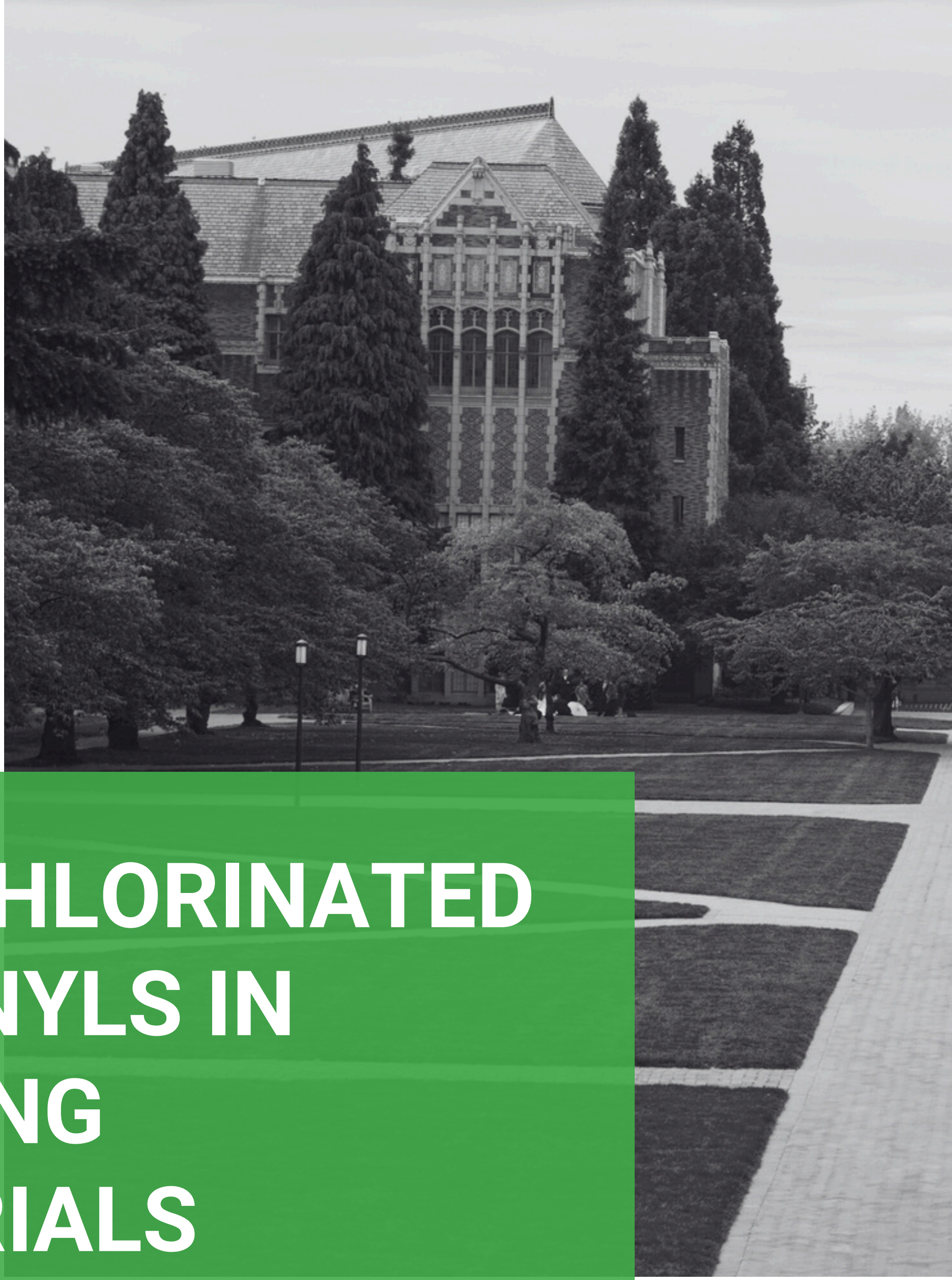


POLYCHLORINATED BIPHENYLS IN BUILDING MATERIALS

UNIVERSITY OF WASHINGTON

SEATTLE 2030 DISTRICT | BELLEVUE 2030 DISTRICT®

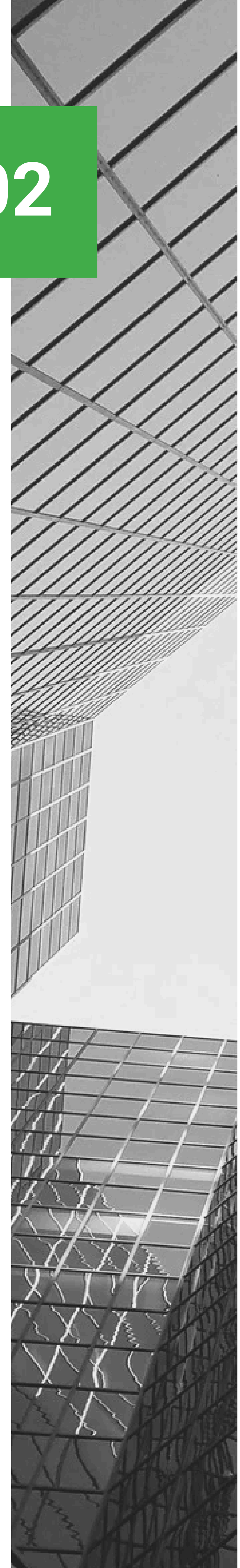
02

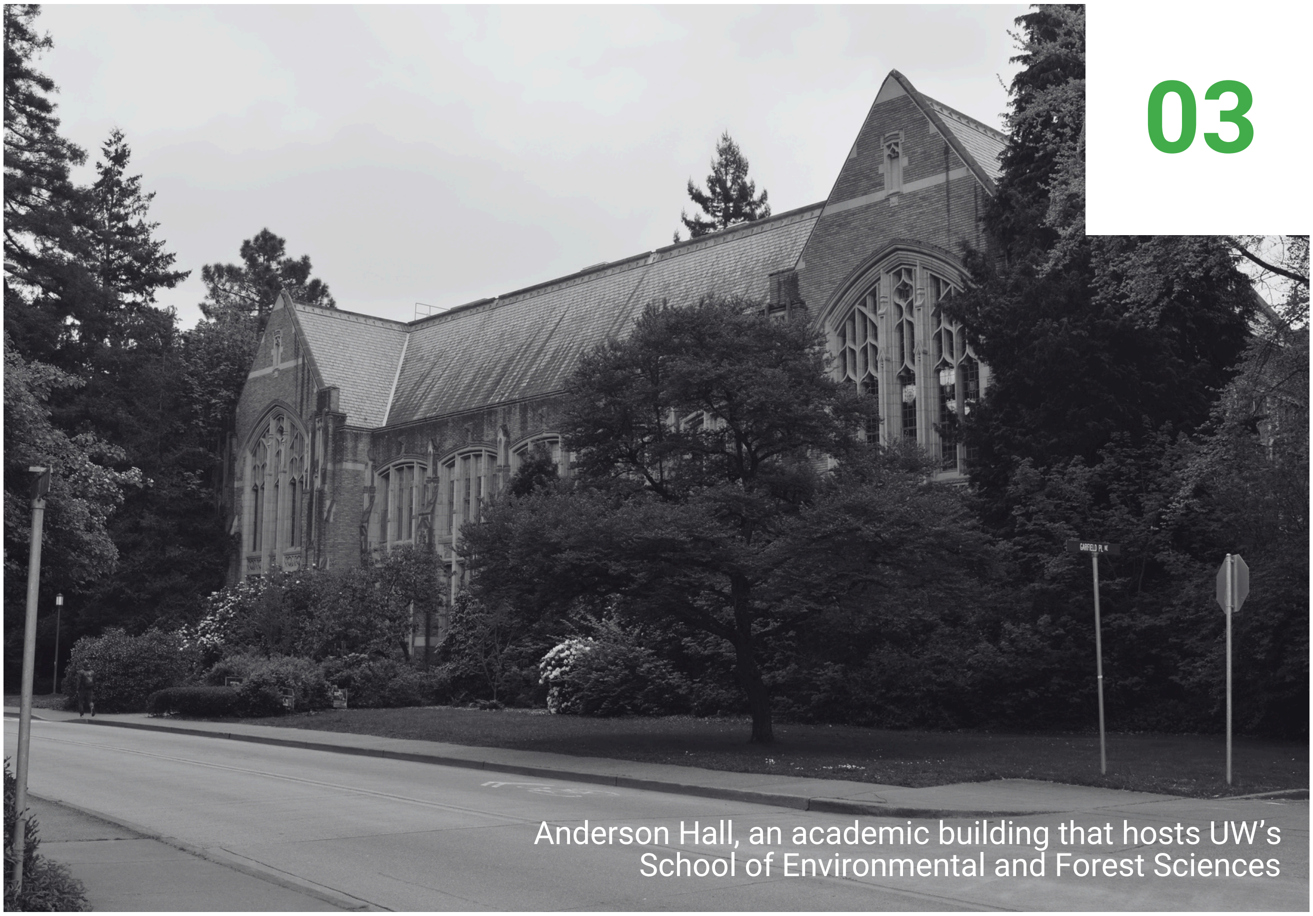
OUR PROJECT PARTNERS

EPA

DEPARTMENT OF ECOLOGY
State of Washington

PacRim
Est.1990





Anderson Hall, an academic building that hosts UW's School of Environmental and Forest Sciences

ABOUT OUR PROJECT

From 2021 through 2022, the Washington State Department of Ecology ("Ecology" hereafter) developed resources to characterize and abate sources of polychlorinated biphenyls (PCBs) within building materials. The Seattle and Bellevue 2030 Districts were awarded a grant through the Stormwater Strategic Initiative Lead to launch an outreach and education campaign targeting property owners about the risks of PCBs in building materials and Ecology's tools for identification and abatement. This case study illustrates the removal of PCBs and showcases Ecology's strong guidance for reducing the impacts of PCBs in our built environmental and natural ecosystems.

THE 101 ON PCBS

Origin & Legacy

Polychlorinated biphenyls (PCBs) are a class of 209 synthetic chemical compounds. They're commonly known by their trade name: Aroclor. PCBs were manufactured to improve flexibility, adhesion, and durability—among other purposes—and were used in a variety of common building materials. While the manufacture of PCBs was banned in 1979 by the Toxic Substances Control Act (TSCA), the use of PCB-containing materials was not prohibited. Thus, PCBs can still be found in buildings built or renovated between 1950 - 1979. Contractors continued using PCB-containing materials throughout the decade following TSCA regulations and the ban of PCBs. This means buildings constructed or renovated between 1980 and 1989 are also at risk of containing PCBs, although the risk is lower. The legal limit that triggers abatement is 50 parts per million (ppm).

Chemical Characteristics

PCB-containing building materials can pose health risks when they contaminate stormwater, soils, sediments, and indoor air. They're persistent, bioaccumulative, and toxic chemicals. Being a bioaccumulative chemical means they build up over time in people and animals through consistent exposure, becoming more concentrated in organisms at the top of the food chain such as orcas. PCBs impact salmon populations, Southern Resident Killer Whales, and sediments and organisms in WA rivers, lakes, and estuaries. These chemical compounds also take a long time to break down and thus remain in the environment and living organisms for their entire lifespan.

Materials Potentially Containing Non-Liquid PCBs: Paint, varnishes, lacquers, non-conducting, electrical cables, rubber/felt gaskets, coal-tar enamel coatings/rust, inhibitor coatings, insulation material, adhesives/tapes, caulk/grout, rubber isolation mounts, foundation mounts, pipe hangers, plastic applications, galbestos siding, mastics, acoustic ceiling/floor tiles, joint material, asphalt roofing/tar paper, synthetic resins/floor varnish, and sprayed-on fireproofing

Materials Potentially Containing Liquid PCBs: Electrical equipment, fluorescent light ballasts, hydraulic equipment, heat transfer equipment, extrusion fluids, oil-filled electrical cable

Toxicity

PCBs have toxic effects on the immune, reproductive, nervous, and endocrine systems in people and other organisms. PCBs cause cancer in animals and are likely to cause cancer in humans. Even low concentrations of PCBs in water can impact aquatic life and human health. They're considered to be one of the most significant toxic chemicals in the Puget Sound.

Exposure Pathways

There are numerous routes to and sources of exposure. Diet is the primary exposure route for humans. This may look like consuming seafood contaminated by PCBs that entered the Puget Sound via stormwater runoff. These chemical compounds can be disturbed and spread during numerous scenarios. For example, this can happen during workplace repairs and maintenance on items containing PCBs, improper removal, contact with old appliances, or electrical equipment accidents.

When PCBs are present in exterior building materials, natural processes like the weather or human actions may cause PCBs to enter the environment. PCB contamination can happen as a result of weather, building maintenance, construction debris, disturbance of PCB-containing materials, and stormwater runoff. It's important to be conscious of these pathways to prevent them.

BUILDING PROFILE

06

The Site

This case study covers a **campus-wide approach** to PCB remediation at 8 sites, including:

1. Center on Human Development & Disability (CHHD) Deck
2. Haring Center
3. UW Tower
4. Haggett Hall
5. Anderson Hall
6. Drumheller Fountain
7. W45 - Parking
8. W46 - Parking

Building Types

- Research
- Medical
- Office
- Classroom/education
- Dormitory
- Garden/art installation
- Parking (2)

Construction Timeframe

1925-1975

THE PROJECT

PCB Discovery

The University of Washington (UW) is a leader in proactive toxicant mitigation policy, including PCBs. Due to the age of the building stock, use types, and internal policies, they actively monitor, take inventory of, and test suspected materials. Because of the prominence of lead and asbestos found in buildings on the UW Campus and the prevalence of using PCBs concurrently with these toxics, Environmental Health and Safety (EHS) staff assume the presence of PCBs in buildings with other toxics of concern until tests prove otherwise.

PCB Sampling

Much of the PCB sampling in University of Washington buildings is preemptive as a result of responsible precautions taken around toxics of concern. Sampling is conducted concurrently with lead and asbestos discovery, ensuring that buildings constructed or renovated between 1950 and 1980 are tested.

DISCOVERY & TESTING → PROJECT PRE-DESIGN & DESIGN → EPA PLAN APPROVAL → PCB MATERIAL DISPOSAL → FINAL REPORTING

Timeline

This case study considers a campus-wide approach to PCB identification and removal. Each building requires a unique timeline based on the extent of PCB presence, use type, and budgetary restrictions.

Generally, EHS projects have multiple steps, each varying in length. The first step after identification is the pre-design and design phases, which can take years depending on complexity, whether an external consultant is contracted to provide extra capacity, and other constraints previously listed. Plans created out of this process must then be submitted to the EPA for approval, which can take as little as 30 days provided there is no follow-up or changes from EPA staff.

Using existing policies and procedures, EHS can then begin disposing of PCB bulk waste and complete the associated reporting, which has a much quicker project timeline than the pre-design and design phases.

PROJECT OUTCOMES

09

Due to strong protocols and procedures set by the University of Washington, EHS staff anticipate positive outcomes on all campus projects. This includes benefits to the long-term health of building occupants, as well as a substantial reduction in stormwater pollution as a result of PCB removal from building envelopes—a key pathway for PCB pollution in our watersheds.

In addition to positive health and environmental outcomes, EHS is strengthening policies, procedures, and systems to properly manage PCB impacts campus-wide. They are also perfecting the training protocol to create a better-trained workforce for handling these toxics of concern while keeping themselves and the public safe.

BENEFITS TO OCCUPANT HEALTH

ENHANCED PCB REMEDIATION PROCEDURES

REDUCED STORMWATER POLLUTION

LIMITATIONS

Because the cost of preventative PCB contamination can be quite high, projects with PCB levels below the EPA threshold of 50 ppm may frequently be delayed while waiting for the proper budget allowance. There is also a shortfall in EHS staff capacity to manage the remediation projects needed to remove PCBs from these buildings. As such, significant considerations have been implemented by the EHS team to determine the risks of allowing buildings with suspected PCBs to go without renovation or replacement.

Additionally, concerns remain for the building stock as a whole which cannot claim public funds for remediation projects, creating a more significant barrier to financing these important public health and environmental remediation projects.

LEARN MORE ABOUT THE 2030 DISTRICTS

The Bellevue and Seattle 2030 Districts work to create a high-performance building districts in the Puget Sound region, aiming to dramatically reduce environmental impacts while fostering economic growth. These organizations work with property owners, managers, developers, and stakeholders to reduce energy use, water consumption, and transportation emissions by 50% by the year 2030. This collaborative effort focuses on driving sustainability in urban development through public-private partnerships and expanding crucial networks. We are the only 2030 Districts with a stormwater pollution reduction program, which was piloted in 2016. This case study showcases this program's goal to reduce negative environmental impacts and pollution in our stormwater.

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