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**Case Study Report #3, 314 Bayside Rd. Bellingham, WA**  
**2 Bedroom Residential House, Circa 1950**

**Site Description:**

Case Study #3 was comprised of a well designed, moderately sized, two-bedroom home and an unattached carport. The footprint of the house covered nearly 1,000 square feet, in addition to the 25'x 35' carport. The home was scheduled for demolition due to growing liability and maintenance issues. Recent increases in neighborhood property values had also rendered this home relatively low value in proportion to the lot. It was chosen as a *RE Store* project and as the third case study largely because this house represents a structure which clearly should not fall prey to conventional demolition under any conditions. The large volume of like materials generated for re-sale was both very marketable, and easily quantifiable. There was some unsalvageable material due to rot or pest damage, though for the most part, the building materials were of high quality and value.

The project was built nearly entirely of wood, utilizing post-and-beam construction. The builders were able to maintain fairly wide spans (up to 8ft.) between central beams by incorporating 2" x 6" car-decking, a structural tongue and groove material, as the primary element providing lateral stability in the roof structure.

**Roof:** The roof of the house was composed of several layers of torch-down roofing affixed to the above-mentioned layer of car decking, supported by a beam running the longitudinal length of the structure and beams transverse to the main support beam. The roof of the carport was built similarly: car decking supported by post and beam construction.



**Interior:** The interior walls were sheathed in 1/2 inch gypsum board and in some places covered again in 1"x 8" finished mahogany paneling. They yielded a number of 8' lengths of 2"x4" framing lumber, as well as some trim and 6 interior doors. The floors were all solid oak over 2" x 6" fir car decking, and were estimated 80% salvageable. Non-recyclable carpeting also covered the floors in some areas.

**Exterior:** The exterior of the house was sided with cedar over recyclable coconut fiberboard and was estimated to be 80-90% salvageable. The carport was also sided with cedar and was also estimated to be 80-90% salvageable. Between the two buildings, it was expected that over 2000

linear feet of beveled and “drop” cedar siding should be salvaged.



The total volume of this building was estimated to be 80% salvageable and includes, most notably:

- 16,000 linear ft. of 2” x 6” car decking,
- 340 linear ft. 4”x 8” fir beams,
- 50’s era antique appliances.

The following report will quantify all material salvaged as well as provide comparisons to estimated salvage potential. Note that a small amount of

salvageable material is always lost due to market fluctuations, deconstruction methodology, or damage. The salvaged material was quantified according to volume/quantity, weight and market value. The debris remaining after salvage and due to deconstruction was sorted and recycled in the best manner that the industry allows, or placed in a landfill as necessary.

### **Comparisons to Traditional Demolition:**

Local demolition contractor, *T n T Recovery*, projected costs, labor, and disposal fees— under a traditional, machine-based demolition scenario— to amount to the following:

|                        | <b><u>Labor</u></b> | <b><u>Disposal</u></b> | <b><u>Total Service</u></b> |
|------------------------|---------------------|------------------------|-----------------------------|
| <i>T n T Recovery:</i> | \$3,500             | \$2,500                | \$6,000                     |
| <i>The RE Store:</i>   | \$4,500             | \$1,250                | \$5,750                     |

### **Disposal**

The estimated yardage of construction and demolition debris (C&D) debris was as follows:

|                        |                         |
|------------------------|-------------------------|
| <i>T n T Recovery:</i> | 200 cubic yards/29 tons |
| <i>The RE Store:</i>   | 80 cubic yards/8.9 tons |

*T n T Recovery* proposed to haul the C&D debris to the region’s premier recycling sites, estimating 198 cubic yards to be recycled, the remaining estimated yardage to be placed in a landfill.

Note that the actual volume of debris to be disposed of by *The RE Store* after salvage consisted of approximately 17,800 lbs. of C&D debris recycled at *Recovery One*— a recycling facility at the Port of Tacoma that accepts and sorts mixed C&D debris— 3 cubic yards of metal recycling, 27,113 lbs. of reusable material diverted from the waste stream and made available to the community at *The RE Store*’s retail outlet, and only 7.5 cubic yds. / 1,248 lbs. placed in a landfill.

## **Labor**

*T n T Recovery* proposed the use of an equipment operator for two days and the use of a laborer for one day, as well as drivers for hauling the recyclable waste.

*The RE Store* employed four skilled deconstruction laborers for a total of 247 hours.

## **Fuel**

*T n T Recovery* estimated the use of 58 gallons of diesel fuel for their excavators, and an unknown quantity of fuel for transportation of debris, equipment, and laborers.

*The RE Store* consumed 14.6 gallons of gasoline, and drove its work trucks approximately 112 miles to transport laborers and materials.

## **Description of Process:**

The first stage in the deconstruction process involved salvaging all reusable and high-value items from the interior and exterior of the property. In the specific case of 314 Bayside Road, this involved: removing all kitchen appliances and fixtures, light fixtures, cabinetry and wall paneling; removing one bathroom vanity; pulling trim and baseboards from all rooms of the house; removing doors and jambs from wall openings; removing all salable windows, and removing the siding and lighting from the exterior of the house.

The second stage of the process involved removing all remaining interior wall sheathing and insulation, and once cleanup of wall and insulation debris was complete, removing the oak floors. The floors are generally left intact until the gypsum board and insulation are removed because a smooth floor surface expedites the cleanup process.

Once the interior was thoroughly gutted, the roof was ready to be removed. The rolled roofing was first cut into roughly 4ft. wide sections with a utility knife and/or power circular saw and then peeled from the car decking. The car decking was then pried from the beams, assessed for damage, and passed down between the beams, being sure to sort according to length to expedite de-nailing and load-out procedures. The beams themselves were then removed from the supporting walls, lowered with ropes and moved outside the house where they were then de-nailed and loaded onto waiting trucks and/or trailers.

- Note that every effort is made to keep like lengths of materials together throughout the deconstruction process to maintain de-nailing, loading, and measuring efficiency. When de-nailing, it is best to de-nail the longest lengths first, and then load them directly onto the waiting truck or trailer, ensuring a neat and stable load.

The deconstruction team then focused on removing all interior walls by cutting the top plate of each wall from its connection to the exterior wall and/or adjoining interior wall and collapsing the cut section of wall. Once on the floor, it was knocked/ pried apart with bars and heavy hammers, each board assessed for value and then sorted for de-nailing and load-out or placed in the C&D recycling dumpster.

The walls comprising the shell of the structure were then collapsed and dismantled in the same fashion, utilizing ropes to pull down the larger, heavier walls, and employing supports fashioned from salvaged lumber to prevent remaining walls from falling in and harming members of the deconstruction team.



Once all walls were down, the deconstruction team then began removal of the sub-floor, in the case of 314 Bayside Rd., 2”x 6” car decking. The car decking from the floor was processed in the same manner as the car decking from the roof. Removing the sub-floor exposed additional beams, which were lifted out, assessed and processed in the same manner as the other material.

- Note that carts were used whenever appropriate while handling material, in order to handle larger amounts of material at once, maintain efficiency and reduce fatigue.

At this point the deconstruction crew was ready for final sight cleanup. The poured concrete foundation was left behind to be removed and recycled by an outside contractor, but the exposed earth within and around the foundation

walls was raked and cleaned.

- Note that the deconstruction crew also carries out daily clean-up operations to prevent debris from migrating into neighbor’s property.

The unattached carport was deconstructed in a similar manner to the house. It was dismantled from the top down, utilizing ropes, supports when necessary, and a four-wheel drive truck to pull down the walls once the roof was removed.

It should be noted that several extra steps were taken during the load out/ measuring process in order to satisfy the terms of the case study. Each item or group of items needed to be carefully weighed and measured as it was unloaded and priced at *The RE Store’s* retail outlet, requiring additional labor from members of the field crew. Special forms, used to document the weight of the material, were used in addition to those normally used to document material’s volume and value, requiring more time for paperwork.

## **Findings:**

### **Materials Recovered**

*(Complete details of materials saved can be seen in project spreadsheets.)*

The actual salvage value of materials differs from estimated salvage potential due to the loss of material from damage incurred by deconstruction methodology, impossibility of salvage due to the manner in which the building was constructed, and loss of estimated value due to poor salability. By deconstructing these buildings by hand, *The RE Store* saved 27,113 lbs. of material valued at \$7573.60 directly for re-use, recycled 17,800 lbs. of debris and sent only 1,248 lbs. to the local landfill. Under the scenario presented by *T n T*, 0-3% of the building would have been available for reuse, but up to 95% recycled, and the remaining C&D debris would have been placed in a landfill.

The total real volume of the building should be seen as the combined volumes of the salvaged materials and the C&D debris. The total real volume was estimated at 120 cubic yards. This real value can be compared with the bid estimates, and industry-standard weight-to-volume conversion ratios. This report shows that, due to *The RE Store's* deconstruction methodology, 58.7% of the building was saved directly for re-use, 38.6% recycled, and only 2.7% sent to the landfill. *The RE Store* also managed to save 5760 square feet of car-decking directly for re-use. The gutters, wiring, old appliances, and other metal structural, electrical, and plumbing fixtures were collected and recycled for their value as scrap metal.

### **Summary of Results**

- *Square footage of structure's footprint: +/- 1000 sq. ft.*
- *Total volume of structure: 120 cubic yards*
- *Total weight of structure: 46161 lbs.*
- *Combined weight of salvaged materials: 27,113 lbs.*
- *Percentage salvaged: 58.7%*
- *Combined weight of recycled materials: 17,800 lbs.*
- *Percentage recycled: 38.6%*
- *Weight land-filled: 1248 lbs.*
- *Percentage land filled: 2.7%*
- *Estimated value of recycled material: \$7573.60*
- *Value per square foot: \$7.57*
- *Weight per square foot: 46.2 lbs*
- *Value per pound of salvaged materials: \$.27/ lb.*

## **Expenses**

The main expense occurred during deconstruction was labor. Four skilled deconstruction laborers were paid approximately \$2500.00 for 247 hours of labor, not including benefits or accounting for L&I expenses and taxes. Fuel cost amounted to only \$31.30 to fuel two vehicles for a combined total of 112 miles. Tool costs were insignificant.

It should be noted that often *The RE Store* uses a “hybrid” method of deconstruction to maintain economic viability, incorporating a track hoe to handle marginal materials and debris, and to minimize labor costs.

*The RE Store*, due to its status as a 501(c)3 non-profit, offers the client the added benefit of a tax deduction for the total value of their donation of salvaged building materials. In the case of 314 Bayside Rd., this donation carried an estimated value of \$4200.30.

## **Further Findings**

In almost all situations, salvage and/or deconstruction methods can be used to varying degrees. Throughout the building/demolition industry, deconstruction methods are gaining support due to growing costs of disposal, and ethics shifting towards sustainability. Hopefully we will see a time when salvage practices are mandated industry-wide.