

Construction Project Wastes

Construction wastes are a big issue in most Villages. You need to know that most construction wastes are not hazardous. Some are. But construction wastes can be a problem for many reasons. And wastes that are not considered hazardous when discarded at a big city landfill can be harmful when discarded at a Village unmanaged dump site. One of the biggest headaches that construction wastes cause is the big volume dumped over a short period of time.

Selawik has adopted a policy that contractors must submit a waste plan for approval before they begin the project. The contractor must estimate the type and amount of wastes that they will generate. Selawik works with the sponsoring agency to let them know of their policy so that the requirement is included in the contract language. That way, the project contractors will know they need to plan to backhaul out their wastes, or include the costs for paying Selawik to discard non-harmful wastes in their landfill.

Here is Selawik's policy:

Native Village of Selawik - Regulation of construction & demolition waste

Before a construction project starts in our community, contractors must submit a waste disposal plan to our supervising local government that oversees the project. The plan must include a time schedule for waste generation, an estimate of the type and amount of wastes expected, and the proposed procedure for disposal. Any hazardous wastes must be shipped out at the contractor's expense. Other wastes can be discarded at our facility, stored for salvage and re-use, or shipped out.

The Selawik IRA Environmental Department (managers of our SWM program) must approve the plan and monitor project compliance. Wastes that are discarded at our facility will be subject to a per volume fee commensurate with the proportionate cost incurred for proper site closure, shortened facility life span, and staff monitoring time. Reusable wastes will be charged on a sliding scale basis, depending on their relative value to the community.

If you would like to see a contractor waste template you can use, go to the last page of this handout. Read below for how you can estimate the C & D waste expected. This way you can check what the contractor submits to you.

Estimating Wastes A competent contractor can make a very good estimate of the type and amount of waste they will generate. A waste disposal plan allows them a chance to plan. Working with the contractor (instead of against them), you both benefit. Knowing exactly what is



expected, the contractor will be much better at adjusting their bid, and being resource-conscious.

As a general estimate for how much construction wastes will be generated in a project, you can use this table:

"The Total Weight Table":

	Residential Construction (pounds/square foot)	Non-Residential (pounds/square foot)
New Construction	4.38	3.89
Renovation	Varies	17.67
Demolition	115.00	155.00

(Source: Franklin Associates, "Characterization of Building-Related Construction and Demolition Debris in the United States," U.S. Environmental Protection Agency, Jun. 98, p. 2-2, 2-3, 2-6, 2-7, 2-8, 2-9, 2-10, and A-5.)

Note: "Square feet" is an area measurement. Multiply the width and length of the house (or room), and that is your "square footage". A 10 foot wide by 8 foot long room would be 80 square feet.

Total Weight Table Example: If a 1,000 square foot house was constructed, an average of 4,380 lbs (i.e. 1,000 x 4.38) of waste would be generated.

**Did you notice how much more waste is created for a *DEMOLITION PROJECT*??
These are the projects that will really fill up space.**

What general types of material is in there?

The following table will help you with planning or how much of the waste your community can salvage, how much you can leave in the landfill, and how might want removed.

"The Percent Weight Table": Average percent by weight of construction waste types (nationwide)

	Wood	Drywall	Metals	Concrete	Plastics	Other
Residential						
New Construction	53%	19%	2%	9%	2%	15%
Renovation	37%	31%	3%	5%	<1%	24%
Demolition	33%	10%	4%	27%	1%	25%
Non-Residential						
New Construction	31%	23%	10%	33%	3%	0%
Renovation	28%	22%	19%	22%	3%	65
Demolition	21%	10%	7%	53%	3%	6%

(Source: Franklin Associates, "Characterization of Building-Related Construction and Demolition Debris in the United States," U.S. Environmental Protection Agency, Jun. 98, p. A-10 to A-16 and the Author.)

Percent Weight Table Example: From above, your 1,000 square foot residential new construction house will generate about 4,380 pounds of **total** waste. What if you wanted to know how many pounds of **wood** that would be?

From the Table in the first column, you can see that residential new construction projects generate about 53% of their waste weight as wood.

$$53\% \times 4380 \text{ lbs of total waste} = \mathbf{2,321 \text{ lbs of wood.}}$$

If your building was a commercial building (like a store), you would use the non-residential new construction numbers from both tables. The equations are below. See if you can find the bolded numbers from the tables and then do the calculations. If you can, you are ready to estimate any new projects!

$$1000 \text{ sq ft} \times \mathbf{3.89 \text{ lb/sq ft}} = 3,890 \text{ pounds of total wastes}$$

$$\mathbf{31\%} \times 3890 \text{ lbs} = 1,206 \text{ lbs of wood would be expected.}$$

Decision-making Time The large bulk of construction wastes will not harm you or your environment. It is a concern for many villages only due to space available. Also, someday you might want to close your dump. The larger the dump, the more the closure costs. That is why landfills in the cities charge a lot for C and D wastes. And you can too.

You can set different fees for different types. Wood is really useful, so you might not want to charge the contractor anything for that. Drywall (assuming no lead paint) and concrete is basically harmless. Metal pipes and other scrap metal is worth something if you can arrange for free backhaul - especially copper and aluminum. If not, it is not harmful to the environment, and takes a very long time to degrade. So you can take 10 or 20 years to plan for a backhaul. If your dump is unmanaged and not covered, you might not want plastics around because they can catch fire and cause toxic smoke. However, the percent of plastics added by construction projects compared to what is added by your community is small. So the additional risk is not large.

The "other" category is a place to watch out. It will depend on the project. A lot of harmless materials are in the "Other" category, like glass, ceramics, cardboard, and workers' lunch garbage. But there are also wastes that might cause problems, especially if it is a demolition project. These projects are likely to generate electrical wiring, mercury thermostats, fluorescent lights, etc. If the walls are painted, they are likely to contain some lead based paint, which was very common in the 1970's and before that. All of these should be removed, unless you have a use for the electrical wiring. See below for a list of common hazardous wastes.

You don't need to charge fees at all, especially if the project is beneficial. But be sure you include your donation of landfill space and additional future cost of closure as a leveraged in-kind cost to the project. Also, be sure you have the space, and the wastes are not hazardous. For space, cardboard, drywall, and wood will eventually disintegrate or be salvaged, so they won't take up as much space in the future. Otherwise, the wastes need to be hauled out.

But what about volume?

Why are waste generation rates always given in weight?? It is because a pile of garbage weighs the same no matter what. But the same pile of garbage takes up a very different volume depending on whether it has been compacted or spread-out. It is frustrating because for Villages, it is the volume that is usually the biggest concern for construction (and most other) wastes. The following table give a very rough estimate for volume of wastes.

The "Volume Table": Rough Average Estimate of Percent Volume for New Construction

	Commercial	Residential
Predominant Materials (10% or greater)		
Wood	20-30%	20-35%
Concrete and block	10-20%	<i>see secondary list</i>
Drywall	5-10%	10-20%
Cardboard	5-10%	5-15%
Secondary Materials (less than 10%)		
Steel from decking, re-rod, etc.	1-8%	
Shingles	--	1-8%
Brick	1-5%	
Concrete	<i>see primary list</i>	1-8%
Crates and pallets	1-5%	
Extruded polystyrene (rigid) insulation	3% range	
Fiberboard	--	1-8%
Kraft paper packaging	3% range	
Plastic sheeting and bags	3% range	
Electrical wire	2% range	
Overspray from fireproofing products	0-5%	

(Source: Innovative Waste Management, "Construction Materials Recycling Guidebook," Mar. 93, p. 4-5.) For greater detail in Residential construction waste volume, see Appendix B in <http://www.p2pays.org/ref/24/23088.pdf>

See how much volume the cardboard takes up? It is part of the "Other category" in "the Weight Table" because it doesn't weigh much. Remember, your contractor will likely give you weight estimates. If they give you volume measurements, ask how they calculated them. Baled cardboard takes up very little space compared to loose boxes. If you don't have a baler, you will never get the cardboard volume very small.

Volume Table Example:

If your contractor estimates they will generate 20 cubic yards of waste for a residential construction project, then you can assume that about 1-8% of that total will be concrete.

$$1\% \times 20 \text{ cu yd} = 0.2 \text{ cu yd} \text{ and } 8\% \times 20 \text{ cu yd} = 1.6 \text{ cubic yards.}$$

So you would expect 0.2 to 1.6 cubic yards of concrete from the project.

Conversions - Be Carefull!

You can only use the percent volume if you know what the volume of waste will be. You can't multiply the percent volume by the total weight.

Here is a table for **converting volumes to weights or weight to volumes**. These volumes are "as generated" volumes - which is what you want when you are deciding how much they will fill up your dump. The numbers are what is called a "specific weight". A specific weight tells you the weight of a material in a specific volume.

"The Material Conversion Table": New Construction Waste as generated.

Waste Type	To convert to volume:	To convert to weight"
Wood	6.7 cu yd./ton	300 lb/cu yd
Cardboard	20-50 cu/ton	30-100 lb/yd
Drywall	5 cu yd./ton	400 lb/cu yd
Rubble	1.4 cu yd./ton	1400 lb/cu yd
Mixed Waste	5.7 cu yd./ton	350 lb/cu yd

*Source: US Army Corps of Engineers, Construction Engineering Research Laboratories, "Concepts for Reuse and Recycling of Construction and Demolition Waste", USACERL Technical Report 99/58 June 1999

Material Conversion Table Example:

Let's go back to the 1,000 square foot house. We calculated that 4,380 lbs of total waste is generated from "the Total Weight Table". From "The Percent Weight Table", we also already calculated that 2,231 lbs of wood would be generated.

We want to know the volume of wood generated. So, look at the second column in the above "Material Conversion Table". It says "6.7" cubic yards per ton of wood waste.

First change the pounds (lbs) into "tons". Tons is a normal unit when talking about garbage. Just divide the pounds by 2000.

$$2,231 \text{ lbs of wood} \div 2000 \text{ lbs} = 1.1 \text{ tons of wood.}$$

Then take the 6.7 cubic yards that make up one ton, and multiply by how many tons you have:

6.7 cu yd/ton X 1.1 tons = about 7.5 cubic yards of wood are generated.

Remember, if your contractor gives you much different numbers than what you estimated from these tables, you can ask now them why!

Hazardous Construction Materials

Often, with construction wastes, it is the hazardous materials with which to be most concerned, and not so much inert waste like concrete or organic waste like wood (as long as you have the space).

To know: It is illegal already for Projects to discard federally or State-defined "regulated hazardous wastes" at your dump.

To also know: The definitions and exemptions of what is a hazardous waste are complex. If you want an interesting headache, see <http://www.epa.gov/osw/hazwaste.htm> for the actual regulations. Considerations include volume and pollution levels, and a lot of miscellaneous exceptions. This means that some wastes that can be harmful to your community and lands *can* be left at the dump. But if you have a contract or ordinances that specify which wastes you will allow, these wastes *can't* be left.

So it always better to be safe. Have a contract that specifies relevant characteristics of your dumpsite, such as "unlined, floods regularly, no cover, and occasional accidental fires". Then state that the contractor must remove any wastes that can be significantly harmful to the environment, subsistence resources, or health of the community, regardless of whether they meet the federal definition of "hazardous waste". Any exceptions can be stated in the contract. If you write into the contract that your dumpsite is unlined and frequently-floods, it makes it very difficult for the contractor to claim they didn't know that contaminants could move off-site.

The most common hazardous C and D wastes are:

- Asbestos Containing Building Materials (ACBMs).
- Lead-based Paint (LBP).
- Poly-chlorinated Biphenyls (PCBs).
- Batteries containing lead and cadmium.
- Mercury.
- Chlorofluorocarbons (CFCs).
- Treated Wood.
- Miscellaneous (e.g., fluorescent lights, thermostats).

You can list these wastes as an example of wastes that must be removed in your contract with your contractor. For some of these wastes, there are certain quantities, concentrations, or types that trigger action levels for federal regulations. Then the



contractor is required to remove them no matter what your contract says. For example, walls with old lead paint may or may not all fit the federal definition of hazardous, depending on how much of the paint and lead is on the wall.

Remember, if you prohibit the disposal of these materials at any level above "no concern to the community", you won't need to worry about the action levels. Remember the federal action levels were determined partly based on the assumption that the wastes would go to a lined landfill and never be open-burned.

Containers: What Is "Empty"?

One example of a hazardous waste not being regulated is the "residual" hazardous waste left in empty containers. Federal law defines when a container is considered empty. It allows a very small amount to be left behind in the container because it can be difficult for the user to get it out.

For most hazardous wastes in a village construction project, a container is empty if:

1. **All waste possible has been removed** using the practices commonly employed for the container type, e.g., pouring, pumping, and aspirating, **AND**
2. **No more than one inch of residue** remains on the bottom of the container or inner liner.

OR, you may apply the percent weight rule:

Containers smaller than 119 gallons: No more than 3 percent by weight of the total capacity of the container remains in the container or inner liner

Containers larger than 119 gallons: No more than 0.3 percent by weight of the total capacity of the container remains in the container or inner liner

OR

For compressed gas: a container is empty when the pressure in the container approaches atmospheric.

For "**acute hazardous wastes**": These are the worst hazardous wastes. These aren't very common in village construction. But you can find out by asking the contractor to list all the hazardous materials that they are using. The empty rules for "acute hazardous wastes" are much more strict and complex. Go to <http://www.epa.gov/epaoswer/osw/laws->

[reg.htm#regs](#) and click on Part 261 under the heading "Hazardous Waste Regulations". Then click on 261.7 "Residues of Hazardous Wastes .

The Bottom Line on Empty: Residue from "empty containers" is still hazardous waste. But it is okay under federal and State law to landfill. If you have a lot of containers, it can add up. Under the 3 percent rule, it takes about 34 containers to make a full container of hazardous waste. Just the sight of the containers can be of concern to residents. If you write up a contract and require a waste plan, you can say what to do with the containers. It may depend on where you dumpsite is, and if it gets flooded. You might allow containers to be discarded in your contract, but require an inspection to make sure they are as empty as possible. If you're not sure what to do, talk with your contractor, the State, or EPA. Between everyone, you can decide the plan that makes the most sense.

What Are Other Communities Doing?

To manage Project hazardous materials, the Native Village of Venetie has a good Ordinance and Contractor Notification Program that they actively enforce.

Lance Whitwell, a highly regarded environmental professional from Venetie, wrote he used to do:

.....I will require the contractor to give me a haz mat list that they are bringing, then I make them sign off that they have received and read our ordinance, and they agree that all employees of the project will abide by the ordinance. This would also include leak prevention, and response plan. Before the project is over, or before we sign off on the project, They must give me back a listing of all haz mat used, and if any containers were disposed of, where was it put, if there is anything left they will be given the opportunity to leave it with the council if they want or can use it for anything, other wise, the contractor must backhaul it. ...

Other Villages such as Koyukuk, Aleknagik, Evansville, Iguigig, and Pedro Bay have asked local construction companies and/or their utility, or utility cooperative, to take responsibilities for the wastes that they bring in and clean them up or ship them out.

Here are some more tips that we've learned in our research (which included asking agencies):

1.

PRE-PROJECT ACTIONS - CONTRACTS AND TALKING

Always, always try to get waste disposal stipulations in a contract - up front.

If you have it in a written contract, you don't actually need an ordinance. The one exception would be if your contract had something in there that was illegal, and the contractor could get out of it that way.

To get what you want in the contract, you need to get involved in the project as soon as possible. And we mean from "Day 1" that you find out about a project in your community, regardless of whether the project is a public project, or a private business.

Different agencies work different ways. It is easier to work with some funding agencies than others. For example, with State projects you might not have a lot of say about who gets hired - it will generally be the lowest bidder. With BIA 638 contracts, you have pretty much all the say about who gets hired, as long as you follow guidelines.



Regardless, you have the right to work with your funding agency on what your community needs. Generally, **there will be a project officer** or project manager or community liaison **assigned to work with your community** on an agency project. **Talk to this person as soon as you can, and talk to them often.** Let them know that you want to insert waste management policies in the contract. Tell them first, and follow that up immediately with a formal letter from your Tribe or City (or both) that repeats what you said, and that contains the details of what you want in the contract.

Hazardous waste that is regulated under Subtitle C of RCRA is supposed to be removed under federal (and State) law and discarded properly as hazardous waste. Thus, some agency personnel who are not familiar with villages might think that leaving the rest of the wastes is okay for your community. Agency personnel are like most anyone else, they want to do the right thing. Let them know why addressing all construction wastes in the contract is something that your community must have. Unless they have visited villages a lot, they may not realize that some wastes left behind can become hazardous if they are burned when the dump catches fire, or the volume can be so big that they can expand the landfill so that it goes into the river or town, or blocks access so that people end up walking on wastes or dumping their wastes elsewhere. Even when the waste is not hazardous, it can be concerning to residents to not know what the waste is and how much is being left. The concern of pollution itself can be enough to change some peoples' subsistence activities. A contract that asks the contractor to explain the wastes and get approval for which wastes she leaves behind can lessen these concerns.

Timing is everything on these projects. The language has to be inserted into the "Request For Proposal" (RFP) to "Solicitation to Bid" before it goes out to bid. Otherwise, contractors will not know to account for the extra waste disposal costs. Although it is changing, be prepared. Agency personnel may not be used to communities providing them contract language. They may not feel they have the time to do this, or may think that the project could be delayed. But in the end, it is your community's project and your responsibility to work with the agency so that they understand.

The Ugly Fact Then there is the case that was very common in the past. Contractors have left even the federally defined hazardous wastes at the dump, against federal law. Sometimes when this happens they even do it with full knowledge that the waste is harmful and they are violating the law. A contract and a waste policy up front will help prevent this situation from ever happening again in villages. That, and monitoring by the environmental staff that the contractor is keeping to their promise. You are in a great position to really help your community by ensuring the waste that can harm your community is taken out, and the waste that is left in your community brings in revenue (by charging for it) or another benefit.

ADEC Letter to Contractors The ADEC Solid Waste Program recognized that some contractors might not know the law and a letter from the state could help. You can send or give this letter to the Project Contractors -- ideally before any final bids and plans have been done. A little legal nudge might help! Go to: <https://dec.alaska.gov/media/sqbdssav/contractor-letter.pdf>

If you feel you still are not getting anywhere with your project contact, look for someone else to talk with. Contact either the Civil Rights office or the Native American or Tribal liaison of the agency that is funding the project. This is a person or a whole program devoted to ensuring the interaction between American Indian Tribes and Alaska Native Villages goes smoothly for their agency projects. They are a friendly advocacy office when all else fails. Each agency has one, and there are too many to list or keep up with. But google "Native American Liaison" and the name of the state or federal agency, or try "Tribal Liaison". If you can't find the correct person, call or email us at 907277 2111 or info@zendergroup.org and we can help.



2. ORDINANCES

Ordinances provide a legal backup insurance to get construction wastes out of town. If they are in effect, the contractor needs to follow them, regardless of what is in the contract. However, if the contractor is not aware that you require all construction wastes to be removed (or otherwise treated differently), they might decide to leave the wastes anyway. With good lawyers, they could even succeed in avoiding any penalties. And if you are a Tribe, your Council must make a hard decision to get involved in a jurisdictional authority case. Many Tribal advocacy lawyers and scholars believe this is a time period to avoid jurisdiction cases. Where Tribal jurisdiction is involved, the cases can take up much more significance than with City jurisdiction. And they are likely to be long and costly.

How to solve this? If you pass waste ordinances, **be sure to provide every agency and every potential and awarded contractor a copy of them.** That way, they know what to expect.



Also, remember, **to be legal, ordinances must be fair.** This means that they must apply equally to all contractors. If you provide free-of-charge disposal for lumber wastes, then you must provide that to all construction contractors, (not just the ones you like!)

You can use **"traditional justice"** and project contracts in place of ordinances. This allows the Tribe to use its traditions and values to determine how the wastes are discarded. For example, if the wastes are determined to be a threat to subsistence or health, for most tribes that would be against traditional unwritten laws that have been in place for thousands of years. Tribes have clear civil jurisdiction over tribal members. With non-member contractors, always use a contract. If you have a City, the City can pass ordinances that adopt the traditional value-based policies that the Tribe uses. See <https://zendergroup.org/oldsite/ordinances.htm> for more ordinances and examples of traditional justice resolutions that cover waste disposal. For a "primer" on how traditional governance could work, go to <https://zendergroup.org/oldsite/docs/overview.pdf> . For a good example of a solid waste ordinance that covers nonlocal construction projects, go to <https://dec.alaska.gov/media/6135/ordinance-template.docx>. Remember though -- always adopt a template to what you decide. What is an appropriate fine for project contractors, do you want a specific waste plan from them, do you want the opportunity to have them pay for landfill use?

3. SITE-SPECIFIC PERMIT

DEC offers a site specific permit process for construction projects in your Village. The contractor or agency can apply for a permit to essentially make their own landfill for up to 1,000 cubic yards of construction wastes. The landfill and its project-specific closure must be compliant with State law. A permit is written up that states a list of condition with which the contractor must comply. As a local government or concerned community member, you have the right to work with the state and contractor to provide your suggestions and concerns when the permit is written. This process can work to your advantage if you want to collect fees for construction waste disposal, but don't want your community dump filled up. In this case, you would apply for the permit, or you would lease the land for the contractor to apply for the permit.



There is also a disadvantage to be aware of. If you refuse waste disposal at your dump, the contractor can apply for the permit without your permission. The limitations are that:

1. They still can't discard wastes that are "regulated hazardous waste's" under Federal Law, and
2. The landfill must be on land controlled by the applicant. If the applicant (the contractor, agency, Village, City) etc. does not control the land, **they need written consent by the landowner, a lease agreement, or a land use authorization.**

So if the contractor can't find any land where a landowner lets them have their landfill, they are back to Square 1. They will have to backhaul their wastes or pay you a disposal fee to use your landfill.

The construction waste permit application is at:
<https://dec.alaska.gov/eh/solid-waste/permitapps/#1-times>

Remember, DEC Solid Waste Program developed this permit to *help* villages with their construction wastes. They are aware of the construction waste problem in villages. If you think this site specific permit can help you, or you are having problems with it because the contractor isn't complying with the conditions specified, you should call DEC staff. They can help you sort out what to do. Don't know who your DEC solid waste staff person is? Go to <https://dec.alaska.gov/eh/solid-waste/waste-in-rural-alaska/rural-contacts/>

4. Ask us for Help

If you are still struggling with C& D wastes, give us a call at 907 277 2111 or email info@zendergroup.org and let us know what problem you are trying to solve. We can help.

Example of Submitted Project Waste Plan from A Contractor to the Tribe.

General Waste Type <i>All hazardous or potentially hazardous wastes must be listed, regardless of quantity.</i>	Projected "as generated" volume in cubic yards, or lbs if more applicable.	Detailed description of waste type and salvage condition (e.g. copper sheathed wiring, broken gypsum wall board)	Proposed disposal (landfill, backhaul, salvage, potential salvage, used oil burner, antifreeze recycler, other)	Estimated Time period of disposal (start and end dates) and whether continuous or infrequent generation	Fee to be paid to per yard, or provided unit (if any).
Wood	5 yards	Scrap lumber	Salvage	Throughout project period	None
Concrete, blocks	1 yard	Typical	Landfill	First 4 weeks of project	\$200/yd
Electrical	<0.1 yard	Wiring, circuit boards,	Backhaul	First two weeks of project	NA
Batteries	500 lbs	Non-oil based.	Backhaul	Throughout project	NA
Paints	50 5-gal empty containers		Landfill	Last 3 weeks of project	\$3/container. Residual paint must be dried before disposal.
Etc.					

Additional conditions by Contractor:

Additional conditions by _____ Environmental Department: When ready to discard any Empty Containers that contained hazardous wastes approved for landfill, the contractor must notify the Environmental Department to allow inspection of the containers before disposal. The containers must meet or exceed the federal definition of "Empty Containers" as defined in CFR Part 261.7.

Approved By Native Village of _____ by _____ on _____.
Title Date

Approved by City of _____ by _____ on _____.
Title Date