions were selected to be surveyed based on specific characteristics of their programs that might serve as the basis for changes / improvements to the CDDD program. A variety of surveys were conducted, including but not limited to:

¹ For purposes of this Report, "contractors" refers to contractors, homeowners, or developers that obtain a building permit from San José.

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- Overall diversion requirements and Zero Waste Planning;
- Methods used to determine waste generation and diversion percentage;
- Inert material diversion requirements;
- Salvage / deconstruction requirements; and
- Coordination between C&D Programs and LEED Certification.

A range of project-specific research was also conducted, including:

- LEED and other green building certification requirements; and
- Public / private salvage and deconstruction partnerships.

R3 also surveyed local and regional salvage and deconstruction firms to obtain information and recommendations.

3.0 CDDD Program Permit / Deposit Process

The CDDD Program process can be summarized as follows:

Prior to any project, a contractor must obtain a building permit from the City. When a contractor applies for the appropriate permit, City Staff requires a deposit to be provided by the contractor based on project type, square footage and estimated C&D waste generation rates. Once the deposit is submitted, contractors are responsible for diverting 50 percent of materials generated from their project site away from landfills. Qualified compliance options include bringing materials to a CDDD Certified Facility, donating or reusing materials, or some combination of the two.

Once a project is completed, the contractor applies for a refund. Documentation of ultimate destination of the waste materials must be provided in order to qualify for a deposit refund. For contractors taking materials to a CDDD facility, it is critical to acquire receipts with permit numbers on them to present as accurate documentation of material destinations. Applications for refunds are only accepted within 12 months after the permit has been inactive. Once the application is received, weight tickets submitted for the project are compared to the estimates made prior to project commencement. Based on review by City Staff of the application and this supporting documentation, the City chooses to refund the deposit proportionally to degree of compliance (or not at all).

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4.0 Survey Results and Analysis

Our findings and analysis are organized as follows:

- Overall Diversion Requirements;
- Waste Management Plans and Methods Used to Determine Waste Generation and Diversion Percentage;
- Inert Material Specific Diversion Requirements;
- Separate Diversion Requirements for Construction versus Demolition;
- Salvage / Deconstruction Requirements;
- Limitations on Allowances for ADC Usage;
- Project Threshold Values;
- Project Deposit Levels; and
- LEED Coordination.

4.1 Overall Diversion Requirements

The City's Zero Waste Plan, which was adopted in October of 2007, has a goal of 75 percent diversion by 2013 and 100 percent diversion by 2022. The zero-waste principles of a closed-loop system were furthered by San José's Mayor's 10 Green Vision Goals, which include the following two goals that relate in part to the CDDD Program:

1. Build or retrofit 50 million square feet of green buildings; and
2. Divert 100 percent of the waste from landfill and convert waste to energy.

San José CDDD Program

The CDDD Program has a 50 percent overall diversion requirement.

4.1.1 Survey Results

Of the more than 100 C&D programs reviewed:

- More than 70 have a diversion requirement of 50 percent (for both construction and demolition), similar to San José;
- Seven (7) have a diversion requirement of 60 percent including the cities of Burlingame, Menlo Park, Portland, Portola Valley and San Carlos (San Mateo County);

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- Two (2) have diversion requirements of 65 percent (Oakland and San Francisco); and
- Three (3) have diversion requirements of 75 percent (The cities of Santa Fe Springs (Los Angeles County), Mission Viejo and Dana Point (Orange County)), and four (4) others have 50 percent diversion requirements that increase to 75 percent².

When comparing diversion requirements it is important to consider:

- What if any associated diversion requirements there are specific to inert material or limitations on the extent to which diversion of inert material can be used to comply with the overall required diversion rate; and
- Limitations on the use of ADC.

As an example, while both the cities of Oakland and San Francisco have overall diversion rates of 65 percent, San Francisco does not require a higher diversion rate for inert materials and does not specify a limit on the use of ADC. Oakland on the other hand has a 100 percent diversion requirement for inert material and does not allow ADC to count toward the required diversion rates.

4.1.2 Analysis

Consideration of changes to the CDDD diversion requirements needs to include:

- What if any inert material-specific diversion requirements the City may implement;
- The ability of certified facilities to achieve higher recovery rates; and
- The availability of markets to absorb recovered materials at the required diversion levels.

The City has several options related to the overall CDDD diversion requirements including:

- Maintain current 50 percent diversion rate;
- Maintain a single overall diversion rate but increase the required diversion level;

² The required diversion rates for the cities of La Mesa, Portland, Lemon Grove and San Diego increase from 50% to 75% when a new mixed C&D facility becomes operational.

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- Maintain a single overall diversion rate (at 50 percent or higher), but limit the amount of diversion that can be attributed to inert material; or
- Establish a separate diversion requirement for inert materials (and potentially other materials such as cardboard and scrap wood generated at construction projects) while requiring 50 percent (or more) diversion of remaining materials.

If the City is to achieve its Zero Waste Goal of 75 percent by 2013, requiring a 75 percent diversion rate, or higher³ for C&D material, would appear to be appropriate and consistent with the City's Zero Waste Goal.

Appendix A provides an analysis of potential diversion rates for various C&D project types based on the California Integrated Waste Management Board's 2006 C&D Waste Composition Study. Table 1 below provides a summary of the Total Divertible Material percentage for each of the identified project types.

As shown, total divertible materials from the C&D Project Types (as defined by the CIWMB study) range from approximately 65 percent for residential remodel projects to more than 86 percent for new non-residential construction (with Other C&D at 93.5 percent). If we back out the impact of inerts (e.g., require a separate diversion rate for inerts), the percentage of divertible materials is just over 50 percent for both residential remodel projects and demolition projects which constitute the two largest Project Types based on the percentage of C&D waste generated. The City may wish to take this information into account as part of any consideration of changes to the required CDDD diversion rate.

| Project Type | % Tons in Bay Area | Total Divertible Material | Total Inert Material (Divertible) | Total Divertible Non-Inerts (1) | Potential Diversion Excluding Inerts (2) |
|----------------------------------|---------------------------|----------------------------------|--|--|---|
| Residential remodel | 21.60% | 65.20% | 27.50% | 37.10% | 51.77% |
| Demolition | 20.80% | 68.60% | 34.50% | 34.10% | 52.23% |
| Roofing | 15.10% | 67.70% | 7.30% | 60.40% | 65.27% |
| Non-residential remodel | 14.10% | 67.70% | 29.60% | 38.10% | 54.04% |
| New residential construction | 10.50% | 75.80% | 16.90% | 58.90% | 71.18% |
| New non-residential construction | 10.10% | 86.40% | 42.10% | 44.30% | 76.35% |
| Other C&D | 7.70% | 93.50% | 81.00% | 12.50% | 65.53% |

(1) This calculation takes total non-inert divertible materials and divides them by total materials

(2) This calculation takes total non-inert divertible materials and divides them by total materials less inert materials

³ Either as a single overall diversion rate or as a net rate accounting for separate (higher) diversion requirements for specific materials (e.g., inert material).

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4.2 Waste Management Plans and Methods Used to Determine Waste Generation and Diversion Percentage

Determining the total amount of material generated by a project is a fundamental component of the diversion rate calculation. Without an effective system for estimating or quantifying waste generation, it is not possible to determine if the project has complied with the 50 percent diversion requirement.

San José CDDD Program

The City does not require contractors to submit Waste Management Plans. However, City staff does develop an estimate of waste generation for each project based on the project square footage and estimated C&D square foot waste generation rates. Weight tickets submitted for the project are then compared to this estimate to determine compliance with the ordinance.

4.2.1 Survey Results

Of the more than 100 C&D programs reviewed:

- Ninety-nine (99) required some form of a Waste Management Plan (WMP) or Compliance Form from contractors, including the cities of Alameda, Livermore, Hayward and Oakland (Alameda County), San Francisco (San Francisco City and County), Foster City, Menlo Park, San Mateo, San Carlos (San Mateo County) and Palo Alto and Santa Clara (Santa Clara County). In some cases, those plans include waste generation estimates.
- The 17 other jurisdictions either do not require a WMP, or the requirements are unclear.

With the overwhelming majority of programs requiring a WMP, R3 investigated the purpose and goal of requiring WMPs. Jurisdictions expressed the value of their WMP requirement as twofold:

- The WMP Final Reports act as the primary or sole method for the city to be able to estimate to the best extent possible the flow of C&D materials; and

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- Requiring contractors to develop a preliminary WMP helped contractors think ahead and detail diversion arrangements properly.

Requiring a preliminary and final WMP also potentially provides jurisdictions with a more concrete view of the successes and shortcomings of their program. WMPs can require, among other things identification of the type of project (e.g., new residential construction, commercial remodel, demolition, etc.). The WMP can also include information, such as the intended means of transportation for recycling or disposal.

Appendix B contains samples of Waste Management Plans for used by other of jurisdictions. Appendix C provides C&D project waste generation estimate per square foot.

4.2.2 Analysis

While the City does not require a WMP its process of producing a waste generation estimate for each project based on the type of project and square footage is consistent with what we found to be the best method for determining compliance with specified diversion requirements. We believe, however, that the City could benefit from requiring project proponents to provide additional project information as part of the permit process. This could include information on the structure that could support the evaluation of salvage and deconstruction activities, planned reuse of materials on-site, the name of the C&D franchised hauler and facilities used, among other information.

4.3 Inert Material Specific Diversion Rates

Inert materials lend themselves to high recovery rates due to their physical characteristics and the type of C&D activities that lead to their generation (e.g., site grading, foundation work, foundation demolition, etc.) and provide opportunities for source separation. Additionally, there is well-established capacity for recovering inert material within Santa Clara County and the Bay Area.

San José CDDD Program

The CDDD Program does not have any inert material specific diversion requirements.

4.3.1 Survey Results

A number of jurisdictions specify a diversion rate for inert material and a separate diversion rate for all other material:

- The cities of Albany, Berkeley, Dublin, Fremont, Hayward, Newark, San Leandro and the Oro Loma Sanitary District

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all require 100 percent diversion of inert material and 50 percent of remaining waste;

- The City of Oakland requires 100 percent diversion of inert material and 60 percent of remaining waste;
- Alameda County requires 75 percent diversion of asphalt, concrete and similar materials, and 50 percent of remaining materials;
- The City of Menlo Park has a 60 percent diversion requirement and specifies that a maximum of 35 percent of the recycled material can be concrete, asphalt, rock or brick;
- The City of Burlingame has 60 percent diversion rate with diversion of at least 25 percent of the waste tonnage that excludes soil, concrete and asphalt;
- The cities of Long Beach and Santa Monica have a 60 percent diversion rate. They also specify that no more than twenty percent (20%) of the sixty percent (60%) diversion rate can be achieved through the recycling or reuse of inert materials unless applicant can demonstrate that sufficient structural materials do not exist for recycling or that forty percent (40%) diversion to total waste through non-inerts is not feasible and
- The City of Portland requires 100% diversion of wood, corrugated cardboard, metal, rubble (concrete/asphalt), and land clearing debris. This diversion may contribute to the overall diversion requirement that is currently 50% but will be 75% by April of 2009. City Staff member Alisa Kane expressed that effective source separation is the key to achieving the desired results.

4.3.2 Analysis

Inert materials lend themselves particularly well to recovery given both their physical characteristics and how they are typically generated during construction and demolition activities. Requiring 90+ percent diversion of inert material would represent an important step toward achieving the City's Zero Waste goals.

4.4 Separate Diversion Requirements for Construction versus Demolition

New construction and demolition projects are not the same. It is estimated that less than 10 percent of construction materials end up as C&D waste.⁴ Alternatively, when that same structure is

⁴ Per StopWaste of Alameda County. For a 2,000 square foot home about 7-8% of construction materials end up as C&D waste.

demolished, 100 percent of the material ends up in the C&D waste stream, or 10 times the amount generated through the construction of that same structure. With this in mind, the city of San José has expressed interest in requirements and policies that regulate the project types differently. However, additional requirements to manage construction and demolition projects separately may require the City to increase the number of staff and associated cost related to the CDDD program.

San José CDDD Program

The CDDD Program does not have separate diversion requirements for construction versus demolition.

4.4.1 Survey Results

Of the more than 100 jurisdictions reviewed, only a handful have separate diversion requirements for C&D (not including those that have separate diversion requirements for inerts), and the diversion requirements are on the *haulers and/or generators*. San José's program is unique because it is *facility driven* where C&D diversion is based on facility recovery standards. Accordingly, the information gathered by the surveys was intended to build on City's highly successful facility driven model. Those programs include:

- East Palo Alto: **C:** 55 percent concrete/asphalt; 20 percent other waste; **D:** 60 percent soil, concrete, asphalt; 25 percent other waste.
- Woodside: **C:** 60 percent of total waste; **D:** 60 percent of total waste, but at least 15 percent of that calculation must be from non-inerts.
- Atherton: **C:** 50 percent of waste tonnage; **D:** 50 percent of waste tonnage including concrete and asphalt, and 15 percent tonnage excluding concrete and asphalt.
- San Mateo: **C:** 50 percent of waste tonnage; **D:** 50 percent of waste tonnage, but salvaged materials may be credited as diversion.

In these examples, there is a trend toward higher or more detailed diversion requirements for demolition projects than construction projects. East Palo Alto demolition diversion requirement is 5 percent higher than that for construction. Woodside's requirement expresses an interest in ensuring diversion of non-inerts as well as inerts from demolition projects. Atherton wants to see non-inert

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materials comprise at least 15 percent of materials diverted from demolition sites. San Mateo's approach is related to highest and best use of materials.

4.4.2 Analysis

Separate overall diversion requirements for construction versus demolition projects may be appropriate given the types, nature and timing of materials that are generated. In some cases, however, it may be more appropriate to specify increased diversion rates for specific material types regardless of whether they are generated during demolition or construction (e.g., 100 percent diversion of inerts). Alternatively, it may be appropriate to specify increased diversion rates for specific material types for demolition projects (e.g., minimum salvage requirements) and increased diversion rates for specific material types for construction projects.

The timing and nature of waste generation associated with construction projects (i.e., the relatively homogeneous nature of the waste stream at certain steps in the construction process) presents waste diversion opportunities and approaches that are not available with demolition projects. As such, it may not be unreasonable to require 100 percent recovery (i.e., source separation) of certain materials that can be effectively source separated on-site (e.g., cardboard and scrap wood generated as part of construction projects).

4.5 Salvage and Deconstruction

One of the specific aspects of the CDDD Program that the City is to considering as part of improvement efforts is to provide for "highest and best use" with "requiring salvage prior to demolition" specifically identified. With respect to the CDDD Program, the Hierarchy for Highest and Best Use is as follows:

- Restoration
- Relocation
- Salvage / Deconstruction

Restoration

Restoration involves renovating a structure to be consistent with a former, original, normal, or unimpaired condition. Depending on the scale of the restoration, the process can include varying degrees of demolition and reconstruction, and might include building additions to structures.

Relocation⁵

Relocation involves moving a structure from one location to another. The process, which can result in 90 percent to 100 percent reuse, can occur through either disassembly and reassembly or moving the structure in one piece. Moving the structure in one unit can be accomplished by using rails if being transported a short distance or by flatbed truck for longer distances. In some cases, aspects of the structure that may pose a hazard during transport, such as chimneys, can be removed. Environmental obstacles, such as tree limbs, and street and traffic lights, may need to be considered when moving a structure. Many structures qualify for relocation but few are moved due to:

- Site constraints;
- Availability of nearby land;
- Availability of a buyer; and
- Time and project schedule

The City of Stockton lists firms that relocate buildings in their C&D program public education materials.

Salvage and Deconstruction⁶

Case studies of deconstruction projects around the U.S. are showing savings with deconstruction costs averaging 30 to 50 percent less than demolition costs.⁷

Deconstruction or “construction in reverse” is the systematic hand or mechanical disassembly of building structures in reverse order of assembly for purposes of reusing the building materials. Deconstruction has strong ties to environmental sustainability reducing the need for virgin resources, reducing associated energy needs and environmental impacts.

Deconstruction is commonly separated into two categories: structural and non-structural. Non-structural deconstruction, also known as “soft-stripping”, consists of reclaiming non-structural components such as appliances, doors, windows and finish materials. The reuse of these materials is commonplace and considered a mature market in many areas. In contrast, structural deconstruction involves dismantling the structural components of a building. Traditionally this had only been performed to reclaim

⁵ City of Portland, Bureau of Development Services; Lunch and Learn, Recycling and Construction and Demolition (C&D) Materials; Presented January 13, 2006.

⁶ Taken in part from Wikipedia “Deconstruction”.

⁷ Deconstruction Institute; Case Studies – Manhattan Deconstruction Project.

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expensive or rare materials such as used brick, dimensional stone or high value wood. Recently, the rise of environmental awareness and sustainable building has made a much wider range of materials worthy of structural deconstruction. Low-end, commonplace materials such as dimensional lumber have become part of this newly emerging market.

Deconstruction's economic viability varies from project to project. The amount of time and cost of labor are the main drawbacks. Harvesting materials from a structure can take weeks, whereas demolition may be completed in a day or two. However, some of the costs, if not all can be recovered through the sale of salvaged materials. In addition, according to a 2004 report on building deconstruction⁸, deconstruction also creates jobs, employing 3 to 6 workers for every worker employed in a comparable demolition job.

Materials that can be salvaged include:

- Finish wood (including flooring);
- Structural wood, steel and steel studs;
- Cabinets and casework;
- Lighting, electrical and mechanical fixtures;
- Doors, door frames, windows and storefronts;
- Door and window hardware;
- Carpet and carpet tiles;
- Metal work (grates, grilles, railings);
- Landscape fixtures (benches and awnings); and
- Specialty materials (cubicles, office partitions, writing boards, chutes, toilets, sinks, bathtubs, partitions, etc.).

San José CDDD Program

The CDDD program provides the option for materials salvage and deconstruction but does not have any mandatory requirements.

4.5.1 Survey Results

A number of jurisdictions have established salvage requirements as part of their C&D ordinances. Our research identified 12 jurisdictions in San Mateo County that have some form of salvage

⁸ OLR Research Report, "Building Deconstruction" written by Paul Frisman, December 13, 3004.

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requirement. It should be noted, however, that it is unclear if the jurisdictions track the impact of these requirements in terms of increased diversion or the time impact on a project. The 12 jurisdictions are listed below:

- The cities of Brisbane, Burlingame, Portola Valley, San Carlos and Woodside require 5 working days for salvage prior to demolition;
- The City of Menlo Park requires 7 working days for salvage prior to demolition;
- The City of Atherton requires 10 working days for salvage prior to demolition; and
- The cities of Colma, Foster City, Half Moon Bay and San Mateo require salvaging as much as possible or to the greatest extent possible.

In an effort to gain additional information on potential benefits of and mechanisms to facilitate the expansion of deconstruction activities, R3 conducted a survey of deconstruction firms in the Bay Area and also contacted a number of jurisdictions that have undertaken efforts to increase deconstruction as part of C&D activities. Findings of that effort include the following:

Deconstruction Firms

- There is significant potential in deconstruction practices that would help the City of San José in meeting its Green Vision Goals. Having spoken with several deconstruction firms in the Bay Area, the consensus is that about 70 - 80 percent of a building on average can be salvaged and reused. This diversion is much higher than the 50 percent mandate in place by the City, fits the City's stated goal of pursuing highest and best use of materials, and is in line with Green Vision Goals. The benefits of deconstruction go beyond increased diversion as well. Deconstruction provides jobs for unskilled workers as well as affordable materials for disadvantaged people. The reader is referred to the U.S. Department of Housing and Urban Development's *Report on the Feasibility of Deconstruction* for additional information on deconstruction, including an analysis of the feasibility of using deconstruction as a vehicle for economic development.
- The ReUse People (TRP)⁹ based out of Oakland, CA suggested that the City decouple building and demolition

⁹ An overview of background, services and economic benefits of ReUse Solution are provided in Appendix D.

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permits so that there is adequate time allowed for deconstruction to be pursued.

- As part of the survey effort, TRP's General Manager stated the following:
 - Most projects over 3,000 sq ft require a month of deconstruction time to obtain 75 percent diversion.
 - He suggested that there is great potential in San José if adequate time was provided for deconstruction.
 - He suggested setting up a retail outlet for salvaged material.
 - TRP would be **very interested** in public / non-profit partnership with the City. They are already involved in a partnership with Boulder, CO.
- Habitat for Humanity, The ReUse people and others all suggested that a large warehouse for salvaged materials would be helpful. Most salvage / deconstruction companies interviewed stated that they need more capacity for salvaged materials.
- Habitat for Humanity in Milpitas stated that they have a large base of clientele that would be very excited about increased capacity of salvaged materials.
- Matt Bradberry of V's Demolition actively researches and promotes deconstruction techniques in lieu of demolition all over the Bay Area. He recommended that deconstruction projects be "Green-Lighted," meaning that permits involving deconstruction automatically go to the top of the list in the Building Department and take precedence over all other demolition projects. Doing this gets the attention of contractors and homeowners who are interested in beginning projects as soon as possible, and in the process allows for an avenue of education on the economic benefits of deconstruction. Mr. Bradberry stressed the tax donation credits that are associated with salvaged materials. This education addresses the barriers associated with deconstruction; first, it nullifies the issue of extra time required and second, it adds dollar incentives to doing the "right" thing. V's Demolition expressed interest in collaborating with San José to promote deconstruction.
- A number of deconstruction firms recommended requiring a certain amount of time between permit issuance and when demolition may commence (e.g., 10 to 30 days). In this case it would be advantageous to have reuse and salvage market information available to contractors so that deconstruction could begin. The City maintains a list of

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deconstruction firms on their website, however, many of the phone numbers and information is outdated. An updated list of deconstruction firms and information supporting the case for deconstruction (e.g., cost savings over demolition) should be made available.

- Orange County, NC has secured the right to delay demolition up to 90 days if contractor is not demonstrating “adequate” deconstruction. This provides a means to actively encourage deconstruction.
- Habitat for Humanity suggested that the City consider creating a type of City Green Certificate for owners to use for prestige in their buildings. This would work in conjunction or in addition to LEED and State Certification already in place.
- At least one local deconstruction firm, Whole House Building Supply (which is a certified CDDD facility), secures deconstruction rights and then opens the site up to the public to take what they want for a price, with the public providing their own labor.
- Our research identified the following local deconstruction companies (not an exhaustive list) that stated they would be interested in deconstruction projects in San José:
 - The ReUse People;
 - V’s Demolition Inc.;
 - Ohmega Salvage;
 - Whole House Building Supply;
 - American Metal and Iron;
 - C&K Salvage; and
 - Habitat for Humanity.

Jurisdictions with Salvage Requirements

- The City of Stockton C&D program representatives personally visit sites prior to demolition to encourage deconstruction and salvage efforts.
- The City of Burlingame requires that the general contractor and all subcontractors “recover the maximum feasible amount of salvageable designated recyclable and reusable materials prior to demolition”. The City also requires that “In the event that it is determined that no materials can be salvaged for reuse from a particular project, written documentation shall be provided to the City as to reasons why salvaging cannot take place at least three (3) days before demolition begins”. The City, however, does not

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appear to require any documentation that salvaging has occurred.

- The Cities of Los Altos, Menlo Park and Oakland have or are considering waiving the demolition permit fee if adequate deconstruction can be demonstrated.

4.5.2 Analysis

A number of jurisdictions have established salvage / deconstruction requirements, as discussed above. However, R3 did not identify any jurisdiction that has a system in place to aggressively support salvage and deconstruction efforts that could be referenced as a Best Management Practice for the City. While the efforts undertaken to date by these jurisdictions represent important first steps, it is not clear to what extent they have actually resulted in increased material salvage.

Simply providing the opportunity for salvage of materials prior to demolition does little if potential deconstruction firms are not aware, or required to be made aware of the opportunity. Additionally, the relatively limited time windows established for salvage and deconstruction efforts do not provide the opportunity to maximize such efforts.

If the City wishes to maximize the opportunity for salvage and deconstruction, a system needs to be developed under which contractors and/or property owners are:

- Required to notify deconstruction firms of the opportunity for salvage and deconstruction prior to demolition and provide the opportunity for those firms to effectively pursue salvage and deconstruction as warranted¹⁰; and
- Held accountable for demonstrating that they have made a good faith effort to provide the opportunity for salvage and deconstruction.

4.6 Limitations on Allowances for ADC Usage

While the use of C&D material as ADC may be beneficial in certain cases (e.g., soil deficient landfills) allowing it to count toward the CDDD diversion requirement may undercut the City's efforts to support the highest and best use of materials.

¹⁰ Alternatively, the City could establish a system to provide for such notification (e.g., listing job sites and pertinent information on a website that deconstruction firms could access).

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San José CDDD Program

The City does not allow materials used as ADC to count toward the 50 percent diversion requirement.

4.6.1 Survey Results

Table 2 below provides list of jurisdictions limiting or disallowing ADC as counting toward their C&D program diversion requirements.

| Table 2 Jurisdictions With ADC Limits | |
|--|---|
| Jurisdiction | ADC Limit |
| San José | ADC is not counted as recycled material |
| Woodside | ADC is not counted as recycled material |
| Menlo Park | ADC is not counted as recycled material |
| Burlingame | ADC is not counted as recycled material |
| Hillsborough | ADC is not counted as recycled material |
| Oakland | ADC is not counted as recycled material |
| San Mateo (city) | ADC is not counted as recycled material except for alteration projects |
| Santa Monica | ADC may account for up to 20% of the diversion calculation counted as recycled material |
| San Diego (city) | ADC may account for up to 20% of the diversion now. The ADC allowance will be phased out over the next 4 years. |

4.6.2 Analysis

The City's current policy of not allowing materials used as ADC to count toward the 50 percent diversion requirement is consistent with efforts to promote Highest and Best Use of recovered materials.

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4.7 Project Deposit Levels

As part of C&D ordinance requirements many jurisdictions require deposits that are refundable upon demonstration of compliance with diversion requirements.

San José CDDD Program

The City of San José currently employs a deposit program, with the amount of the deposit based on the type of project and the project square footage. Table 3 below provides the basis for the City's CDDD deposit amounts for the various project types.

**Table 3
Project Deposit and Threshold Levels**

| Project Type | Deposit per Sq. Ft. | Minimum Valuation | Maximum Sq. Ft. Subject to Deposit |
|----------------------------------|---------------------|-------------------|---|
| Residential New Construction | \$0.20 | \$115,000 | \$125,000 detached; \$100,000 attached |
| Non-Residential New Construction | \$0.10 | \$135,000 | \$25,000 commercial; \$75,000 industrial |
| Residential Alterations | \$1.16 | \$2,000 | None |
| Non-Residential Alterations | \$0.35 | \$5,000 | None |
| Residential Demolition | \$0.35 | \$5,000 | None |
| Non-Residential Demolition | \$0.10 | None | None |
| Roofing Project with Tear-off | None | None | None |

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4.7.1 Survey Results

Of the jurisdictions surveyed:

- Most (64 jurisdictions) reviewed, but not all (47 jurisdictions), utilize some form of deposit system;
- Jurisdictions use a variety of methods for setting the deposit amount:
 - Percentage of permit value (23 jurisdictions) - Deposits based on the percentage of project permit value range from 1 - 3 percent;
 - Tonnage (12 jurisdictions) - Deposits based on tonnage were \$50 per ton for each of the identified jurisdictions;
 - Set amount (7 jurisdictions);
 - Square footage (6 jurisdictions) - Deposits based on the project square footage range from \$0.20 to \$0.35 with the exception of the City of Dublin, which assesses a fee of \$1.05 per square foot plus \$2,738; and
 - Data not Available (16 jurisdictions).
- Some jurisdictions limit the deposit amount:
 - Santa Clara – 3 percent up to \$50,000;
 - San Gabriel – 3 percent up to \$10,000; and
 - Orinda – 2 percent up to \$5,000.
- Some jurisdictions have set minimum deposit amounts:
 - Menlo Park - \$50 per ton starting at \$1,000;
 - Colma - \$50 per ton, not less than \$1,000;
 - Rancho Cucamonga - \$5,000 to \$15,000 depending on size; and
 - Pomona - \$1,000 to \$15,000.
- Some jurisdictions levy fines or take other steps to deal with ordinance violations either in conjunction with, or in lieu of deposits:
 - The Castro Valley Sanitation District C&D ordinance has no deposit requirement but contains a provision for levying fines of at least \$1,000 but not to exceed 3 percent of the total project cost for violations;
 - The City of Lynwood refunds deposits based on the equation: $\text{Refund} = \text{Deposit} \times \text{Diversion Rate}$. The added economic incentive is for contractors to seek

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the highest diversion possible rather than settling at a benchmark;

- Butte County does not have a deposit program but assesses an administrative penalty for failing to meet 50 percent diversion. The penalty is \$250 per ton of material not recycled as required, with a maximum penalty is \$50,000;
- The City of Imperial Beach imposes a non-compliance fine of the greater of \$1,000 or 1 percent of project cost. There is no deposit;
- The City of Brisbane has a deposit amount of \$.025/lb. not to exceed \$50,000. If an infraction occurs, the security deposit rate for the next project is increased to \$.04/lb. not to exceed \$75,000; and
- The cities of Brawley, Calexico and El Centro all state that failure to comply with 50 percent diversion will not only result in loss of security deposit, but also civil penalties of 2 percent of project value.

4.7.2 Analysis

The mechanism used to establish the Project Deposit Levels is not as important as the actual dollar amount of the Project Deposit. The Project Deposit Level must be sufficient to incentivize project owners and/or contractors to effectively comply with the CDDD Ordinance.

The City's square footage deposit amounts fall within the general ranges reported by other jurisdictions that use this method for determining deposits. The one exception is the \$1.16 square footage deposit amount for alterations, which is much higher than that reported by other jurisdictions. However, when we compare the amount of deposit based on the City's square footage method to that for jurisdictions that use a percentage of permit value method we find that the City's method results in a substantially lower dollar deposit amount for construction projects.

Appendix E provides a comparison of the deposit generated by the City's square footage method to that generated by the percentage of permit value for a hypothetical 1,000 square foot project construction project valued at \$250,000 (\$250 per square foot construction cost). As shown, the City's methodology results in a substantially lower deposit than the percentage of permit value methodology (e.g., the City's deposit for Residential New Construction is \$200 (1,000 ft² x \$0.20/ft²) compared to \$2,500 based on 1 percent of the permit value and \$7,500 based on 3 percent of the permit value).

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With respect to demolition projects, the difference between the City's square footage deposit method and the percentage of permit value method is much less due to the much lower demolition cost. In both cases, however, the resulting required deposits are relatively small (particularly when the demolition cost is part of a combined demolition and construction project), and it could be argued that it provides relatively little financial incentive for contractors or property owners to comply with the ordinance. This is of particular relevance because:

- Demolition projects generates significantly more waste than construction projects for the same square footage (as much as 10 times or more); and
- Salvage and deconstruction opportunities represent the highest and best use C&D waste management option available.

4.8 Project Thresholds Levels

Not all projects are covered under the various C&D ordinances. In many cases jurisdictions establish a threshold above which projects must comply with the C&D ordinance. Those projects which fall below the established threshold are not impacted and do not need to comply.

San José CDDD Program

As shown in Table 3 above, San José's current thresholds are:

- Residential and commercial construction - \$115,000 and \$135,000, respectively;
- Residential and non-residential alterations - \$2,000 and \$5,000, respectively;
- Residential demolition projects - \$5,000, with no threshold for non-residential demolition projects; and
- There is no threshold (or required deposit) for roofing projects.

4.8.1 Survey Results

Of the more than 50 jurisdictions reviewed that have construction dollar thresholds:

- Only 3 have thresholds above the City's:
 - Santa Clarita - \$500,000 for new construction; \$100,000 for alterations

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- Livermore - \$300,000; and
- San Mateo County - \$250,000.
- Of those with construction thresholds less than the City:
 - 13 have a \$100,000 threshold;
 - Six (6) have a \$75,000 threshold;
 - 25 have a \$50,000 threshold;
 - 1 has a \$25,000 threshold;
 - 1 has a \$20,000 threshold;
 - 5 have \$10,000 thresholds; and
 - 2 have \$5,000 thresholds.

Demolition Project Thresholds

Of the more than 50 jurisdictions reviewed that reported demolition dollar thresholds:

- 25 specifically require all demolition projects to comply with the ordinance including the cities of Colma, Concord, San Mateo and Stockton and Los Angeles County;
- 3 have a \$5,000 threshold;
- 4 have a \$10,000 threshold;
- 1 each have \$20,000, \$25,000 and \$40,000 thresholds;
- 17 have \$50,000 thresholds;
- 3 have \$75,000 thresholds; and
- 12 have \$100,000 thresholds.

4.8.2 Analysis

The City's construction project threshold is higher than that of the majority of the other programs reviewed, while the City's demolition project thresholds are among the lowest. A case can be made that lowering the construction threshold while also requiring additional diversion requirements (e.g., recover 100 percent of the cardboard and scrap wood generated) would capture significant additional construction waste volume (check with City records) and should be pursued. Alternatively, given the amount of waste generated by demolition projects a case can be made to remove the \$5,000 threshold for residential demolition projects and require all residential and commercial demolition projects to comply with the ordinance.

4.9 LEED Coordination

Leadership in Energy and Environmental Design (LEED) is a Green Building Rating System developed by the US Green

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Building Council to provide measurable accreditation for environmentally friendly construction practices. Buildings are rated and scored credits with a maximum of 69 points possible. The following certification levels are given for associated amassed credits:

- **Certified** - 26-32 points;
- **Silver** - 33-38 points;
- **Gold** - 39-51 points; and
- **Platinum** - 52-69 points.

Construction and Demolition Programs are very relevant to projects pursuing LEED Certification. Under the Materials and Resources section of LEED worth a total of 13 points, two points can be earned through waste diversion. One point is earned for achieving 50 percent and another point is earned for reaching 75 percent. The USGBC grants an additional innovation point for achieving a 90 percent or greater C&D diversion rate. With facilities already providing high diversion rates, a successful C&D program can help builders achieve LEED Certification. Appendix F provides the LEED Project Checklist.

The City of San José has expressed interest in exploring overlap between LEED and C&D Programs. Of the programs surveyed, only the City of Oakland reported intersecting work between the C&D program and LEED. The City of Oakland's C&D program reviews and guides compliance for city projects to ensure the 75 percent LEED Gold Certification. The program also actively reviews and assists in logistics to help make the jump from the city C&D diversion minimum of 65 percent to the Gold Certification level of 75 percent in the LEED rating system.

With specific reuse and salvage requirements in place, a C&D program can assist in earning more credits as more points may be earned for using local and salvaged materials. Using 20 percent of materials generated from within 500 miles and 10 percent salvaged materials would earn another four points. Thus, the quality of a C&D Program alone can play a significant positive role in encouraging Green Building Practices certified by the USGBC.

San José CDDD Program

The CDDD Program does not currently have any coordination with LEED projects.

4.9.1 Analysis

By partnering with LEED qualified people within the City of San José's departments, the C&D program can act as a qualified and

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convenient resource for new construction projects that intend to “go green” with a certain level of LEED certification. As diversion requirements continue to rise, expertise in assisting the step up to 75 percent Gold Certification for LEED will be a valuable contribution to the City’s Zero Waste goals.

5.0 CDDD Program Evaluation

5.1 CDDD Evaluation Activities

In an effort to align the CDDD program with the City’s Green Vision Goals and its Zero Waste Plan, the City is in the initial stages of analyzing the modifications to the CDDD program. The evaluation of the CDDD program is expected to be completed by July 1, 2009, with potential changes to the CDDD program becoming effective in 2010.

To address potential changes to the CDDD program, the City has undertaken the following steps:

- C&D Material Characterization Study (completed October 31, 2008);
- Self-Haul Material Characterization Study (completed October 31, 2008);
- 2008 CDDD Interim Status Report (completed October 31, 2008);
- Survey and Analysis of C&D Recycling Programs (completed October 31, 2008);
- Certification of C&D Facilities Under Current CDDD Standards (expected to be completed December 31, 2008);
- Review and Update CDDD Deposit System (expected to be completed June 30, 2009); and
- Franchise and Governmental Fee for Construction and Demolition Debris Service (expected to be completed February 27, 2009).

5.2 CDDD Program Evaluation Considerations

As noted above, the City is in the initial steps of gathering data and conducting analysis of options that if implemented could increase C&D diversion. ***As such, because the analysis is not completed, the following discussion points should be viewed on a preliminary basis only and additional analysis will need to be conducted prior to developing specific program recommendations.***

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As part of the CDDD program evaluation, the City may wish to consider six related components in an effort to increase C&D diversion:

- Increasing job site reuse / recovery – Need to sufficiently incentivize property owners / contractors to pursue required levels of salvage and recovery;
- Increasing diversion through franchised C&D hauler requirements / incentives;
- Increasing facility diversion and processing capacity – Need to sufficiently incentivize facility operators to expand processing and maximize diversion;
- Expanding / strengthening markets to support increased diversion – Need to support / actively pursue efforts to expand / strengthen markets for recovered materials, including conversion technologies;
- Establishing a grant program to provide partial funding to expand the diversion of C&D; and
- Proactively managing the C&D waste stream by establishing an effective system for determining waste generation and the associated diversion percentage associated with each CDDD project, and monitoring the certified facilities to ensure that they are achieving the required diversion rates.

5.3 Future CDDD Program Options

The following outlines future CDDD program options that the City may wish to consider as the CDDD evaluation moves forward.

5.3.1 Diversion Requirements

- Consider establishing a 90 percent diversion requirement for inert material;
- Consider establishing 90 percent diversion requirement for source separated green waste material;
- Consider establishing 90 percent diversion requirement for scrap wood/lumber material wood generated at construction projects;
- Consider establishing 90 percent diversion requirement for cardboard generated at construction projects;
- Consider requiring diversion of 90 percent of roofing material (assuming the availability of appropriate infrastructure and markets for this material);
- Consider increasing the diversion rate to 75 percent for all other materials on a multi-year phased in basis in support

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of City's Zero Waste Goal, and assuming there is adequate processing capacity;

- Consider increasing the diversion requirement if a certain level of salvage / deconstruction is not achieved;
- Consider aligning diversion and facility usage requirements for the franchised haulers with the diversion standards of CDDD program; and
- Consider incorporating LEED and Green Building standards into the CDDD program requirements as appropriate.

5.3.2 Contractor Checklists

- Consider instituting a process whereby simple "checklists" (see Section 4.2 on "Waste Management Plans" for a full discussion) are required as part of the CDDD permitting process covering:
 - Estimated waste generation (could be the estimated as provided by the City);
 - Tracking and reporting of inert materials;
 - Salvage and deconstruction information that can be shared / accessed by interested Salvage firms – set it up so salvage firms can proactively pursue salvage opportunities ; and
 - Reporting any planned use of materials on-site.

5.3.3 Salvage / Deconstruction Requirements

The City may wish to consider establishing a Salvage and Reuse Requirement for demolition projects and develop a system to effectively support and verify contractor adherence to that requirement. This could include:

- Consider establishing salvage / deconstruction requirements for all demolition projects that are reasonable and that require the project proponent to clearly demonstrate "good faith efforts" (See Salvage and Deconstruction considerations below);
- Consider waiving demolition permit deposit or provide other economic incentives for projects that can support that they have achieved the City's reuse objectives;
- Consider decoupling construction and demolition permits so that there is adequate time for deconstruction (provided that this does not negatively impact the City's administrative burden);
- Consider requiring up to 30 days for salvage activities after securing deconstruction services, prior to demolition;

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- Consider certifying deconstruction firms and establishing reporting requirements to support documentation of required deconstruction efforts;
- Consider requiring specific documentation to support and verify best faith salvage and deconstruction efforts;
- Consider establishing Specific Salvage / Deconstruction Deposit;
- Consider creating incentives to encourage salvage/deconstruction such as providing a 100 percent deposit fund after salvage operations rather than waiting until the project is completed;
- Consider offering grants for the cost of debris boxes if the boxes are used solely for salvage operations;
- Consider allowing contractors that engage in salvage operations to be charged the City's negotiated tip fees at Newby Island for residue material generated from salvage operations; and
- Consider soliciting additional recommendations from Salvage and Deconstruction firms in support of increased salvage and deconstruction as part of the CDDD Program.

5.3.4 Project Threshold Values

Construction Projects

- Consider changing the deposit requirement for Construction and Alteration Projects to three percent (3%) of project value for construction.

Demolition Projects

- Consider increasing the deposit requirement for Demolition Projects to a level that will provide sufficient incentive for compliance (e.g., 10% - 20% + of permit value).
- Consider assigning a portion of the deposit for salvage / deconstruction specific demolition projects (e.g., 10% of deposit amount).
- Consider a policy similar to Orange County, NC, which would give the City the right to delay demolition up to 90 days if contractor is not demonstrating "adequate" deconstruction.

5.3.5 Project Deposit Levels

- Consider lowering Construction Project Thresholds as follows:

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- Residential Construction – between \$50,000 and \$100,000; and
- Commercial Construction - between \$50,000 and \$100,000.

- Consider maintaining thresholds for alteration, demolition and roofing projects;
- Consider removing the threshold for residential demolition projects, similar to non-residential demolition; and
- Consider increasing the maximum square footage subject to deposit.

5.3.6 Limitations on Allowances for ADC and Beneficial Use

- Consider maintaining the requirement excluding the use of ADC in diversion calculation;
- Consider maintaining the requirement excluding the use of Beneficial Use (i.e., landfill road base) in diversion calculation; and
- Consider a multi-year phase out of the use of C&D materials for ADC and Beneficial Use.

5.3.7 LEED Coordination

- Consider the example set by the City of Oakland for promotion of the LEED program discussed above. Specifically, equip CDDD program staff to educate and assist interested parties with LEED certifications in construction projects;
- Consider additional LEED Certification for Certified Facilities that can document 90 percent diversion of C&D Materials; and
- Consider LEED Certification for franchised C&D Haulers working in conjunction with LEED Certified Facilities.

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