



How to Estimate Abatement Project Costs for PCBs in Building Materials

Prepared for:

Puget Sound National Estuary Program

Submitted by:

Hazardous Waste and Toxics Reduction Program
Washington State Department of Ecology
Olympia, Washington

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Related Information

- Ecology's Publication 21-04-030: [Focus on: PCBs in Building Materials](#)¹
- Ecology's Publication 22-04-024: [How to Find and Address PCBs in Building Materials](#)²

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¹ <https://apps.ecology.wa.gov/publications/SummaryPages/2104030.html>

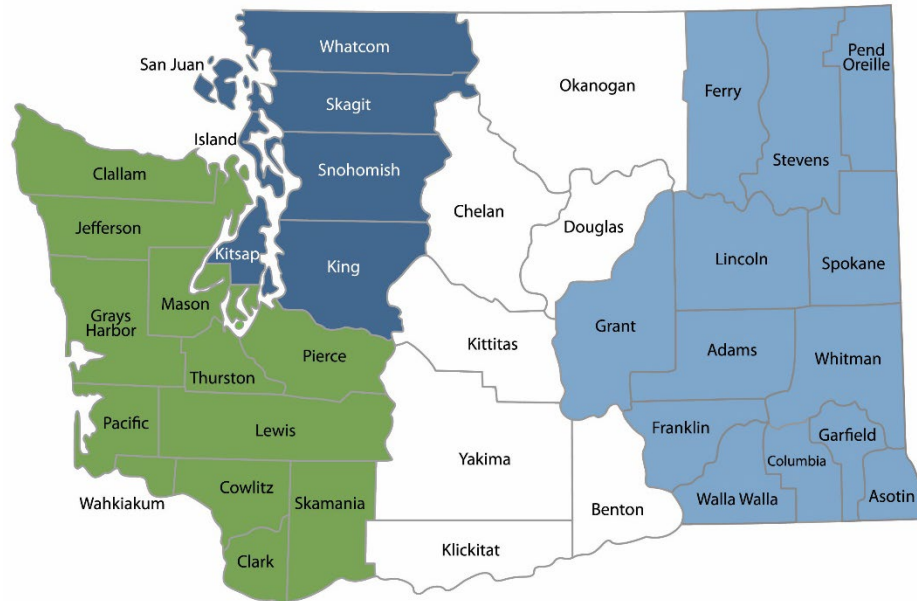
² <https://apps.ecology.wa.gov/publications/SummaryPages/2204024.html>

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Northwest Region
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Central Region
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Northwest	Island, King, Kitsap, San Juan, Skagit, Snohomish, Whatcom	PO Box 330316 Shoreline, WA 98133	206-594-0000
Central	Benton, Chelan, Douglas, Kittitas, Klickitat, Okanogan, Yakima	1250 W Alder St Union Gap, WA 98903	509-575-2490
Eastern	Adams, Asotin, Columbia, Ferry, Franklin, Garfield, Grant, Lincoln, Pend Oreille, Spokane, Stevens, Walla Walla, Whitman	4601 N Monroe Spokane, WA 99205	509-329-3400
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DEPARTMENT OF
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State of Washington

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Introduction

In 2022, the Washington State Department of Ecology (we) published a guide ([How to Address PCBs in Building Materials](#)⁵) to help property owners, developers, and contractors identify and abate (remove) external building materials that contain polychlorinated biphenyls (PCBs) during their demolition or renovation projects.

PCB abatement costs during demolition or renovation can vary widely. Major costs include:

- Potential planning and reporting.
- Operational best management practices (BMPs) to protect the surrounding environment, such as stormwater.
- Structural BMPs to protect the surrounding environment.
- Sampling, analysis, and reporting.
- Demolition and/or renovation.
- Waste separation, disposal, and transportation.

We worked with Pacific Rim Environmental, Inc., a local environmental consulting firm, to develop the PCB cost estimate worksheet ([Appendix A](#)). We designed it to help building owners, developers, and contractors broadly estimate PCB-containing building materials when following the process we outlined in the [guide](#).⁵ This will allow you to plan and budget for your projects before you begin.

This publication's sections explain:

- How to use the worksheet (instructions).
- The tool's assumptions.
- The tool's limitations.

Please note: The U.S. Environmental Protection Agency (EPA) has regulatory authority over reporting, recordkeeping, testing requirements, and other restrictions relating to chemical substances under the Toxics Substances Control Act (TSCA). This costing publication is based on major elements of work under these regulations. We defer to EPA for final input on what actions you may need to consider in order to meet TSCA requirements.

We collaborated with Pacific Rim Environmental, Inc. to develop this publication. They based cost estimates on their extensive experience bidding and implementing PCB abatement projects in Washington state.

⁵ <https://apps.ecology.wa.gov/publications/SummaryPages/2204024.html>

Instructions

The PCB Cost Estimate Worksheet ([Appendix A](#)) provides a framework to estimate costs related to identifying and addressing PCBs in external building materials. This spreadsheet has three worksheets:

- **Index page:** brief details about the spreadsheet to help you navigate through it.
- **PCB cost estimate worksheet:** a framework with fillable fields where you can enter data to estimate your project's costs.
- **Glossary:** definitions and terms used in the worksheet.

How to use the PCB cost estimate worksheet

The PCB Cost Estimate Worksheet includes cost elements to identify and abate PCBs in building materials when you follow the processes we described in our guide, [How to Find and Address PCBs in Building Materials](#).⁶ Please read that guide before continuing with this cost estimate.

The PCB Cost Estimate Worksheet includes six tables related to various stages of a potential PCB abatement project.

Tip: To make sure you have the correct measurement type, select drop-down list choices from left to right. If you change a material type after selecting quantity range:

- Change the quantity range to **Select**.
- Change the material type in column A.

Table 1: Cost estimate summary

This is a summary of costs from Tables 2–6 and a final project total. You don't need to modify anything in Table 1 because the details are pulled from the other tables.

Table 2: Potential plans and reports

Look through the plan and report names, and select **yes** for each one you plan to develop.

Please note:

- The facility's owner must have both:
 - The appropriate plans and reports to safely handle PCBs.
 - The appropriate permits and work plans for the renovation or demolition project.
- If you decide to conservatively manage building materials as if they contain PCBs and will not be performing sampling, then don't select **yes** for the sampling plan row.

⁶ <https://apps.ecology.wa.gov/publications/SummaryPages/2204024.html>

Table 3: Best management practices

Select the necessary BMPs for your project.

- In the **awareness training** row, enter the number of staff who will receive this type of training in the **project size / unit #** column.
- In the following rows, select the project size in the **project size / unit #** column to generate the average 2022 industry standard cost.

Table 4: PCB sampling, analysis, and report expenses

If you choose to sample suspect building materials (rather than assuming PCBs throughout), work through Table 4. If you aren't sampling suspect materials, skip to Table 5.

- Select the suspect building materials in column A.
- Once you choose the material, the unit of measurement will auto-populate in column B.
- Select the estimated quantity range of that suspect material in column C.
- The required minimum number of samples (described in the [guide](#)⁷) will auto-populate in column D.
- The total cost of the laboratory analysis will auto-populate in column E. It's based on the average price of a standard turnaround analysis (for example, not rushed).

Table 5: Demolition/renovation expenses

- Select the quantity range for the corresponding PCB materials, as it relates to your project, in column C.
- The average estimated hours and costs for abatement of these materials will auto-populate in columns D and E.
- Taxes, insurance, and contingency costs will be taken into account in column E.

Table 6: Waste disposal and transportation expenses

Select the same materials and quantity ranges that you entered in Table 5. The worksheet will convert unit measures into an estimated volume and cost for disposal in column E.

⁷ <https://apps.ecology.wa.gov/publications/SummaryPages/2204024.html>

Assumptions

Pacific Rim Environmental, Inc. used many factors to develop the PCBs Cost Estimate Worksheet. They considered costs at 2022 industry standard rates and five key elements. Then they averaged costs for each element based on quantity ranges to simplify the estimating tool. While this allows for a simplified worksheet, it limits the estimate's accuracy.

All specialty contractors or trained professionals have minimum project costs to perform the various stages of PCB work. The average industry minimums have been considered for this as a basis for the minimum project size range costs used throughout the cost estimate tool to portray actual costs for the work to be performed, even if the quantity was very limited. There are many factors to be included in a cost estimate beyond the material being sampled or abated.

These are the five key elements and the assumptions that fed into each cost estimate.

Labor

These were based on 2022 union laborer wage rates. They also included state tax, federal tax, and benefits.

Costs included:

- Mobilization of equipment and staff.
- Worker time, including a **non-working foreman** as a competent person for up to 10 workers:
 - Reviewing and verifying the scope of work or specifications of abatement work. This includes confirming the types of material to abate and quantities.
 - Setting up areas for containment, protection of surrounding components (including catch basin protection, straw berms and stakes), and worker and equipment decontamination.
 - Removing, separating, and packaging waste for disposal. This includes removal rate by skilled and trained workers.
 - Final cleaning and encapsulation (lockdown).
 - Tearing down protection and cleaning tools.
 - Disposing of PPE.
 - Preparing waste for disposal.
 - Coordinating waste hauling.

Materials

These were the estimated total material costs, found by estimating the total number of units over the course of the project.

For this estimate, we based units on the expected material costs during an 8-hour shift. We considered the following typical materials part of unit estimates and included applicable Washington State Sales Tax (WSST).

Costs included:

- Typical number of **boots, eyeglasses, gloves, and Tyvek** suits used per day of abatement work.
- Dimension of the work area to determine the amount of **plastic sheeting** to protect the surrounding area.
- Total number of necessary **duct tape rolls**.
- Number of **HEPA units** required based on dimensions of the work area and **filters** needed per units and/or shifts.
- Gallons of necessary **encapsulant** to cover work area.
- **Small tools for removal/abatement work.**
- **This estimate doesn't** include the specialty tools, such as:
 - Additional scaffolding.
 - Lift.
 - Generator.
 - Specialty tools.
 - Saw-cutting equipment.
 - Other specialty equipment for unique projects.
- **Stormwater protection materials, initial set-up and upkeep costs for maintenance,** including during construction or long-term stormwater protection.
- Types of **stormwater protection materials** used for costing, such as:
 - Filter fabric.
 - Straw berms.
 - Stakes.
 - Limited silt fences.
 - Drain socks.

Disposal

These costs were provided by reputable disposal vendors' input with several years of costing experience. Disposal vendors considered the following as part of their cost estimates:

- Transportation to proper disposal landfills.
- Current disposal rates at approved EPA landfill.
- TSCA bulk waste management only.

Contractor markups

Contractor markups are industry standards included to account for specialty contracting. PCB abatement work is specialty contracting because it's not currently routinely completed.

WSST was included in the estimates and is required for all contractor services. These costs include:

- Raw cost of all labor plus a 30% markup for overhead and profit.
- A 20% markup on all subcontractor costs.
- A 20% cartage fee for the cost of acquiring and delivering materials to a job site.
- A 20% markup on the combined cost of materials and WSST.
- A 5% markup on insurance costs for general liability and pollution liability.

Contractor license bond costs **weren't** included.

Other considerations

The estimate didn't consider:

- Utility costs including water, power, solid waste disposal, heating, cooling equipment, vacuum trucks, or other utility related activities.
- Building height, which can affect cost of lifts, fixed frame scaffolding, or swing stages to access work areas.
- Removing obstructions to access PCB-containing materials.
- Sidewalk and street use permits.
- Demolition and construction permits (such as city construction permits or Construction Stormwater General Permit).
- Delays or site modifications resulting from weather-related issues (such as wind, cold, and heat).
- Tenant, staff, and the public's security.
- Limited work hours, including noise restrictions.

Limitations

The primary limitations to the PCBs cost estimate worksheet include the following:

- Every abatement project is unique in its locations, materials, and other site-specific conditions.
 - Although this worksheet gives you a specific estimate, only use it to determine the magnitude of your project. It doesn't accurately cost your full scope of work.
 - To determine an accurate cost, we recommend working with a contractor or consultant.
- Costs are influenced by a variety of factors that will change over time, including inflation and labor rates. Expect these values to drastically affect the cost estimate.
- Having qualified personnel to perform work is vital to completing work correctly and safely. This worksheet assumes all workers are qualified and trained to complete abatement work. This cost estimate doesn't consider the additional costs needed to:
 - Obtain the appropriate insurance.
 - Account for location-specific wage rates, including prevailing, union, or private rates.
 - Provide health and safety training, including respirator fit-testing, medical monitoring program enrollment, and Site Specific Health and Safety Plan use.
- These estimates are from the prospective of one PCB abatement consultant. Please don't consider it representative of all consultants or contractors in Washington state.

Appendix A. PCB Cost Estimate Worksheet

Visit this publication's [summary page](#)⁸ to download the PCB cost estimate worksheet and estimate the your project's costs.

⁸ <https://apps.ecology.wa.gov/publications/SummaryPages/2204036.html>

Appendix B. Acronyms and Abbreviations

Table 1: Acronyms and abbreviations used in this publication.

Term	Meaning
Abate	Remove
BMPs	Best management practices
EPA	U.S. Environmental Protection Agency
PCBs	Polychlorinated biphenyls
TSCA	Toxics Substances Control Act
WSST	Washington State Sales Tax
We	Washington State Department of Ecology