Sledge Seattle Residential Deconstruction Case Study

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For additional information about this grant or about Sledge Seattle, please contact Jim Barger or John Benavente.

2 EXECUTIVE SUMMARY

Sledge Seattle, LLC ('Sledge'), a Seattle-based limited liability corporation hand-deconstructed 14 structures during 2019-2020. One residential deconstruction project was partly funded by a grant from Seattle Public Utility as part of their waste-reduction initiatives[1]. Sledge's goals for the waste free grant project were to identify a viable Seattle deconstruction project, demonstrate to neighborhood residents a process that is healthier than traditional demolition projects, provide meaningful employment to at-risk populations, and use salvaged materials to build, and incorporate into, new housing construction in Seattle, reducing waste and preventing additional carbon dioxide (CO2) emissions while maintaining the embodied carbon in our old-growth structures. This case study follows one of these projects (code-named "ShipLap"), a single-family residence in the Ballard/Phinney area; a 2772 square foot home we hand deconstructed. The findings presented in this case study include:

- We diverted over 32,000 lbs. of waste from Seattle King County CND (construction and demolition facilities) & landfills.
- Deconstructing the home yielded 16 tons of old growth lumber which was incorporated into multiple new building projects throughout Seattle.
- Reincorporating this urban-harvested lumber prevented an additional 28 tons of CO2 being released into the atmosphere.
- The cost of deconstruction was 2.4% lower than an estimated cost of demolition.
- Sledge has been successful in creating deconstruction crews whose members are hired from the formerly incarcerated population and in helping these at-risk individuals grow their skills and improve their life situation during their transition from incarceration, work release, to society. 40% of these individuals continue to have a successful outcome after working for Sledge (i.e., are either still employed with Sledge or have moved on to a better opportunity or to starting their own business).
- The duration of hand deconstructing a home can be 3-5 weeks vs. a typically 1-day duration for a demolition.
- There were multiple challenges involved with the project, some of which we were able to mitigate, and some which remain unsolved.
    - Inventory management and tracking required excessive labor to understand precisely how much lumber was harvested and re-used. More highly technical solutions are required but were out of reach in the grant timeframe for this small startup.
    - Identifying potential projects is difficult since investors/owners of potential deconstruction targets must be convinced that the extra time and expense of hand-deconstruction versus traditional demolition can be mitigated through sale of salvaged materials and/or savings from shortened construction timelines (for the new construction), and willingness to contribute to an improvement in the environment.

[1] http://www.seattle.gov/utilities/protecting-our-environment/community-programs/waste-free-grants/funded-projects

3 In The Pacific Northwest: A Deconstruction Comparison of Two Cities

3.1 Portland, Oregon[2]

3.1.1 City Government Actions

Portland was the first city in the United States to implement a city-wide ordinance to dismantle, rather than demolish, certain structures. In July of 2016 they imposed this restriction on all homes built in 1916 or earlier. In November of 2019, they extended this restriction to all homes built in 1940 or earlier, which went into effect on January 20, 2020[3]. The initial restriction applied to approximately 33% of all residential homes in Portland, and the extended restriction pushed that coverage up to approximately 66%.

3.1.2 Environmental Impacts

A study by Oregon Department of Environmental Quality in March of 2019, which closely measured the impact of the first 36 deconstruction projects covered by the 2016 restriction, reported that among the more experienced contractors, net carbon benefits were as high as 10 MT CO2e per average home.[4]

3.2 Seattle, Washington

The city of Seattle has introduced a new zone classification within the single-family zones: RSL (residential small lot). The new code allows for an increase in dwelling unit density and depending upon the zone, including up to two accessory dwelling units. Single Family zones now have an FAR requirement, making sure the maximum Floor Area Ratio is 50% of the total lot size – helping to make homes scales aesthetic and reasonable in size.

While this may encourage the reuse of existing structures and lower levels of demolition, Seattle has made little city-wide efforts to enforce hand-deconstruction versus demolition – or even to dis-incentivize demolition – of older city homes when the decision to replace a structure is made.

Up to the Fall of 2019, the city gave proponents of deconstruction an edge – used by and lobbied for by founding members of Sledge –provided an option for planned deconstruction projects to obtain demolition permits prior to the issuance of their construction permit. This allowed a project that was deconstructing the existing structure to remove the structure prior to issuance of the construction permit. In the past these permits were coupled, and demolition (or deconstruction) could not occur until the construction permit was issued. – “De-coupling” the permits when performing deconstruction narrowed the disadvantage due to the additional time it takes (and helped to offset increased labor costs) to deconstruct vs. demolish a structure. Unfortunately, the city removed this incentive and now they allow fast-tracked demolition permits to be issued to all developers whether the project is to be deconstructed or demolished.

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[2]

[3]https://www.portlandoregon.gov/citycode/article/752368

[4]https://www.oregon.gov/deq/FilterDocs/DeconstructionReport.pdf

The Seattle Climate Action Plan[5] developed in April 2018 by Mayor Jenny A. Durkan's administration does, however, include an action which is to be completed by 2030:

> *Develop training programs for deconstructing buildings to increase the amount of materials salvaged for reuse as an alternative to traditional demolition techniques.*

Additionally, Seattle Public Utilities has made waste reduction an important goal, and deconstruction/salvage clearly benefits under that goal. However, without incentives to lessen the short-term financial and time disadvantages that deconstruction incurs, the long-term rewards of decreased carbon emissions and greener neighborhoods cannot be realized.

[5] http://www.seattle.gov/environment/climate-change/climate-planning/climate-action-plan

4 PROCESS OVERVIEW

The following illustration provides the general flow of the Sledge Seattle deconstruction process.

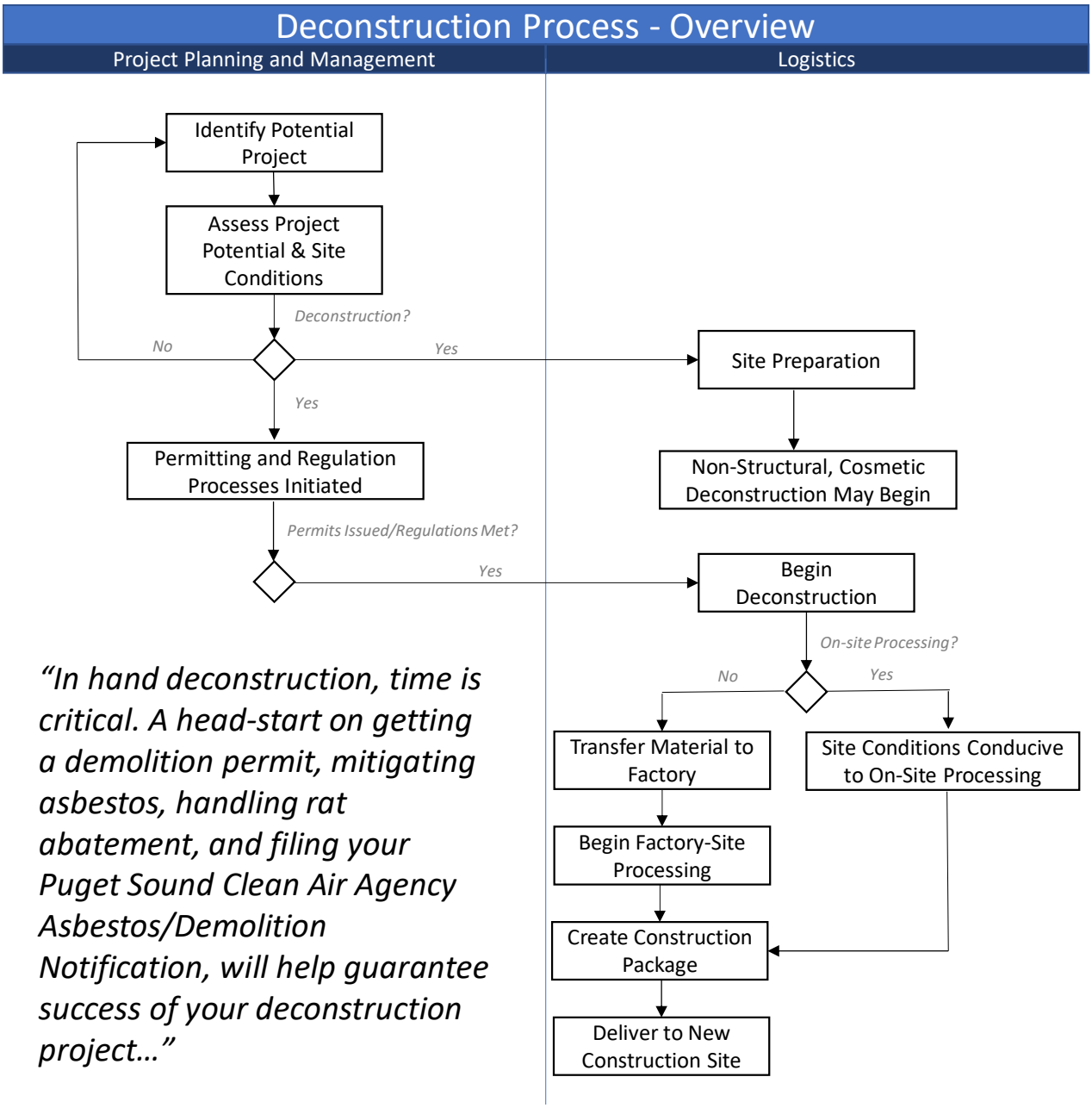


Figure 1 - General Flow of Seattle Sledge Deconstruction Process

5 Project Planning and Management

5.1 Identify Potential Project

All structures will need to eventually be dis-assembled & deconstructed if we ever want to have healthy and sustainable development. Working towards deconstruction right now is critical because it is so much less expensive to demolish & throw away. We must change this mindset. We argue that there is no structure that is not "worth" deconstructing, but we accept the economic realities we are in and have therefore identified projects that have more chance of breaking even within our current throw-away culture and fossil fuel driven development practice of demolition. This process has been to identify what potential salvaged materials and methodologies do and do not mitigate the extra costs of deconstruction.

5.2 Assess Project Potential & Site Conditions

At Shiplap, an initial investigation and walkthrough of the project revealed the following:

- The building year (1915) was in the timeframe of higher quality (old growth) wood, and a time when only nails were used in building instead of newer adhesives or other petroleum derived building material products.
- The home was platformed framed, and the wood is the most valuable of existing materials, particularly the shiplap which was extensively used on all assemblies (walls, & floors)
- Douglas Fir accounted for most of the framing and finishes
- There was little indication of decay, which harms future resale value
- The lot was difficult to access with traditional demolition equipment, thereby giving the owner more incentive to agree to a more time-consuming hand deconstruction process.

Figure 2 The ShipLap house as seen from a street view on Bing Maps

Figure 3 – Newer asphalt siding pulled aside to reveal the original wood siding beneath.

Figure 4 - Flooring materials removed to expose underlying floor joists

Figure 5 - Dry wall removed revealing lath.

Figure 6 - Unfinished top floor with shiplap

Figure 7 - Cutaway area of top floor showed an additional layer of shiplap

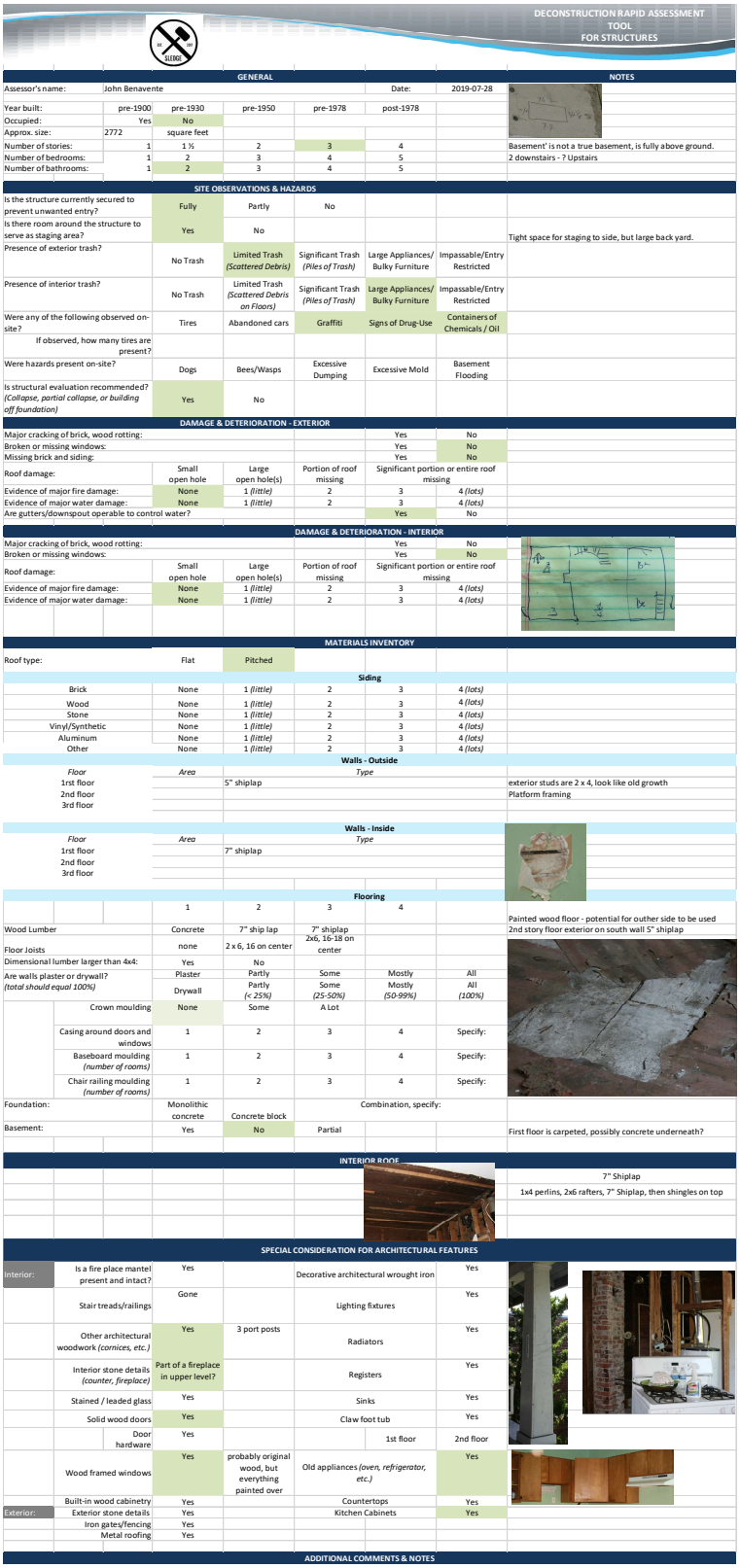
Sledge assessed both the home and the site to validate that the return on investment would be worthwhile and that access and operations would be possible.

Sledge has leveraged a deconstruction assessment form[6] available on the United States Environmental Protection Agency (EPA) site. The process involved a walk through and recording of not just salvageable material, but potential workplace hazards as well.

The results of the assessment validated that the home was a good choice for deconstruction.

[6] https://www.epa.gov/sites/production/files/2015-07/deconstruction-rapid-assessment-tool-20150716.xlsx

Figure 8 Assessment form for ShipLap project



DECONSTRUCTION RAPID ASSESSMENT TOOL FOR STRUCTURES

GENERAL							NOTES
Assessor's name:	John Benavente				Date:	2019-07-28	
Year built:	pre-1900	pre-1930	pre-1950	pre-1978	post-1978		
Occupied:	Yes	No					
Approx. size:	2772	square feet					
Number of stories:	1	1 ½	2	3	4		Basement' is not a true basement, is fully above ground.
Number of bedrooms:	1	2	3	4	5		2 downstairs - 7 Upstairs
Number of bathrooms:	1	2	3	4	5		

SITE OBSERVATIONS & HAZARDS						
Is the structure currently secured to prevent unwanted entry?	Fully	Partly	No			
Is there room around the structure to serve as staging area?	Yes	No				Tight space for staging to side, but large back yard.
Presence of exterior trash?	No Trash	Limited Trash *(Scattered Debris)*	Significant Trash *(Piles of Trash)*	Large Appliances/ Bulky Furniture	Impassable/Entry Restricted	
Presence of interior trash?	No Trash	Limited Trash *(Scattered Debris on Floors)*	Significant Trash *(Piles of Trash)*	Large Appliances/ Bulky Furniture	Impassable/Entry Restricted	
Were any of the following observed on-site?	Tires	Abandoned cars	Graffiti	Signs of Drug-Use	Containers of Chemicals / Oil	
If observed, how many tires are present?						
Were hazards present on-site?	Dogs	Bees/Wasps	Excessive Dumping	Excessive Mold	Basement Flooding	
Is structural evaluation recommended? *(Collapse, partial collapse, or building off foundation)*	Yes	No				

DAMAGE & DETERIORATION - EXTERIOR						
Major cracking of brick, wood rotting:				Yes	No	
Broken or missing windows:				Yes	No	
Missing brick and siding:				Yes	No	
Roof damage:	Small open hole	Large open hole(s)	Portion of roof missing	Significant portion or entire roof missing		
Evidence of major fire damage:	None	1 *(little)*	2	3	4 *(lots)*	
Evidence of major water damage:	None	1 *(little)*	2	3	4 *(lots)*	
Are gutters/downspout operable to control water?				Yes	No	

DAMAGE & DETERIORATION - INTERIOR						
Major cracking of brick, wood rotting:				Yes	No	
Broken or missing windows:				Yes	No	
Roof damage:	Small open hole	Large open hole(s)	Portion of roof missing	Significant portion or entire roof missing		
Evidence of major fire damage:	None	1 *(little)*	2	3	4 *(lots)*	
Evidence of major water damage:	None	1 *(little)*	2	3	4 *(lots)*	

MATERIALS INVENTORY						
Roof type:	Flat	Pitched				
Siding						
Brick	None	1 *(little)*	2	3	4 *(lots)*	
Wood	None	1 *(little)*	2	3	4 *(lots)*	
Stone	None	1 *(little)*	2	3	4 *(lots)*	
Vinyl/Synthetic	None	1 *(little)*	2	3	4 *(lots)*	
Aluminum	None	1 *(little)*	2	3	4 *(lots)*	
Other	None	1 *(little)*	2	3	4 *(lots)*	
Walls - Outside						
Floor	*Area*	*Type*				
1rst floor		5" shiplap				exterior studs are 2 x 4, look like old growth
2nd floor						Platform framing
3rd floor						
Walls - Inside						
Floor	*Area*	*Type*				
1rst floor		7" shiplap				
2nd floor						
3rd floor						
Flooring						
	1	2	3	4		Painted wood floor - potential for outher side to be used
Wood Lumber	Concrete	7" ship lap	7" shiplap			2nd story floor exterior on south wall 5" shiplap
Floor Joists	none	2 x 6, 16 on center	2x6, 16-18 on center			
Dimensional lumber larger than 4x4:	Yes	No				
Are walls plaster or drywall? *(total should equal 100%)*	Plaster	Partly	Some	Mostly	All	
	Drywall	Partly *(< 25%)*	Some *(25-50%)*	Mostly *(50-99%)*	All *(100%)*	
Crown moulding	None	Some	A Lot			
Casing around doors and windows	1	2	3	4	Specify:	
Baseboard moulding *(number of rooms)*	1	2	3	4	Specify:	
Chair railing moulding *(number of rooms)*	1	2	3	4	Specify:	
Foundation:	Monolithic concrete	Concrete block	Combination, specify:			
Basement:	Yes	No	Partial			First floor is carpeted, possibly concrete underneath?

INTERIOR ROOF	
	7" Shiplap
	1x4 perlins, 2x6 rafters, 7" Shiplap, then shingles on top

SPECIAL CONSIDERATION FOR ARCHITECTURAL FEATURES						
Interior:	Is a fire place mantel present and intact?	Yes		Decorative architectural wrought iron		Yes
	Stair treads/railings	Gone		Lighting fixtures		Yes
	Other architectural woodwork *(cornices, etc.)*	Yes	3 port posts	Radiators		Yes
	Interior stone details *(counter, fireplace)*	Part of a fireplace in upper level?		Registers		Yes
	Stained / leaded glass	Yes		Sinks		Yes
	Solid wood doors	Yes		Claw foot tub		Yes
	Door hardware	Yes			1st floor	2nd floor
	Wood framed windows	Yes	probably original wood, but everything painted over	Old appliances *(oven, refrigerator, etc.)*		Yes
	Built-in wood cabinetry	Yes		Countertops		Yes
Exterior:	Exterior stone details	Yes		Kitchen Cabinets		Yes
	Iron gates/fencing	Yes				
	Metal roofing	Yes				

ADDITIONAL COMMENTS & NOTES

5.2.1 Result

The initial review of the site suggested a large quantity of valuable wood could be harvested from the home, so the project moved on to the assessment phase.

5.3 Site Preparation

The ShipLap site was challenging because of the access to the structure, its close placement to a commercial brick building on the south side, and its height above street level which was occupied by a concrete terrace/bunker garage. This limited access to trailers or trucks for material loading, as well providing a limited area for processing and preparing wood (e.g., nail removal, bundling, & performing an inventory). The lumber would need to be moved from the lot down to the street level, where it would be loaded on to trailers and taken to a central location (the 'Curtain Factory') to be processed & stored.

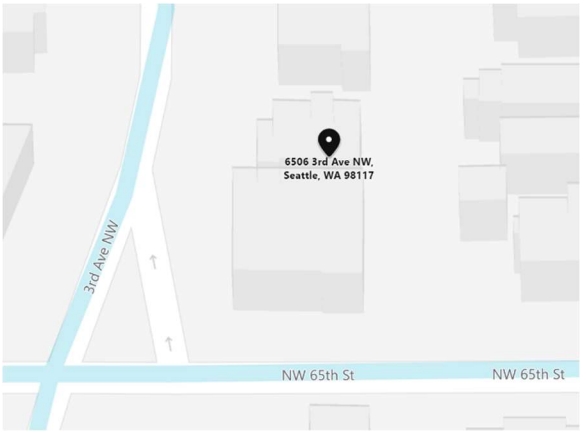


Figure 9 This shot from Bing Maps shows the ShipLap property abutted with a commercial building on its south side.

The three-story structure would require the passing-down of internal structure through windows and holes we made in the floors to the tight space near the wood prep area, increasing the danger of injuries. All in all, the work area which included deconstruction, lumber movement, processing, stacking and then passing to the street area would need to be done in a very tight footprint.

6 Deconstruction Processes

6.1 Materials: Handling and Transportation Logistics

Due to the site conditions, setting up a materials processing station on site for removing nails from the lumber was not feasible. The crew attempted a new technique – removing the nails from the wood before passing it outdoors. This worked, but did slow down the process overall, according to some crew members.

Because the site was approximately 10 feet above sidewalk level with a narrow steep stairway leading down to the sidewalk, removing materials from the site and onto a trailer for transportation to a central location (the 'Curtain Factory') for further processing was also unwieldy. The crew members employed multiple techniques, e.g., handing materials down from the site from the roof of the underground garage, as well as walking items down the stairway.

At the street level, materials were placed onto a trailer manually and then transported to the Curtain Factory warehouse.

6.2 Materials: Re-Purposing & Inventory Management

Materials were processed for re-purposing at the Curtain Factory, a large empty building with a large parking area that had been home to the Seattle Curtain Manufacturing Company since 1930 but recently went bankrupt and closed. Sledge was able to negotiate use of the empty building and lot with the current owner for a period of one year at a token monthly cost, in part to help prevent vandalism on the property. Sledge removed a large section of the building first floor wall abutting the parking lot to allow easy flow of lumber into and out of the processing area.

Trailer loads of harvested lumber were stacked in the large parking area. Inside the processing area wood was stripped, trimmed, and then finished. The finished wood was stacked to dry, and then sorted by length.

Figure 10 The rear parking area of the Curtain Factor

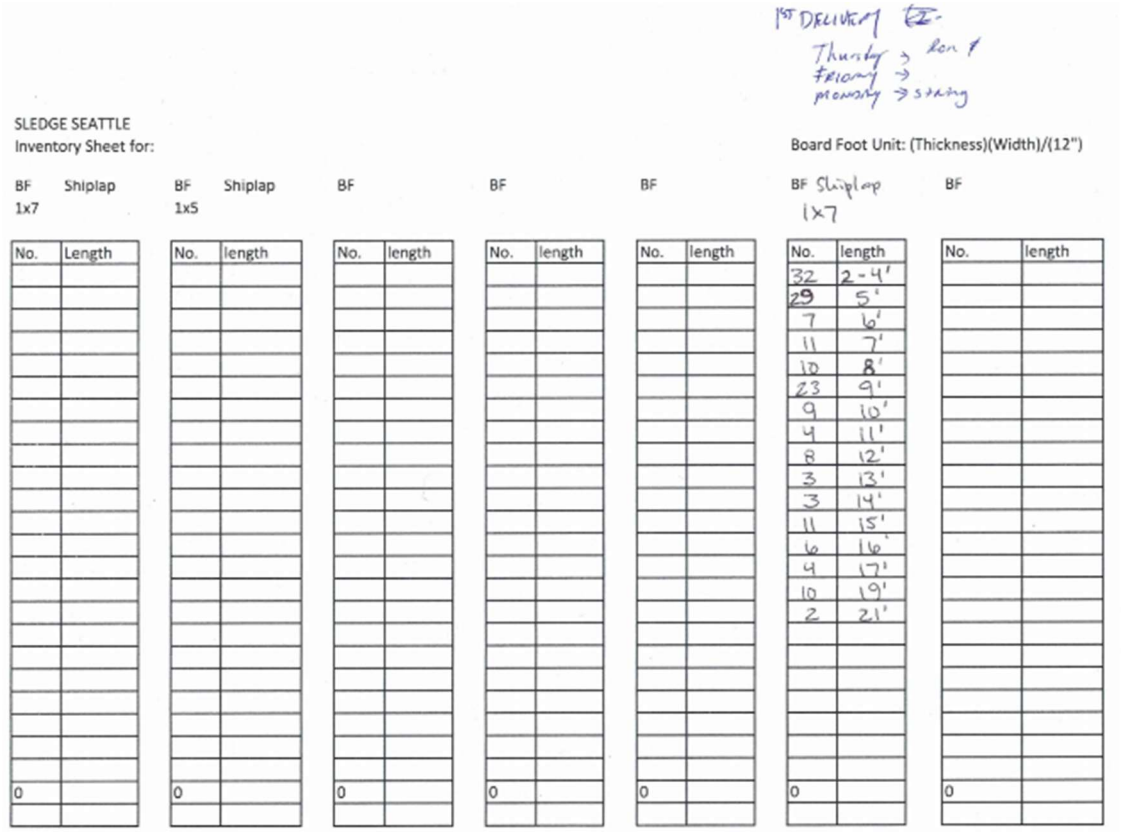
Figure 11 Crew unloading harvested wood from ShipLap at the Curtain Factory

Figure 12 Crew member Ron Ammann finishing processed lumber

Figure 13 Crew member Joshua Inman stacking finished lumber for drying

Figure 14 Re-milled and stained wood

During this process inventory was manually tracked on forms by the crew processing the wood. Sledge hired a consultant to create a spreadsheet-based entry and reporting system to manage the inventory.



1ST DELIVERY EZ-
Thursday → Ron #
Friday →
Monday → staring

SLEDGE SEATTLE
Inventory Sheet for:

Board Foot Unit: (Thickness)(Width)/(12")

BF 1x7 Shiplap		BF 1x5 Shiplap		BF		BF		BF		BF 1x7 Shiplap		BF	
No.	Length	No.	length	No.	length	No.	length	No.	length	No.	length	No.	length
										32	2-4'		
										29	5'		
										7	6'		
										11	7'		
										10	8'		
										23	9'		
										9	10'		
										4	11'		
										8	12'		
										3	13'		
										3	14'		
										11	15'		
										6	16'		
										4	17'		
										10	19'		
										2	21'		
0		0		0		0		0		0		0	

Figure 15 Sample inventory sheet used by crew to track harvested product

Manually gathering inventory data proved time consuming and distracting for the crew, but eventually they had incorporated it into their work process. However, Sledge and its consultant investigated various more automated forms of gathering, such as tagging and scanning each piece of material and they are still considering similar options for the future.

Sledge discussed the selling of materials to local reclaimed/salvage stores and heard back that a continual stream of dependable product would be required to make it work. This demonstrates how important it is to have robust inventory tracking and a consistent pipeline of deconstructions.

Once sorted and tracked, they lumber was moved into separate packages based on what was needed at the new building projects. These packages were placed on a trailer and moved to the new building sites, where they were either used immediately or stored for future use.

6.3 Materials: Use in New Construction

Deconstruction, re-processing, and re-use were parallel processes during this project. The lumber harvested from the ShipLap project was incorporated into six new building projects in Seattle. While deconstruction was still occurring at the site, the earliest materials harvested had been processed and were already incorporated into the first new building project.

The buildings incorporating harvested ShipLap product are listed in the table following table. Details of several of the projects follow.

Table 1 New building projects using lumber harvested from ShipLap

Project	Material Use
4724 31st Ave S	Exterior & Interior Siding, Unit Address Signage
9443 & 9449 5th Ave SW	Exterior Siding, floor, framing, joists
1043 S. Cloverdale St	Floor joists and roof rafters
1051 S. Cloverdale St	Floor joists and roof rafters
3017 SW Charleston St	Exterior Siding
3026 SW Charleston St	Exterior Siding
2353 23rd Ave S	Interior Features

6.3.1 4724 31st Avenue South

Project Taghus is located immediately across from the Columbia City Light Rail Station, in the former backyard of a single-family home that was converted into two lots in 2017. A 4-unit row house building was built in the front and a 9-unit apartment building was under construction in the rear. A lot that formerly held one single family home now was preparing to hold 13 single family residences in the same amount of land.

A siding package, harvested from ShipLap, was trailered to the Heathrow project site, where it was incorporated into the new apartment building.

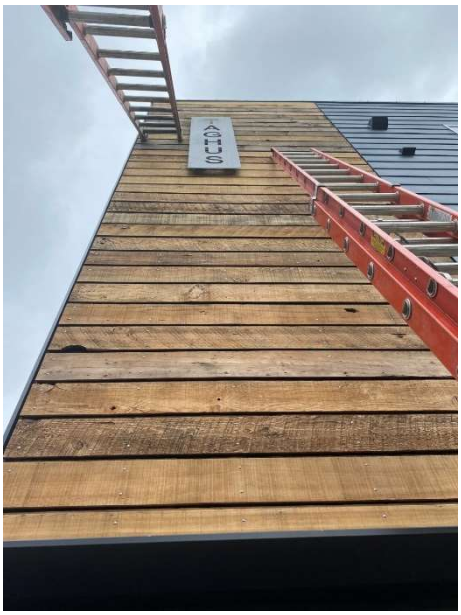


Figure 16 Heathrow rear apartment building with siding created from ShipLap harvest, south view

Figure 17 Taghus shiplap siding, north view

Figure 18 Painted shiplap being installed at Taghus

Figure 19 Exterior feature created with shiplap

6.3.2 9443 & 9449 5th Avenue Southwest

The Maple Lane project was built on a lot that originally contained a single-family home and a detached garage. The new design places three new construction single family homes, the existing home is remodeled, and the existing detached garage has been turned into a DADU, in the same lot – moving from a single 2-bedroom single family home to 5 single-family homes.

Figure 20 Lumber package, wood harvested from ShipLap, stored at the Maple Lane building site

Figure 21 ShipLap product as decorative exterior siding on the homes at Maple Lane

Figure 22 Closeup of kitchen island made with shiplap

Figure 23 ShipLap product used for kitchen island finish and ceiling joists

Figure 24 ShipLap product as ceiling joists in second Maple Lane home

Figure 25 ShipLap product as ceiling joists in third Maple Lane home

6.3.3 2353 23rd Ave S

The 23rd Avenue S project was a large lot with an existing home which was remodeled. The underlying second lot was large enough to put two standalone dwelling units. Originally a single-family lot now contained spacious homes for three separate families.

Figure 26 Rough sawn salvage used for interior features

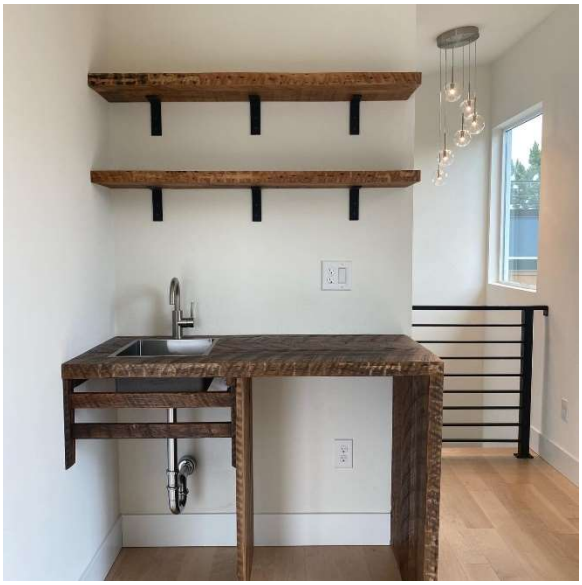


Figure 27 Kitchenette built with rough sawn salvaged material another project

7 Crew Impact

The founders of Sledge Seattle are passionate not just about waste and pollution reduction and materials reuse – they are also passionate about helping others in the community, especially interested in helping people who are formerly incarcerated. These are people who may run into roadblocks once returning to society, and Sledge wants to be a work environment that will mentor vs. hinder this group of people.

Most members of the deconstruction crews are formerly incarcerated individuals. Daniel 'Quest' Jolliffe, Sledge's head of deconstruction, is himself a former inmate, and is particularly dedicated to helping others succeed after incarceration. During this grant timeframe, Sledge hired and trained 22 individuals, 19 of whom were previously incarcerated, for a total of 20 previously incarcerated Sledge employees. 40% of these individuals have had success thus far and either continue to work with Sledge or have moved on to start their own business or to take a better job.[7] Status of these individuals is listed below.

[7] A 2018 study for the U.S. Department of Justice followed 401,288 state prisoners released in 2005 from 2005 through 20014. The study found that 44% of prisoners were arrested during the first year following release, 68% within 3 years, 79% within 6 years, and 83% within 9 years.

- 4 (20%) crew members are still employed with Sledge.
- 4 (20%) crew members moved on to more successful jobs.
- 8 (40%) crew members were either fired from, or left Sledge, because of issues with drugs or due to re-incarceration.
- 1 (5%) highly skilled crew member was laid off during the pandemic. Because of some low-level drug issues the individual was continuing to have, decreased workload during the pandemic led to the choice to lay him off.
- 1 (5%) crew member was reincarcerated due to drugs but was released and subsequently was able to find related employment. This individual contacted Quest to say he was back on track to success, and to thank Quest and Sledge for giving him the skills to help him get his current job.
- 2 (10%) crew members' whereabouts/situations are unknown.

Currently, the construction team consists of Quest and six crew members reporting to him. Four members of the team are previously incarcerated.

We conducted brief interviews with several of the crew members and a more extensive interview with the co-founder of IQ Solutions (and head deconstruction manager at Sledge), which hires and manages the crew. Excerpts of these interviews can be seen in a video created for Sledge Seattle which overviews the start-up and its goals[8].

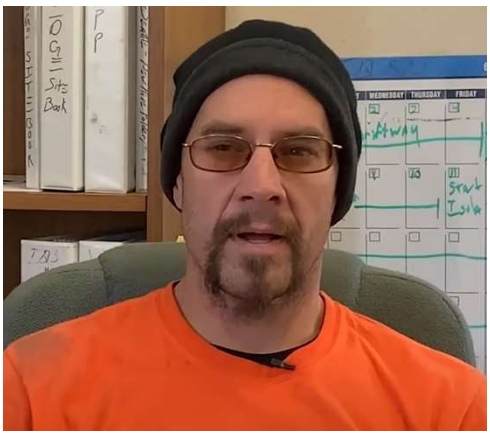
7.1 Crew Interviews

Quest's interview was conducted at the Curtain Factory and was a 30-minute interview covering his thoughts on the deconstruction business, his crew members, and his association with Sledge Seattle.

All crew member interviews were conducted on-site at the ShipLap project. Each crew member was asked to introduce himself, to say something interesting about himself, to elaborate about themselves as desired, and then to discuss anything they found interesting or meaningful about the ShipLap project. Finally, they were asked if they had any general advice on life. Interviews ranged between 5-7 minutes.

[8] https://www.youtube.com/watch?v=e1WYTBZN35A

7.1.1 Daniel "Quest" Jolliffe



Quest, Seattle Sledge's head of deconstruction, branched out in 2018 as co-founder of IQ Solutions[9], a start-up with an interest in finding novel methodologies for less destructive forms of demolition and more efficient tools for deconstruction, in an effort to make the choice for deconstruction over demolition an easier to make.

They have found that hand deconstructions are labor intensive and so time and financial intensive as well. In their initial efforts they attempted to salvage everything possible (fixtures, cabinets, etc.) – now they understand there are not necessarily markets for everything. They have identified that their most effective niche is in shiplap, clear vertical-grained fir flooring, old growth rough-sawn studs, floor joists, and rafters. These are no longer manufactured since the material is not available and so they are focusing salvage efforts on them.

Quest hires, manages, and oversees the deconstruction crews. He believes that most people would think his position would be difficult if they knew that almost all the crew members – and including Quest himself – were previously incarcerated. Quest says, however that it is actually the opposite, that the intense work focuses crews' attentions, and the dangerous nature of the work makes them well aware of the fact that not being attentive and careful could cause injury to themselves or their teammates – and he feels that most of them have risen to the occasion quite handily. The job also gives them – many of whom have anti-social tendencies – a 'home' of sorts, a place they can be where there's common ground.

He attributes the success of this effort to provide a chance to the crew members is the stewardship provided by the Sledge Seattle founder, Jim Barger, and co-founder John Benavente; he cites their welcomeness and openness as key to the success and flourishing of the crew. He believes that the opportunities and responsibilities they have been given at Sledge are not typically found by previously incarcerated employees at many companies where they are generally pigeonholed as potential problems.

Life/thoughts in general? *"There's a lot of really, really talented people coming out of difficult backgrounds, challenged backgrounds, questionable backgrounds. There's a lot of talented people and that has been really awesome to see and participate in and experience."*

Some of the details of Quest's interview can be seen in the project overview video, beginning at minutes 4:50 and 6:30.

Update, November 2020: Quest's company, IQ Solutions, continues to grow, and he maintains a close partnership with Sledge Seattle.

[9] https://www.instagram.com/iqsolutionsllc/

7.1.2 Jordan Jines

Jordan has worked for Sledge Seattle since they first started out, in 2017. He started as a laborer and is now a supervisor. He has had an opportunity to learn the deconstruction process, recycling and re-using, an alternate route of taking homes apart. The day I interviewed him was his last day with Sledge. He said that the Sledge founders have been great mentors, and over the last few months he made his own company, at which he has been working part time. Now he is prepared to launch fulltime with his own company.

He mentioned that this deconstruction project was taking longer than with others; they were trying a new method of pulling the nails from the lumber while it was still inside, saving time on the post-removal processing. Generally, a deconstruction can take three weeks or so, but this had taken 5 weeks. This one also had shiplap on the inside as well as the outside of the framing, yielding a greater amount of product.

He said the most difficult part of this is selling it – since a demolition is just a day; there do not seem to be strong incentives yet in the industry to do the deconstruction – they need to be shown and believe in the overall vision.

Life/thoughts in general? "*Working with this company, specifically Jim, has really helped me with perspective of life, as far as you know, taking time on the things that matter…especially seeing with reusing the wood…. reusing things in general…It changes your view on value and you learn to value things differently and to see value where people don't see value."*

Some of the details of Jordan's interview can be seen in the project overview video, beginning at minute 5:55.

Update, November 2020: Jordan continues driving his own business, which is going "phenomenally" according to Quest – and has even hired on colleagues who previously worked with Sledge Seattle.

7.1.3 Joshua Inman

Joshua works fulltime for Sledge Seattle and grew up in Lake Stevens north of Seattle, and currently lives in Marysville – quite a commute to Seattle. He likes to hike, fish, wander in the woods in his time off. He was working on multiple projects but is working part time on ShipLap. He had done about 7 deconstruction projects during 2019 by the time we spoke in September of 2019 and said what was different to him about ShipLap is that the lot was quite constrained and so it was more challenging, and that there had been a few 'wrinkles' in working out the inventory tracking, but not bad overall. He has never worked on traditional demolitions – and feels that although the job is a very hard job, it is worth being able to re-use the wood, salvage additional materials, and reduce waste to the landfills. He wants to do this for a while but is extremely interested in fisheries and would like to pursue a four-year degree in possibly wildlife biology.

Life/thoughts in general? "*Don't get stuck in a rut*!"

Update, November 2020: Joshua continued to work with Sledge Seattle and was eventually promoted to lead multiple crews, but more recently has moved on to work with Jordan Jines, his old teammate at Sledge.

7.1.4 Solomon Blue Tucker

Blue is Solomon's real middle name ("*I don't know what they were thinking…").* He said that this project is also taking longer because they were short staff here and there. While he has done other deconstruction projects, this is the first one he has been assigned to from top to bottom. They typically have a time limit and when they have reached that time limit, no matter how much material they have been able to harvest, the machinery will come on in to finish up the site. They do prioritize what they want most and go for that first. He felt that being assigned to a single project like this from start to finish has made him feel "*more like it was my baby…I felt more that it was my project through and through."*

Life/thoughts in general? There have been days, he said, when things have not gone well and "*it can also be depressing when you're like 'dude, I should have done that better'".*

Some of the details of Blue's interview can be seen in the project overview video, beginning at minute 6:14.

Update, November 2020: Blue has moved on and up! He was able to get a union slot and works on the massive blue gantry cranes that can be seen while driving on the 520 bridge. He has his own place, a car, a girlfriend and is, according to Quest, "totally content with a normal life now!"

7.1.5 Ron Ammann

Ron had just moved from San Diego where he had been doing construction/handy work for about 10 years. He had been back in the Seattle area for about 2 months, after deciding he would like a change of scenery – and he has family up here, he grew up in Olympia. He is enjoyed the opportunity to jump around on different projects and tasks to learn different areas of the deconstruction process.

Life/thoughts in general? *"Heck, I'm still trying to figure out life, I can't really give out advice…"*

Update, November 2020: Ron has been promoted to a lead position, drives his own assigned company truck, and has taken on some new responsibilities coordinating several special projects.

8 Community Impact

The community impact of hand deconstruction vs. the impact of demolition is real. In traditional demolition, heavy equipment is brought in to destroy a structure that may have stood for well over a century in a residential neighborhood. The destruction is like a bomb, spreading toxic dust into the air and into the soil & water, and potentially traumatic for the neighbors. It is completed usually within a matter of hours, and the scars of the demolished structure can be an ever-present reminder of the loss until new construction is well underway. Portland residents provide a template for the results of social organization which recognized the negative health impacts (especially upon already stressed lower income and non-white populations) that arise from demolition.

8.1 Resident Interviews

We did casual interviews with a few residents who lived within proximity of the project (no further than 4 homes away) mid-way through the hand deconstruction of the ShipLap project home. The proximity requirement limited the number of options for interviews (the project is at the end of the residential portion of a busy intersection with surrounding commercial properties.) Open questions were used, such as:

- "Are you aware of the ongoing work?"
- "Are you aware that it's a hand deconstruction?"
- "Do you have any thoughts about deconstructing a house versus demolishing it?
- "Have you noticed any impact to the neighborhood"

- “Anything else that you’d like to say?”

8.1.1 Dan

Dan is a middle-aged man and lives four houses to the north on the same side of the street He works at home all day long and has not been inconvenienced by noise or anything else related to the project, but he was very definitely aware that the project was going on and had greeted the Sledge crew the first time he saw them on the site. He walks by occasionally and says that the crew seems to be “very polite” and that they always wave hello to him, and “seem like very nice people”. He was glad to see that something was being done with the house because he thinks there have been water leaks in the past which have caused the street to become flooded and then iced over. He was impressed that the lumber was being re-used in new construction – and very excited when I was able to show him a few photos of some of the earliest-salvaged shiplap that had already been applied as decorative siding to a new apartment building in Columbia City.

8.1.2 Keith

Keith is a younger man, lives across the street, one lot to the north. He knew it was happening but is not usually home during the day and so said he has not noticed any impact. His roommates, who usually are home during the day have not mentioned anything about it, so he feels that they probably have not really noticed it as well. He had seen the deconstruction sign and thought it was more positive than doing a demolition.

8.1.3 Amy and Ken

Amy and Ken are a younger couple and live across the street, three houses north of the project. They walk a lot around the neighborhood with their baby in a stroller but did not notice the work until well after it had been in progress. Ken said that one day they were walking by and he said to Amy, when they passed by the project site, “wait, wasn’t there a house right there?” and they went over to read the deconstruction information sign. They were positive about the deconstruction effort and felt that it was much better for the environment to do a deconstruction rather than a demolition. They were not aware that the salvaged wood was to be used in new construction, and when told, were quite enthused and said that was “really great!” They felt that the project had not had any harmful impact on the neighborhood.

9 SHIPLAP: DIVERTED WASTE

Sledge ran approximately 13 deconstruction projects during 2019; 7 of those 13 deconstructions were full (vs. hybrid) hand deconstructions and were single family homes (vs. small commercial properties). These projects yielded 49.9 tons of salvaged wood.

Deconstruction Project Yield Comparisons

Project Name	Harvest by BF	Harvest by Weight (lbs)
ShipLap	11,534.92	31,890.52
Malden	7,137.42	19,627.90
Broadway	1,024.00	2,816.00
3017 Charleston	2,121.75	5,834.81
611 17th Ave E	2,024.58	5,567.60
4033 Ashworth Ave N	4,995.08	13,736.48
143 22nd	3,741.67	10,289.58
Total	**32,579.42**	**89,762.90**
Average Harvest Per Project	**4,654.20**	**12,823.27**

Figure 28 - ShipLap Lumber Salvaged Compared to Other Sledge Projects

Between 1996 and 2018, 4,999 demolition permits for single family homes were issued in the city of Seattle.[10] Even assuming that only 2/3rds of these family homes were good candidates for hand deconstruction, using our average harvest per project, that suggests that 7677 tons of wood could have been harvested and their carbon locked in, rather than released into the atmosphere, for additional generations.

ShipLap produced an abnormally large amount of lumber because it had shiplap both outside (typical) and inside (atypical in our experience) the framing. The materials harvested, broken out by type, are listed in the following table.

[10] http://www.seattle.gov/Documents/Departments/Housing/Footer%20Pages/Data%20and%20Reports/Residential%20Construction%20Permits%20by%20Year%20(New%20and%20Demo).pdf

ShipLap Project Harvest Details				
Member Types	**Total Members**	**Total Linear Feet**	**Total Board Feet**	**Total Weight (lbs)**
1x4	17	92.0	30.7	84.3
2x4	348	2,516.0	1,677.3	4,612.7
2x6	33	575.0	575.0	1,581.3
2x7	19	430.0	501.7	1,379.6
2x8	8	101.0	134.7	370.3
2x10	2	20.0	33.3	91.7
4x4	4	24.0	32.0	88.0
6x6	10	81.0	243.0	668.3
LapSiding1x4	336	2,034.0	678.0	2,034.0
ShipLap1x5	87	551.0	229.6	631.4
ShipLap1x7	1,065	11,798.0	6,882.2	18,926.0
TongueGroove1x3	106	801.0	200.3	550.7
TongueGroove1x4	51	376.0	125.3	344.7
TongueGroove1x7	54	329.0	191.9	527.8
Total	**2,140.00**	**19,728.00**	**11,534.92**	**31,890.52**

Figure 29 - ShipLap Lumber Salvaged, Details

10 Project Cost Breakouts

The approximate cost of the entire project was $70,082.50. $10,000 was funded by the Seattle Public Utility Waste Reduction Grant and the remaining $60,082.50 was paid by Sledge.

The value of the harvested lumber was estimated at $4.00 per board foot[11], or a total of $46,139.68. Deducted from those sales was the cost of finishing the wood, at $1.25/board foot, for a net revenue of $31,721.03, leaving a net project cost of $38,361.47.

Because a total of $20,000.00 was paid to a consultant to manage and complete the grant deliverables, an expense that is not typical to the process, we cite an 'Estimated Project Cost' less than $20,000 fee, or $18,361.47.

A traditional demolition for a single family home similar in size costs approximately $18,800.00[12]. The estimated project cost (i.e., deconstruction cost) of $18,361.47 is 2.4% less than the estimated cost of demolition.

[11] Price includes a 25% factor for overhead costs; this price varies widely due to the character of the material salvaged.

[12] Quote from I.Q. Solutions for a 2772 sq. ft. single family home. This number does not include foundation removal or site grading/preparation due to the owner wishing to perform these activities separately. The price for a complete demolition ending with a shovel ready site would be significantly higher.

ShipLap Project Cost Breakdown		
Item	**Amount**	**Explanation**
Project Costs	$70,082.50	Total costs paid for project deliverables by Sledge Seattle
Project Revenue	$31,721.03	Sale of 11,534.92 BF of lumber for $4.00/BF - $1.25/BF finishing
Project Costs - Revenue	$38,361.47	Total costs after revenue adjustment
Grant Management Fee	$20,000.00	Deduction of non-typical $20,000 grant management consulting fee
Estimated Project Cost	**$18,361.47**	

Figure 30 Project costs breakdown

11 Waste Reduction

This effort resulted in 31,890.52 pounds of lumber which was diverted from landfill and re-incorporated into homes in Seattle.

Because of complications of the 2020 pandemic and industry restrictions, as well as the developer's requirements for this project, we have not yet received the final dump certificates – however, we are able to estimate the debris by comparing the structure size to data from 30 similar deconstructions.

It is estimated that total debris from the site is at 94.68 tons, with a 17% reduction in debris due to salvaging 16 tons of lumber; an estimate of total reduction by mass, however, is probably closer to a 35% reduction.

12 Successes and Challenges

There were several important successes during the 18 months of this project.

- We provided new jobs and training opportunities for the community. And, in our specific case, we serviced a population of workers that, because of their backgrounds as having been previously incarcerated, may be at higher risk of not finding steady, rewarding, and well-paid work. Team members were able to grow their skills and improve their life situations. Compare a traditional demolition crew consisting of 2: one person to operate the excavator, and another to spray the debris with potable water to limit dust pollution, for a few hours, vs. crews of 4-6 members working for 4-6 weeks.
- We were able to divert 16 tons of old growth lumber into new homes in Seattle, avoiding a potential introduction of 28 tons of CO2 into the atmosphere – all from one single family home project.
- We discovered new products for the materials as we harvested them, such as exterior siding, flooring, cabinets, tiny houses, and more.

However, there were also multiple challenges, some of which we were able to mitigate.

- Physical site restrictions were challenging – the footprint was quite small, with very close-by neighboring buildings, little space for on-site processing, and a height of 10 feet separating the

home from the street level. However, the crew members' flexibility and creativity overcame all of these, e.g., by using a parallel vs. linear operation process.

- Having a central location to store wood is needed and requires space. However, to afford that type of space is expensive and as a startup, is not something that we can afford. We have been able to find creative solutions (such as the 'abandoned site of the Curtain Factory during 2019 and the early part of 2020, and later, at Magnum (an empty storage building in south central Ballard). Going forward we need to identify a more permanent solution.
- Delays and errors during process steps (rat abatement, asbestos mitigation, power and gas disconnect, etc.) occurred because deconstruction crews were not able to control these processes; they are reliant on either the developer or the general contractor. Fortunately, our crews and deployment practices allowed us to work around these issues, but in the future, it is imperative for cost and time efficiencies that the deconstruction contractors have control over site preparation (or partner with developers/general contractors who understand deconstruction)
- Costs were incurred each time we needed to move the lumber – so from deconstruction site, to processing site, to the new building project. We are currently mitigating this by experimenting with constructing walls at the site of the deconstruction which are then shipping them directly to the building site. Though these are in part offset by the reduction in payment of "dump fees" to the King County CND facilities & the sale of the salvaged wood.

Figure 31 Reclaimed framing being assembled at the Maple Lane project

And some challenges remain challenges for which we do not currently have solutions.

- Finding inducements for property owners/developers to deconstruct rather than demolish their structures is difficult. We lobbied long – and successfully – for an early demolition permit (rather than waiting for the construction permit to be issued) projects employing deconstruction vs. demolition. That gave owners/developers a great time advantage that could offset any time and cost increase in using deconstruction. However, that success was quickly nullified when the city decided to extend the early demolition permit option to all projects, regardless of whether hand deconstruction or traditional demolition was to be used.

- The extra time requirement and increase in costs in hand-deconstruction vs. traditional demolition will continue to be a block to large scale hand-deconstruction, demolished home waste reduction, and decreased release of currently trapped CO2 in residential structures in Seattle. While there are solutions such as the mandatory deconstruction ordinance for certain structures in Portland, the city of Seattle has yet to make progress in that area.
- The lack of any unified "certified deconstruction contractor" system of training and assessment, and training continues to assure that deconstruction startups will fail in Seattle because there is no legitimization of deconstruction as a viable and acceptable alternative to de
- Seattle Public Utility still does not track 'deconstruction' on the waste assessment and salvage forms[13], meaning that we operate in the dark and the city has no insight to all the waste reduction contributed by deconstruction vs. demolition of structures.

[13] SPU as a 'Deconstruction' tab on the form, but they do not track this information, nor does the material get so identified as coming from a deconstruction. It is all in one bucket (demolition).

13 CONCLUSIONS

The two major factors that have generally impeded the choice of a hand deconstruction are:

- potential project delay – three-four weeks for hand deconstruction vs. a single day for a demolition
- an associated increase in labor costs
- deconstruction in the current financial climate is not financially sustainable, breaking even is our goal with each project. Due to the unique circumstances of this project we managed to eke out a small return, however this is unusual, and most projects are a loss.

There is a lack of regulatory incentives which could make demolition harder and more expensive to level the playing field. However, we believe that the side benefits of increased jobs and skills learning opportunities, reduced pollution, waste, and disturbance, and the recovery of our Pacific Northwest tree heritage in the form of embodied energy outweighs in the long run the increased time of the hand deconstruction process. To realize these benefits, however, long term impacts must be recognized as outweighing short-term profits.

The city of Portland has researched, tested, and validated the potential benefits of deconstruction. Profit-based industries may find it difficult to take personal short term financial hits for the long-term benefit of society and the environment. Thus, the actions the Portland City Council, specifically in association with Shawn Wood of the Bureau of Environmental Services, have taken to ensure that long term benefits are realized are excellent lessons to which other cities should pay heed.

We have proven deconstruction of Seattle homes is financially feasible and potentially even profitable. However, real action from others in the building and development community and city of Seattle leaders, as well as King County and Washington state leaders, can help make deconstruction a healthy and sustainable building removal alternative.