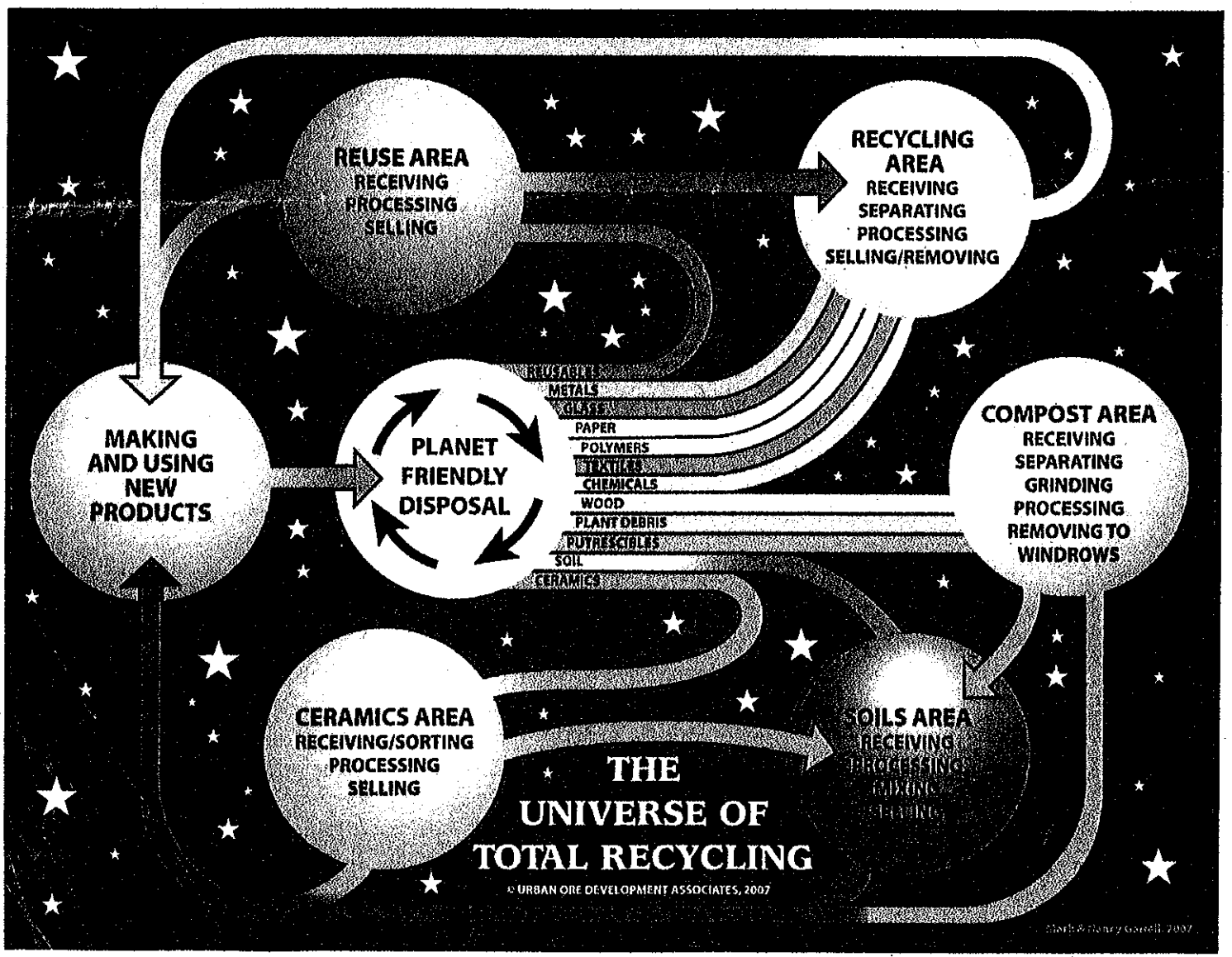
Waste *Isn't* Waste *Until* It's Wasted

Zero Waste uses recycling to dispose of unwanted stuff

By Daniel Knapp, Ph.D.

Zero waste is a big vision - no resources wasted. It's policy in California and several of its cities and counties. For discards, no single method can do the whole job. Instead, a complex economic ecosystem is evolving of sustainable disposal and production.

Many parts already exist, each different. My own company is Urban Ore, a three-acre reuse enterprise in Berkeley, California, open 360 days a year. We receive and sell nearly anything that doesn't require a motor vehicle permit. Income from retail sales, scrap, and service is about $2.5 million annually. We have 38 employees, a full parking lot, hundreds of retail customers streaming in and out, vehicles loaded with incoming



This diagram shows how all 12 master categories of discarded resources can flow to diverse industrial processes for development into clean feedstocks. (Illustration by Mark and Nancy Gorrell, copyright 2007 by Urban Ore.)

discards and outgoing merchandise. The staff play interesting music, and conversations fill the air. Every transaction involves a human negotiation.

Urban Ore is one company in an economic ecosystem built on secondary materials. Other conserving businesses have industrial and sometimes spiritual names like American Soil Products, American Iron, Community Conservation Center, Standard Metal, Tri-CED, Habitat for Humanity, Ohmega Salvage. Like many recyclers, I started out in another field. I was a sociologist who left teaching. As codirector of the Lane County Office of Appropriate Technology in Eugene, Oregon, I studied the goods wasted at a tiny rural solid-waste station. The results revealed a rich opportunity. But as so many decision-makers have done with recycling opportunities, the County Supervisors declined to pursue it. Later they de-funded the agency, so I hitchhiked to Berkeley and tested the study by salvaging at the municipally-owned bayfill. I wore a psychic lab coat as protection from the chaos and cultural downgrading.

The sensory contrasts at a landfill are jarring. Berkeley's 90-acre mini-peninsula jutted into San Francisco Bay. It had sweeping views of the Marin County hills, the Golden Gate Bridge, and San Francisco. In Berkeley, the university's Campanile carillon gleamed. But underfoot were 50 feet of compressed garbage, held in by a stone dyke. Rats appeared at dusk. The smell was the internationally consistent landfill smell. Dry weather brought dust, wet weather smelly mud. Winds blew continuously. When the ten-foot-high garbage compactors squeaked, beeped, and rumbled by, the "land" jiggled. Swooping clouds of seagulls soared, circled, and perched all around us.

Balancing carbon, reducing footprints

Urban Ore's mining metaphor fit the daily work. One resource we "mined" was refined aluminum in industrial products: windows, doors, cable, car parts, sheet goods. We upgraded it by removing contaminants such as ferrous screws. By recovering, disassembling, and cleaning, we converted discards into feedstock.

Smelting also creates feedstock. Once I worked in a coal-burning aluminum plant in the Ohio River Valley. The precious metal was extracted from a white earthen powder mined in the tropics and barged thousands of miles. Similar plants in the Columbia River Gorge may use the Bonneville Dam's hydropower for electricity, but all reduction furnaces still use vast amounts of coal for anodes and cathodes, which vaporize during production.

By "making" feedstock from already-refined metals, recycling shrinks aluminum's carbon footprint. Recyclers can tell similar tales about wood, glass, bricks, textiles, and even plastics. Our story improves substantially when we sell the recovered objects for reuse, conserving the manufacturing value too.

Balancing mind, matter, body, and business

Reuse and recycling also offer personal balance. Instead of working mostly seated in an office, I do mental work early in the day, then switch to the physical labor that is my main source of exercise. I cashier, restock doors, price fresh goods, and work with a talented staff, many of whom bike to the job. Many choose this work although they have other options.

Urban Ore is one of 56,000 recycling enterprises nationally. Recycling isn't only about conserving resources and value, it's also about staying healthy and having more fun working.

Balancing disposal service

My company isn't in the field of "waste management." Managing wastes is related only by its feedstock - discarded resources. Waste management is our competition for the supply. We are, however, in the disposal business. Despite unfair obstacles, sharp competitive practices, and regulatory barriers, recycling is winning market share from wasting.

We recyclers have important structural advantages. First, the disposal function is at the heart of the recycling business experience, and we do it with more soul. Suppose that you have something to let go of. If a recycler accepts it, it will be upgraded and returned to productive use. If you give it to a waste company, it will be mashed, mixed with unlike materials, and taken to your local landfill or incinerator. The rough handling destroys everything.

Both methods provide the service of disposal, which is simply to make your unwanted thing go "away" legally.

Second, financially, destructive

disposal depends completely on service fees, whereas reuse and recycling also sell products. Operators can balance the income sources to cover costs and generate profits, so recycling can charge lower service fees than wasting. Waste companies argue that only they can assure that local governments will fulfill their statutory public-health obligations. But then they want police-power protection and guaranteed profits, often of 30% or more. Worse, many communities rely on garbage-service income as a cash source, so whatever policies they may make, they must protect waste income. It's hard to replace an industry that's so embedded financially. But we have ideas - more about that later.

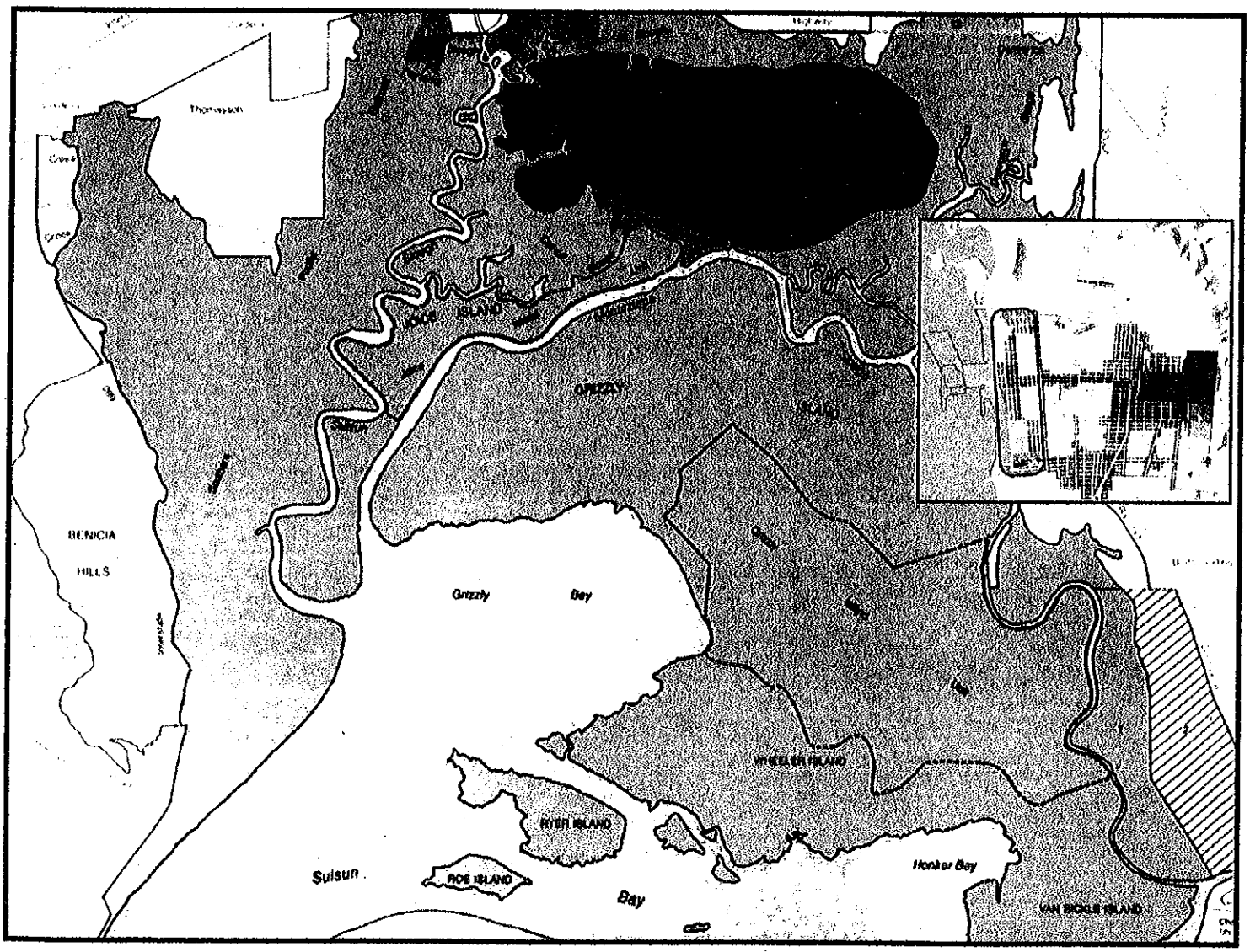
Recyclers only ask that wasting be priced at its full cost, including assured long-term landfill space since they say it's necessary; cleanup for hundreds of years in case water supplies are contaminated (current contracts provide the federal minimum of 30 years); and greenhouse gas offsets.

Landfills generate huge, almost equal quantities of carbon dioxide and methane. Waste companies brag about capturing methane, producing energy, and sequestering carbon. But analysts think more methane is generated during the filling, when organic garbage is fresh and cooking, than after closure, when gas collection starts.

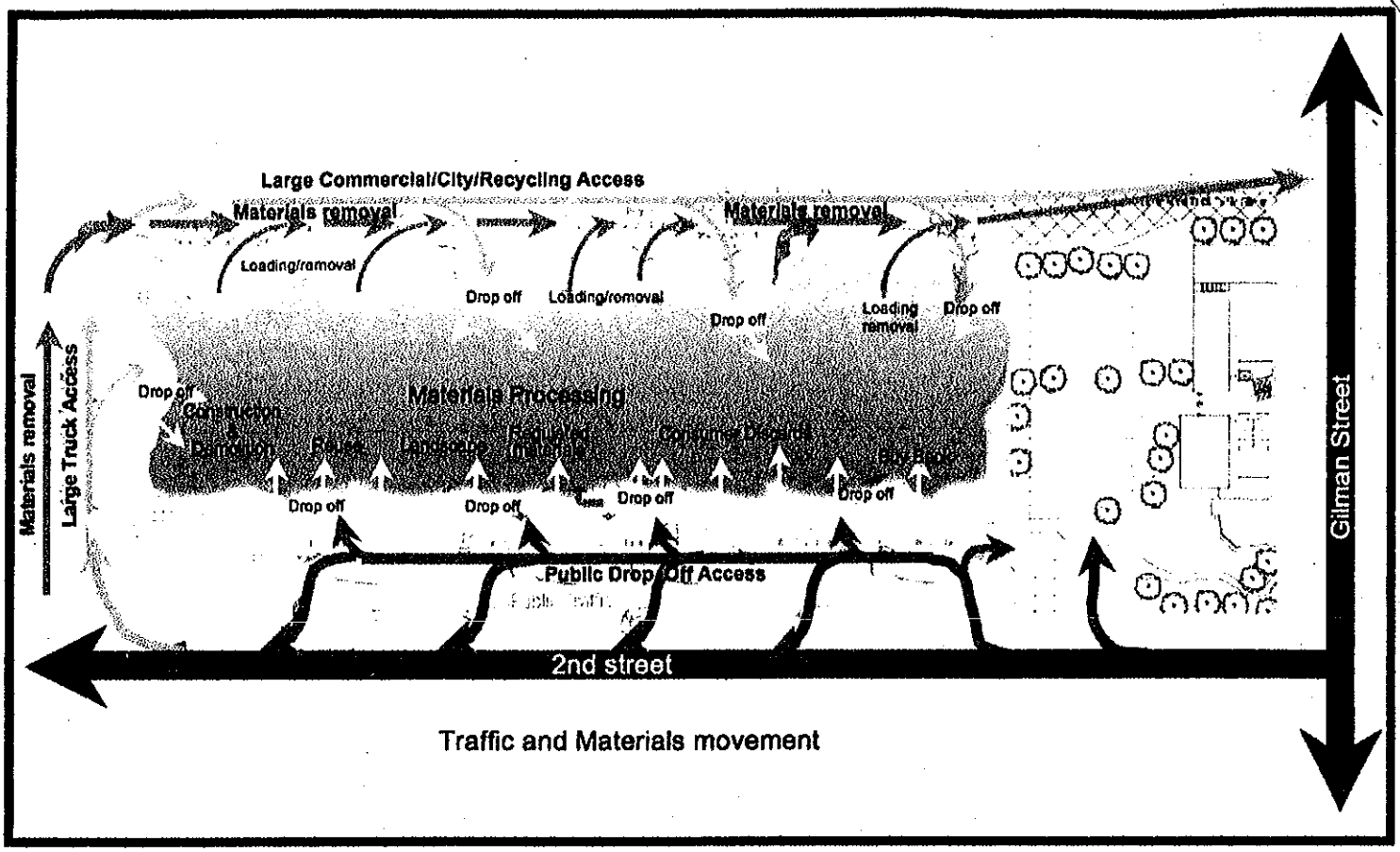
Recycling and reuse have no comparable longterm liabilities.

Recycling's advantages have intensified the resource competition. The Environmental Protection Agency says recycling is now five times the financial size of the waste industry, and growing. In my region, I have watched the cost of landfilling rise from about $15 to $110 per ton.

Recycling's opportunity to expand is



The Potrero Hills Landfill (black) wants to expand. It sits inside the protected Suisun Marsh (dark gray), the largest wetland on the West Coast. INSET: the City of Berkeley, about 30 miles southwest of the landfill. The rounded rectangle contains all industrial lands plus housing and other mixed uses. City planners want to shrink the industrial lands for "smart" growth. (Maps from public agencies.)



Berkeley has an obsolete nine-acre solid waste and recycling facility. This proposed zero-waste redesign of the recycling area shows how all 12 categories of materials would flow from the small-customer dropoff interface at the bottom, through multiple processing areas, to the commodities shipping areas at the top. Large incoming loads would arrive at the top to separate large and small traffic. The existing waste area is at the left, not shown. (Design by architects Mark Gorrell and Greg VanMechelen for Urban Ore Development Associates, 2007.)

the size of everything landfilled. All discarded resources can be divided into twelve master categories of commodities handled by today's industry. In general, the more a master category is subdivided, the more money is generated.

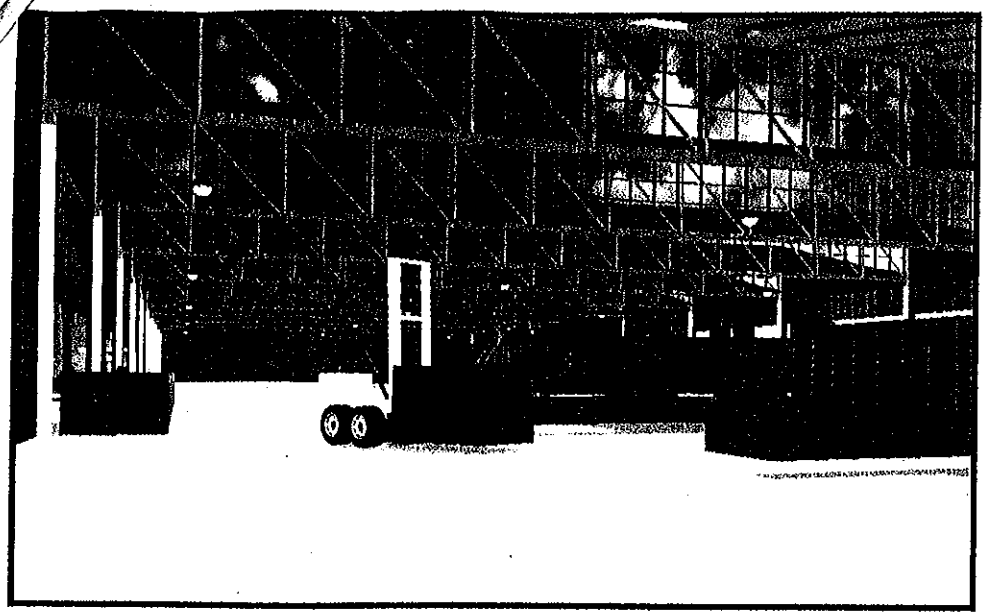
Balancing land uses and protecting resource quality

Besides full-cost pricing for wasting, the two biggest challenges facing recycling today are finding land and protecting resource quality.

Geographically, solid waste has a small urban footprint but a very large rural footprint. Old edge-of-town dumps are now parks, and rural megafills are standard. Conversely, reuse and recycling have a small footprint in the country except for compost windrows, but must occupy large urban industrial spaces. Resources have to be received, sorted, and aggregated for sale. Yard debris is best shredded at the aggregation point before transport to rural windrows. Reuse has the largest urban land requirement and needs a good retail location. It also generates the highest revenue per ton.

Unfortunately cities today are shrinking their industrial neighborhoods to favor "smart" growth, assuming domestic manufacturing is dead and letting infill take production lands. Meanwhile California's Alameda County Source Reduction and Recycling Board found that recycling-based businesses are having trouble finding sites, and cities bluntly make them unwelcome. The board found these businesses tend to own their own properties, employ many people per dollar invested, pay good wages - and need industrial land.

Another challenge is protecting resource quality. Today's municipal waste managers have conflicting mandates and internally divided departments. They develop recycling using solid-waste thinking, so they build automated systems that first mix and contaminate resources, then sort the pieces. They keep life simple by using a single contractor to recover diverse resources. Some recyclers call it developing



Urban Ore's design for a Berkeley Zero Waste Transfer Station features a long unloading area similar to an airport for maximum customer convenience and materials throughput.

the lowerarchy. Some call it a sin against Nature.

Balancing the whole resource system

Today's combined problems could be largely solved by building zero-waste parks modeled on airports, seaports, or malls. Municipally owned and managed facilities, coherently designed, could be occupied by synergistic, specialized tenants. Government's ability to manage contractors would be fused with private entrepreneurial talent that is already working and looking for more opportunity.

Resource parks would unify municipal missions and facilities with income. They would develop the hierarchy instead of the lowerarchy, encourage diversified conserving industries, condense the industrial footprint required for aggregation and processing, protect rural areas, and generate sustainable community income through conservation. The outputs would be feedstocks for domestic green businesses to make it into new products.

Feedstocks produced could include graded metals, color-sorted glass cullet, glass-free paper and other fiber, compost, and crushed concrete. End products might include topsoil, glass dishes, countertops with embedded polished glass, doors and windows, furniture, and roadbeds. Locally made products can be sold for fair prices to local markets, completing the resource loop where it matters most.

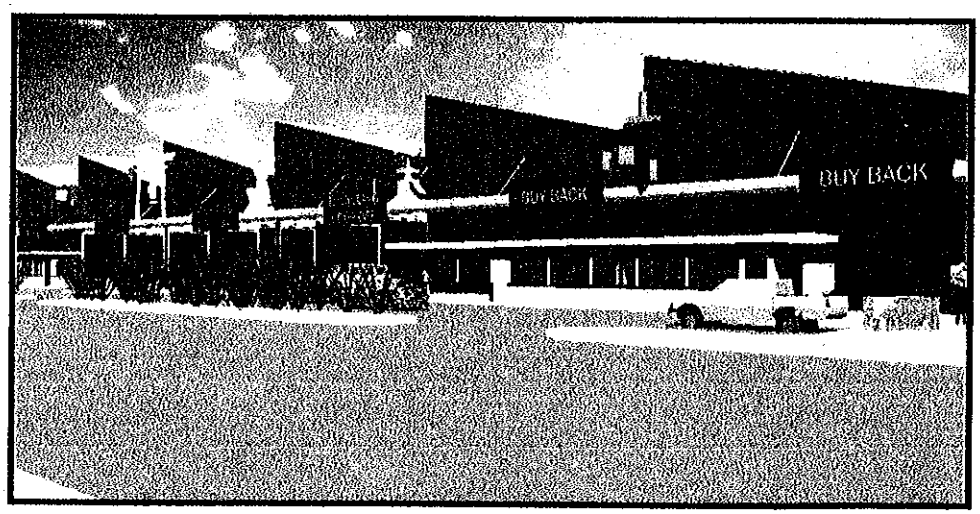
Some operations use more labor per unit of output than others. Reuse is intensive in labor and knowledge; a ceramics recycler is more capital intensive. Both can pay living wages with environmental and social justice integrated into the triple bottom line.

The wages of conservation are greenbucks. So let's make our own products again. Let's supply a rebuilding boom. Let's conserve and enhance value. Let's become genuinely sanitary. Let's build resource recovery parks and run them with resource development authorities. Let's stop all landfill expansions and stop subsidizing wasting. Let's get all organics out of landfill, and stop burning what is better composted and returned to the soil.

Let's go all the way to zero waste, and the sooner the better.

Dr. Knapp has operated Urban Ore, a zero-waste materials recovery enterprise, for 28 years. Urban Ore Development Associates (UODA) teams also design zero-waste resource recovery parks for private and public clients internationally.

This publication contains an article Professor Pliny Fisk asked Dr. Knapp to write for ARCADE magazine, whose audience is architects and designers in the Northwest. It was prepared for Urban Ore staff on June 26, 2008.



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