IMPACT of C&D RECYCLING on HOUSING AFFORDABILITY

This proposed ordinance is based on green building requirements to divert construction materials from landfilling. In particular, this ordinance closely resembles the Construction Waste Management requirements for commercial, multifamily and Two Star single-family ratings from the Austin Energy Green Building Program (AEGB). In addition, LEED credits include similar construction material management standards. Projects currently subject to this requirement through the AEGB Program include those built Downtown (CBD/DMU), in Mueller or UNO, certified as SMART Housing, subject to PUD or Downtown Density Bonus standards.

The following Basic Requirement for AEGB Multifamily Ratings is similar to a Basic Requirement for AEGB commercial projects and Two Star rated single-family projects:

13. Construction Waste Management

Intent
To reduce construction and demolition waste destined for the landfill or incineration facilities by reusing or recycling material thus, extending the life of the landfills, and saving energy, resources, and costs

Requirement (Residential and Non-Residential Uses)
Recycle and/or salvage at least 50% (by weight) of non-hazardous construction and demolition waste, excluding excavated soil, stone, and land clearing debris. Diverted material must include at least four material streams (i.e. concrete, metal, wood, gypsum wallboard, paper and cardboard, plastic).

Required Verification
CONDITIONAL APPROVAL

- Specifications for Construction Waste Management in the contract documents
- Construction Waste Management Plan. Plan must address at minimum:
    - Anticipated waste streams
    - Four materials to be diverted from landfill
    - Hauler and landfill/recycler location for each material stream

FINAL APPROVAL

- Calculations from the AEGB Construction Waste Calculator. An updated calculator must be provided to AEGB quarterly reflecting the project's current status
- Weight tickets for all of the waste recycled, salvaged, or sent to the landfill, as requested

Because the following provisions of the Land Development Code require meeting or exceeding AEGB minimum requirements, many building projects are already diverting construction materials:

- § 25-1. Article 15. S.M.A.R.T. Housing
- § 25-2-586. Downtown Density Bonus
- § 25-2-593. Downtown (CBD/DMU)

- § 25-2-754. University Neighborhood Overlay
- § 25-2 B. 2. 5. Planning Unit Development
- Mueller

These green projects provide insight on the impact of requiring construction material diversion.

In some cases, reaching a high level of diversion requires having separate containers at the job site for landfill trash and each of the materials to recover. Most job sites, however, don't have the extra space for additional containers. In addition, keeping materials separate can require changes in material handling at the job site.

To address space restrictions and keep material handling simple at the job site, several area landfills and other material recovery businesses established processing systems for mixed loads of construction materials. Consequently, whether construction materials are ultimately diverted or not, construction crews don't have to change how they handle discards on the job site. It all goes into one box.

From that aspect, requiring diversion has little to no impact on the placement or usage of a debris box at the job site. From there, private haulers transport the material to either a landfill or processing center, most of which are located next to or near a landfill. Thus, whether the material is diverted or disposed, the hauling distance is about the same. So, this ordinance would not impact hauling distances for construction material debris.

Processing mixed construction materials can, however, cost more than landfilling. The following tip fees provided by landfills, processors, and private haulers illustrate the cost difference between landfilling and processing:

- Landfilling
    - Range: $40 to $50/ton
    - Average: $45/ton
- Mixed C&D Material Processing
    - $325 per roll-off box (for up to 6 tons in the box)
    - Range: $55 to $80/ton (4 to 6 tons/box)
    - Average: $65/ton

These figures indicate that, on average, processing mixed construction debris can cost about $20 more per ton than landfilling. Some contractors reduce this cost by collecting certain recyclables separately on the job site, particularly concrete, metal, and wood. In fact, many projects generate large quantities of these materials when removing an existing structure prior to construction.

But not every project has room for on-site separation. And not all projects have pre-construction demolition materials. Those projects would be the most impacted by this ordinance.

The following table presents typical material generation rates compiled by the U.S EPA and others. These figures are consistent with generation rates for fifteen recent Austin-area green building projects.

The table also presents estimates for the additional cost per square foot to process instead of dispose of construction materials, based.

Project Type	Debris Generation Rates*		Cost per square foot		
	H, M, or L	lbs/sq ft	100% Disposal	50% Diversion	Increased Cost
Multi-family	Low	5	$0.11	$0.16	$0.05
	Medium	7.5	$0.17	$0.24	$0.08
	High	18	$0.41	$0.59	$0.18
Single-family	Low	3	$0.07	$0.10	$0.03
	Medium	8.5	$0.19	$0.28	$0.09
	High	15	$0.34	$0.49	$0.15

* Sources

- www.stopwaste.org/recycling/business/waste-management-plans
- www.epa.gov/osw/conserve/imr/cdm/pubs/cd-meas.pdf

Essentially, these figures show that charging $20 per ton more to process rather than dispose of construction materials adds from $0.03 to $0.18 per square foot to the building costs, depending on the material generation rate. The median is $0.08 more per square foot.

The table on the next page calculates what the costs would be to divert 50% of the construction material compared to 100% disposal for fifteen recent Austin area green building projects.

ESTIMATED COSTS FOR CONSTRUCTION MATERIAL DISPOSAL AND DIVERSION
FOR SEVERAL RECENT AUSTIN ENERGY GREEN BUILDING RATED PROJECTS

Project			Actual Data					Estimated Costs			
			Tons			Diversion Rate	Generation (lbs/sq ft)	100% Disposal	50% Diversion	Increase	
ID	Type	Area (sq ft)	Landfill	Diverted	Total					$	$/sq ft
A	Multi-family	91,976	276.4	745.3	1021.7	72.9%	22.2	$45,975	$66,408	$20,433	$0.22
B		177,032	320.8	741.4	1062.2	69.8%	12.0	$47,799	$69,043	$21,244	$0.12
C		241,817	433.5	987.8	1421.3	69.5%	11.7	$63,960	$92,387	$28,427	$0.12
D		234,968	135.5	743.0	878.5	84.6%	7.5	$39,531	$57,100	$17,569	$0.07
E		292,150	303.5	506.7	810.2	62.5%	5.6	$36,459	$52,663	$16,204	$0.06
F		138,873	277.0	769.5	1046.5	73.5%	15.1	$47,094	$68,025	$20,931	$0.15
G		185,710	352.6	1092.6	1445.2	75.6%	15.6	$65,034	$93,938	$28,904	$0.16
H		297,755	466.5	483.1	949.6	50.9%	6.4	$42,730	$61,721	$18,991	$0.06
I		391,773	506.4	1507.6	2014.0	74.9%	10.3	$90,631	$130,912	$40,281	$0.10
MF AVERAGE		**228,006**	**341**	**842**	**1,183**	**71.2%**	**10.4**	**$53,246**	**$76,911**	**$23,665**	**$0.10**
J	High Rise Multi-family	287,498	186.8	1117.6	1304.4	85.7%	9.1	$58,699	$84,787	$26,088	$0.09
K		235,584	521.4	2091.4	2612.8	80.0%	22.2	$117,574	$169,830	$52,255	$0.22
L		314,263	456.4	2,238	2694.4	83.1%	17.2	$121,247	$175,135	$53,888	$0.17
Hi Rise MF Ave.		**279,115**	**388**	**1,816**	**2,204**	**82.4%**	**15.8**	**$99,173**	**$143,250**	**$44,077**	**$0.16**
M	Single-family	2,759	3.6	10.5	14.1	74.2%	10.2	$634	$916	$282	$0.10
N		3,216	0.6	8.0	8.6	93.4%	5.3	$386	$558	$172	$0.05
O		6,408	1.5	9.0	10.5	85.7%	3.3	$471	$681	$209	$0.03
SF AVERAGE		**4,128**	**1.9**	**9.2**	**11.0**	**82.8%**	**5.4**	**$497**	**$718**	**$221**	**$0.05**
ALL		**193,452.1**	**282.8**	**870.1**	**1,152.9**	**75.5%**	**11.9**	**$51,882**	**$74,940**	**$23,059**	**$0.12**