



Achieving zero waste together

# CASE STUDY

## Commercial Deconstruction



ITT office building before deconstruction.

*A Deconstruction Pilot Project of the International Telephone and Telegraph (ITT) Building in the City of Palo Alto*

### AT A GLANCE

#### THE INITIATIVE

The City of Palo Alto (City) has adopted an industry-leading local ordinance related to deconstruction, salvage, and source separation of materials in buildings. As a step in the policy development process, City staff engaged in an in-depth deconstruction pilot project to gain a robust understanding of the opportunities and challenges related to deconstruction. The lessons learned during the pilot project helped to inform the local municipal code that was ultimately adopted by the City Council during the summer of 2019. This case study provides insights into deconstruction with the goal of helping building permit applicants understand the process and benefit from the lessons learned on this project.

#### CORE TEAM

The deconstruction pilot project team included: the City of Palo Alto Zero Waste (ZW), the deconstruction contractor, The ReUse People of America (TRP), Zanker Recycling (Zanker), and the local hauler, GreenWaste of Palo Alto (GreenWaste).

#### PROJECT FOCUS

The project focus included an analysis of the deconstruction activities, timelines, costs, labor, and logistics compared to traditional whole building demolition. The building undergoing deconstruction was a 2,580 square foot unoccupied commercial office building, known as the International Telephone and Telegraph (ITT) Building (See Image 1). The ITT Building was systematically disassembled, the materials source separated, and select parts salvaged for donation to a reuse organization. City staff focused on understanding the challenges that a typical project team would face on a project to help uncover and demystify these issues for future projects.

#### TIMEFRAME AND COSTS

The deconstruction project was completed with a crew of four (4) people over a fourteen (14) day period. The overall project cost was \$92,468, which is a rate of \$35.84 per square foot. The project was completed in April of 2019.

#### PROJECT FIGURES

Square footage:	Cost/square foot:	Total cost:	Days to complete:	Crew size:
<b>2,580</b>	<b>\$35.84</b>	<b>\$92,468</b>	<b>14</b>	<b>4</b>

## PROJECT OUTCOMES

Material that was either recycled, salvaged, or landfilled:

**184.6 tons**

Materials recycled:

**171.62 tons**

**93%**

Materials salvaged:

**7.28 tons**

**4%**

Materials landfilled:

**5.16 tons**

**3%**

## BACKGROUND

Over 40 percent of the waste from Palo Alto disposed in landfills is from construction and demolition related projects. The amount of disposal is approximately 19,000 tons annually. The waste produced during the process of demolition, construction, renovation, or remodels of structures is often referred to as mixed construction and demolition debris (C&D). Mixed C&D typically includes a comingled assortment of concrete, asphalt, wood, metals, gypsum wallboard, roofing material, glass, carpet, bricks, rocks, dirt, trees, stumps, and vegetation.

During traditional demolition, an excavator will typically crush all existing building components and load the mixed C&D into debris boxes to be hauled away together for disposal. Deconstruction has been utilized as an alternative to standard demolition. Materials identified to be salvaged for reuse can also be recovered during the deconstruction process.

To compare the process, cost and details of deconstruction versus standard whole building demolition, the City conducted a deconstruction pilot project using an unoccupied commercial building owned by the City.

The 2,580 square foot building, known as the International Telephone and Telegraph (ITT) office building (Image 1), was built in the 1950's and is located within the Emily Renzel Wetlands, East of Highway 101 in Palo Alto. ITT, which consisted of a wood framed structure with a concrete foundation, first underwent an abatement of lead containing materials and then was systematically disassembled, the materials source separated and select parts salvaged for donation to a reuse organization.



### Images:

- A portion of lumber salvaged
- Deconstruction day 7 of the project
- Debris boxes set up

## ITT BUILDING DECONSTRUCTION STEPS

**STEP 1: Salvageable Material Identification:** Conducted a salvage survey to identify materials for reuse.

**STEP 2: Hazardous Materials Inspection:** Surveyed for hazardous materials such as asbestos and lead.

**STEP 3: Request for Quotation (RFQ):** An RFQ was issued with a detailed scope of work and vendor selected.

**STEP 4: Pre-Construction Meeting:** Reviewed deconstruction steps and timeline (Table 1).

**STEP 5: On-Site Deconstruction:** Execution of deconstruction activities.

**STEP 6: Transportation of Materials to Approved Facilities:** Materials were delivered to approved facilities.

## THE JOURNEY

### PILOT PROJECT EXECUTION

#### **STEP 1: Salvageable Material Identification:**

The team first identified the materials that could be salvaged for reuse. A representative from TRP, a reuse organization in Oakland, came to the site and conducted a salvage survey to identify materials acceptable for reuse. The acceptable materials included structural lumber (2x4, 2x6, 2x8), two air conditioning condenser units, interior doors (solid, slabs with jams and hardware), fluorescent light fixtures, kitchenette cabinets, and whiteboards. This list of materials to be salvaged for reuse was included in the deconstruction project scope of work (SOW).

#### **STEP 2: Hazardous Materials Inspection:**

As with all other demolitions or deconstructions, the building was next surveyed for the presence of any hazardous materials, such as asbestos and lead. The survey revealed the presence of hazardous levels of lead paint in the windowsills, rafter tails, and rain gutters. An abatement was performed to remove these materials prior to going out to bid for the deconstruction portion of the project.

#### **STEP 3: Request for Quotation (RFQ)**

An RFQ was issued with a detailed statement of work stating what needed to be done for the project. The statement of work required the building be deconstructed, recyclable materials be source separated, and materials identified to be donated for reuse be salvaged, prepared, and packaged per the reuse specifications.

#### **STEP 4: Pre-Construction Meeting (RFQ)**


Once a contractor was selected, a pre-construction meeting was held at the ITT location. During this meeting, the contractor and City staff planned the steps of the deconstruction and identified the materials that would be generated and need to be hauled away so the correct level of bin service could be ordered.

#### **STEP 5: On-Site Deconstruction**

The building materials were then systematically dismantled. The materials included the following: tar and gravel roof, stucco, sheetrock, insulation, wood framing, floating ceiling tile and T-bar framing, heat and air conditioning ducting, air conditioning units, electric panels and conduit, concrete foundation, and metal garage doors. Those materials were source separated into the following recycling or garbage categories. Sheetrock, clean wood (not salvageable), metal, stucco, concrete, asphalt and tar and gravel roof were separated into individual containers and collected as recyclables. Garbage was consolidated in its own container and consisted of insulation, painted wood, non-recyclable ceiling tiles, and other incidental non-recyclable materials.

#### **STEP 6: Transportation of Recyclables to Approved Facilities**

Recyclable materials, except for metals, were taken to Zanker Recycling which is located 13 miles from Palo Alto in San Jose and is on the City's approved list of recycling processing facilities. Metals were taken to the GreenWaste Materials Recovery Facility (MRF) which is 15 miles from Palo Alto and is also on the City's list of approved recycling facilities. Materials ultimately salvaged from this building and delivered to TRP for reuse included lumber, two air conditioning condenser units, interior doors (solid, slabs with jams and hardware), fluorescent light fixtures, kitchenette cabinets, whiteboards, and a bookshelf.



Light fixtures were prepared according to specs.

## PROGRESS TIMELINE

	Days 1-5	Days 6-9	Days 10-12	Days 13-14
<b>ACTIVITY</b>	Manual removal of material, stockpile salvage materials, begin de-nailing salvageable wood	Disassembly of siding, continue de-nailing salvageable wood	Finish de-nailing salvageable wood, break and off-haul concrete slab	Organize and package salvaged materials and deliver to TRP
<b>FOCUS AREAS</b>	<ul style="list-style-type: none"> <li>• Sheetrock</li> <li>• Insulation</li> <li>• Ceiling tile</li> <li>• HVAC system</li> <li>• Roof boards</li> </ul>	<ul style="list-style-type: none"> <li>• Tar &amp; gravel roof</li> <li>• Stucco</li> <li>• Fluorescent lights fixtures</li> </ul>	<ul style="list-style-type: none"> <li>• Interior Siding</li> <li>• Exterior Siding</li> <li>• Structural lumber</li> </ul>	<ul style="list-style-type: none"> <li>• Salvaged wood</li> <li>• Concrete slab</li> </ul>

## LESSONS LEARNED & KEYS TO SUCCESS

### ✓ Experience Matters

Since deconstruction and source separation is not the industry standard, the City provided significant oversight to ensure that specific procedures were being followed. This pilot project required staff to identify solutions in the field to allow the project to continue progressing successfully.

*Contractors should look to a knowledgeable supervisor or project manager for procedural oversight, as an experienced team is vital to effectively identify problems and create solutions. Consider providing specialized deconstruction training to employees.*

### ✓ Prepare for Additional Salvageable Materials

Not all salvageable materials will be obvious at the time of the salvage survey. On the first day of deconstruction, additional salvageable wood was discovered behind interior sheetrock, exterior stucco, and under the tar and gravel roofing.

*Contractors should be prepared to find additional salvageable materials not included on the initial salvage survey; contractors are encouraged to salvage the additional materials. Additional cost to salvage could be partially offset by there being no disposal cost for this material or potentially receiving additional donation tax benefits and would vary on a case by case basis.*

### ✓ Plan for Logistics and Materials Management

The large area to stage equipment and debris boxes on this project's site allowed for disassembling and source separation of large amounts of debris at a time.

*Contractors should plan for materials management and collection, especially in cases where there are space constraints. This is crucial for debris box or smaller bin services. Contractors should also plan services according to the order that materials are being generated.*

### ✓ Organize Jobsite

There is no substitution for a well-organized construction site with clear and appropriate signage directing the construction team to meet the local deconstruction requirements.

*Contractors should brief employees about using signage to guide the process of source separating materials. All crew members should be aware of which materials are salvageable and recyclable. Ensure containers are clearly labeled to provide clarity to workers. Designate an area onsite to stockpile salvageable materials.*

## FOR MORE INFORMATION

[deconstruction@cityofpaloalto.org](mailto:deconstruction@cityofpaloalto.org) | (650) 496-5910