

Kate Harrison
Councilmember District 4

REVISED AGENDA MATERIAL

Meeting Date: November 1, 2023

Item Number: 3

Item Description: Refer to the City Manager to Enhance the City's Deconstruction and Construction Materials Management Enforcement and Regulations and Refer to the AAO #1 Budget Process \$250,000 for Social Cost of Carbon Nexus Fee Study for Berkeley Origin Construction and Demolition Debris

Submitted by: Councilmember Harrison

Converted the item from an ordinance to a referral to the City Manager and a budget referral.

Refer to the City Manager to Enhance the City's Deconstruction and Construction Materials Management Enforcement and Regulations and Refer to the AAO #1 Budget Process \$250,000 for Social Cost of Carbon Nexus Fee Study for Berkeley Origin Construction and Demolition Debris
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Since 2011, the advent of new insulation and electrification technologies make renovating or adapting older buildings more competitive in terms of reducing existing onsite carbon emissions.⁹ This ordinance-referral takes the perspective that both the carbon avoided by reusing existing materials (as in the examples above) and the carbon used in the original construction need to be considered as impacts of C&D and be accounted for in addressing the climate emergency. In other words, existing buildings represent historic expenditures of carbon and demolition needs to be seen as both destroying the usefulness of past emissions and *contributing new emissions*.

⁸ Id.

⁹ Id., p. 20

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The greenest building is the one that already exists.¹⁰ The best way to avoid new carbon emissions, and to repurpose or restore the use value of existing emissions, is to preserve and renovate existing structures. To the extent that new or additional uses are needed, e.g., converting a single-family home into a multiplex, the lowest carbon path is to maintain as much of the original structure as possible with expansions and modifications as needed. Such a strategy maintains the integrity of the historic embodied carbon, and minimizes expenditure of new carbon emissions. For example, UC Berkeley's new Engineering Center includes adaptive reuse which UC states "will significantly lower the carbon emissions of the project, including more than a 90% reduction in demolition."¹¹

A 2021 study conducted by ECONorthwest found that "conservatively speaking, residential and commercial demolitions in the City of Portland are responsible for 124,741 metric tons of CO₂ emissions per year, which amounts to approximately 4.5 percent of the City's total annual [emissions] reduction goal."¹²

¹⁰ Adam, Robert. "The Greenest Building Is the One That Already Exists." *The Architects' Journal*, 13 Aug. 2021, <https://www.architectsjournal.co.uk/news/opinion/the-greenest-building-is-the-one-that-already-exists>.

¹¹ "Engineering Center." *Berkeley Engineering*, 2 May 2023, engineering.berkeley.edu/about/facilities/engineering-center/.

¹² Oregon, Restore. "Understanding the Carbon Cost of Demolition." *Restore Oregon*, 1 Oct. 2021, <https://restoreoregon.org/2021/04/12/understanding-the-carbon-cost-of-demolition/>.

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Fight Climate Change with Restoration & Reuse

Oregon's existing buildings are among our greatest renewable resources.

THE HIDDEN COST OF DEMOLITION & RECONSTRUCTION



Renovating a 1,500 SF older home, instead of tearing one down and replacing it with 3,000 SF of new construction, reduces CO2 emissions by 126 tons.



Renovating a 10,000 SF commercial building versus replacing it with a 20,000 SF structure, which uses more energy-intensive materials, reduces CO2 emissions by 1,383 tons.

RENOVATION & REUSE PREVENT EMISSIONS



A savings of 126 tons of embodied CO2 is roughly equivalent to preventing the emissions from 44,048 gallons of gasoline.



The carbon savings for a commercial building is equivalent to preventing the emissions from 464,127 gallons of gasoline.

LOOKED AT ANOTHER WAY...



The average car uses 474 gallons of gasoline per year. Renovating just one older home, vs. demolishing/replacing it, equates to taking 93 cars off the road for an entire year.



Renovating an existing commercial structure makes an even bigger impact as its renovation equates to taking 1,028 cars off the road for an entire year.

DO THE MATH: IT REALLY ADDS UP!



From 2016-2020 in Portland, over 823 houses were demolished. That's equivalent to annual emissions from **76,480 cars!**



Over the same five years, 376 of Portland's commercial structures were razed. That's equivalent to annual emissions from **386,528 cars!**

Embodied energy is all the energy used constructing a building, including the creation of materials and building components as well as their transportation.

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City of Berkeley's Current Construction and Demolition Waste

A 2017 StopWaste Waste Characterization Study for Alameda County found that approximately 10% of Berkeley's total waste tonnage in 2016 resulted from C&D debris.¹⁴

2017 Waste Characterization Study Design
 StopWaste of Alameda County, CA

SCS ENGINEERS

Exhibit 2. 2016 Annual Waste Quantities - Adjusted

Originating Jurisdiction	MSW					C&D			Special				Unknown	Total	
	Devis Street TS	Berkeley TS	BLT Ent TS	Altamont LF	Vasco Rd LF	TOTAL	Devis Street TS	Altamont LF	TOTAL	Devis Street TS	Altamont LF	Vasco Rd LF			TOTAL
Alameda	23,417	36		344	23,796	1,283	135	1,418			355	14	369	25,583	
Albany	3,567	364		2	3,933	1,023		1,023			0		0	4,956	
Berkeley	2,091	47,014		171	76	49,352	5,269	5	5,274		432	11	443	55,069	
Castro Valley SD	INCLUDED IN Alameda Unincorporated														
Dublin	51			28,591	1,602	30,244	25	41	66		97	60	158	30,468	
Emeryville	5,873	166			16	6,056	3,051		3,051		349	2	351	9,457	
Fremont	417		156,167	2	918	157,503	229	127	356		305	347	652	158,510	
Hayward	78,374	233	7	104	1,341	80,058	20,320	190	20,510	290	1,915	264	2,468	103,036	
Livermore	100			284	58,923	59,307	88	2,063	2,151		562	601	1,163	62,621	
Newark	69		28,946	0	39	29,054	34	2	36		0	225	225	29,315	
Oakland	148,509	7,635		76	3,451	159,671	21,664	242	21,905		7,430	434	7,864	189,441	
Oro Loma SD	INCLUDED IN Alameda Unincorporated														
Piedmont	39	135			9	183	69		69		17		17	269	
Pleasanton	158			8	94,690	94,856	297	985	1,282		203	403	606	96,744	
San Leandro	31,752	213		50	39,003	71,018	5,513	10	5,523	4,231	375	389	4,994	81,535	
Unincorporated	25,713	175		756	3,236	29,879	3,471	185	3,656	358	1,164	181	1,703	35,499	
Union City	791		34,342	2	69	35,204	74	2	76		399	2,318	2,717	37,998	
Total	320,920	55,971	219,462	30,043	203,719	830,114	62,411	3,986	66,397	4,879	13,602	5,250	23,731	262	920,503

1. Removed 4,000 tons of Special Waste disposed of at Altamont Landfill from City of Alameda
2. Removed 18,800 tons of MSW disposed of at Berkeley TS from City of Berkeley
3. Removed 20,662 tons of MSW disposed of at Altamont LF from City of Newark; and removed 27,357 tons of Special Waste disposed of at Altamont LF from City of Newark

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This study predates the recent building boom associated with new local and statewide housing policies, economic developments, and COVID-19 related renovation trends. It may also not capture cross-jurisdictional disposal of waste.

A snapshot for the twelve months preceding April, 2023 suggests a substantial increase in C&D as compared to StopWaste's 2016 study. As reported through the City's Green Halo Systems dashboard, C&D waste was more than 18,000 tons, a staggering 244%

¹⁴ "Alameda County 2017-18 Waste Characterization Study." StopWaste - A Public Agency Reducing Waste in Alameda County, StopWaste, 5 Sept. 2018, <https://www.stopwaste.org/resource/alameda-county-2017-18-waste-characterization-study>.

¹⁵ Id.

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increase from 2016 levels. Of this material, the City reported that only 567 tons were reused while 2,530 tons were disposed (landfill), and 15,073 recycled.¹⁶ The distribution of materials within each distinct material category is not clear. The Green Halo dashboard summarizes overall C&D by category over the same period as follows:

MATERIAL	IN TONS	RATE
1 Concrete	10,839.63	58.74%
2 Mixed C & D Debris	4,762.22	25.80%
3 Asphalt - Pavement & Grinding	661.01	3.58%
4 Deconstructed & Reuse Items	567.24	3.07%
5 Bricks, Masonry & Stone Products	474.15	2.57%
6 Dirt/Soil-Clean Fill	320.97	1.74%
7 Metal	286.43	1.55%
8 Waste (Trash)	207.81	1.13%
9 Drywall - Clean/Unpainted	198.87	1.08%
10 Wood - Clean	136.52	0.74%

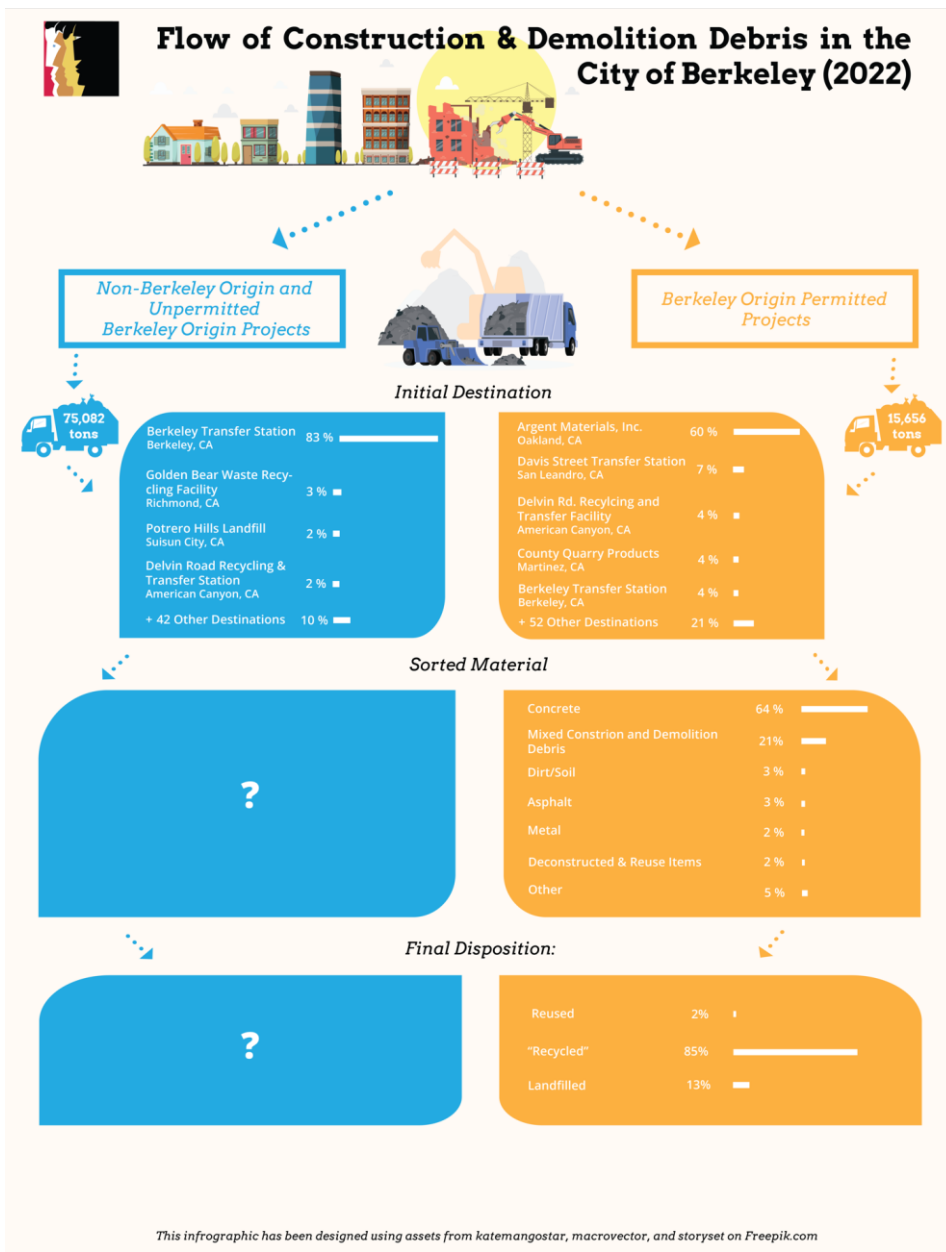
The author worked with Zero Waste staff to produce a snapshot of construction and demolition debris from Berkeley origin permitted, and non-Berkeley origin and unpermitted Berkeley origin projects for 2022:

¹⁶ City of Berkeley Recycling Center, City of Berkeley, Powered by Green Halo Systems and City of Berkeley, 5 Apr. 2023, <https://berkeley.wastetracking.com/>.

¹⁷ Id.

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City of Berkeley's Current Approach to C&D Waste

In furtherance of state law regulating C&D debris,¹⁸ the Building and Safety Permit Service Center currently maintain a "Construction Waste Management Plan"¹⁹ form applicable to the following projects:

1. Any non-residential projects requiring building permits.
2. Residential new buildings.
3. Residential projects that increase a building's conditioned area, volume, or size.
4. Residential projects valued over \$100,000.
5. Demolition permits valued over \$3,000.

Projects are asked to disclose generally which methods they intend to use to reduce waste during construction:

Construction Methods

The following methods will be used to reduce waste generated during construction:

<input type="checkbox"/>	Efficient design
<input type="checkbox"/>	Careful and accurate material ordering
<input type="checkbox"/>	Careful material handling and storage
<input type="checkbox"/>	Panelized or prefabricated construction
<input type="checkbox"/>	Deconstruction/salvage/reuse
<input type="checkbox"/>	Other: _____ 20

Applicants then complete a more detailed "Construction Waste Management Plan" through the Green Halo web platform.

In addition, the form asks for information about weight tickets for disposed and recycled materials and photos of any salvaged/reused materials. This data is then uploaded and

¹⁸ A minimum of 65% of the waste generated by construction and demolition activities must be diverted away from landfill disposal through any combination of recycling, salvage, reuse or composting. 100% of asphalt, concrete, and land clearing debris must be recycled.

¹⁹ Form #172 Construction Waste Management Plan - Berkeley, California. Building and Safety Permit Service Center, 19 Mar. 2021, <https://berkeleyca.gov/sites/default/files/2022-02/Waste%20Management%20Plan.pdf>.

²⁰ Id.

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processed via the City's Green Halo dashboard.

Diversion Documentation

Submit a Construction Waste Management Plan via Green Halo at www.berkeley.wastetracking.com. Prior to permit final, weight tickets for all materials disposed and recycled must be uploaded. Photos are acceptable for salvaged/reused materials.

Green Halo Tracking Number:

I understand the waste diversion requirements of Berkeley Municipal Code Section 19.37 and submit this Construction Waste Management Plan pursuant to California Green Building Standards Code Section 4.408.2 or 5.408.1.1.

Name Signature Date ²¹

Ordinance Referral Overview: Enforcement and Consideration of New Requirements

Drawing inspiration from neighboring jurisdictions such as Palo Alto and Portland, the proposed ordinance-referral to the City Manager moves beyond the state's simple percentage-based diversion, recycling, and reuse requirements, and towards defining specific building components that are potentially reusable and requiring a salvage survey provided by the City, a reuse organization, or other third party approved by the City. These reporting requirements would need to be met prior to the issuance of a demolition permit. The survey is aimed at itemizing the potential materials and items eligible for salvage and reuse and the estimated weights, preparing the builder for source separation, and connecting builders directly to salvaging experts who may be able to connect the builder to organizations who can accept or purchase their material for reuse. The size thresholds would remain the same as in the current statute.

This approach is more proactive than state rules, which rely on the judgment of the builder, to avoid incentivizing (1) more destructive techniques of traditional demolition, and (2) recycling instead of reuse. In addition, the City now only requires the builder to self-certify that disposed material was diverted after demolition occurs (as opposed to a detailed site survey that estimates weights before demolition occurs).

²¹ Id.

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The ordinance-referral also requires deconstruction, which is defined as “the systematic and careful dismantling of a structure, typically in the opposite order it was constructed, in order to maximize the salvage of materials and parts for reuse and recycling.”

Upon completion of the deconstruction and source separation of materials, the applicant or person responsible for the project ~~shall~~ may be required to ensure the items listed on the salvage survey are delivered to, collected by or received by, and certified by a reuse organization or other third party approved by the City, and shall submit to the City proof of delivery of salvage items in accordance with City regulations. This process creates a chain of custody of environmentally, labor, and carbon intensive resources, and incentivizes builders to prioritize designs and projects that minimize demolition in favor of adaptation.

In addition, this item includes a referral to the ~~City Attorney's~~ City Manager to conduct a nexus fee study in connection with a potential social cost of carbon fee applied to landfilled construction and demolition debris. The City Attorney's office has advised that the nexus study must be completed before the Council can consider a fee.

FISCAL IMPLICATIONS

Staff time will be needed to ~~administer and enforce the ordinance~~ implement the referrals, and to coordinate with approved salvage operations.

ENVIRONMENTAL SUSTAINABILITY

Restoring or adapting embodied carbon in buildings is significantly less carbon intensive than demolition and new construction. In instances where restoration and adaptation are not feasible, reuse of materials through deconstruction is superior to traditional demolition techniques.

CONTACT PERSON

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