

Demolition Reuse and Recycling
Oscar J. Boldt Construction
Final Report
St. Marys Hospital in Madison, Wisconsin

BOLDT®



Prepared by:



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Introduction

Construction of the expansion of St. Marys Hospital in Madison, Wisconsin got underway in the summer of 2005. Phase I of the project – the demolition or relocation of buildings occupying two square blocks of land near the hospital was completed in May of 2005. Both the hospital and the general contractor wanted the removal of the existing buildings to be handled in a way that would permit the reuse and recycling of as much material as possible from the site.

This high-profile project has served as an excellent demonstration of how demolition waste can be reused or recycled instead of landfilled. Oscar J. Boldt Construction, the general contractor, hired WasteCap Wisconsin to develop a demolition waste management plan and provide some demolition waste management services.

Successful waste reduction, reuse and recycling at the St. Marys Hospital demolition site was made possible through the cooperation of every person on the site and many off site – the owner, contractor, subcontractors, hauler, local resource people, and many others.



The project achieved a 95.46% reuse and recycling rate and saved over \$200,000 by reuse & recycling

At the end of the 13-month project period, our overall recycling rate by weight was 95.46% and by volume was 83.78%. During this project, 9 out of 24 houses on the site were relocated and approximately 11,720 tons of trash was kept out of Wisconsin landfills. The project also saved over \$200,000 by reusing and recycling.

All Madison demolition projects are required to submit a demolition waste management plan. The St. Marys plan was the first-in-the-city (and state) demolition waste management plan approved by the City of Madison. WasteCap Wisconsin wrote the Demolition Waste Management Plan in cooperation with Boldt Construction and Boldt Construction was responsible for the overall management of that plan. A copy of the Demolition Waste Management Plan is attached to this report as Appendix A.

Boldt's activities included: locate and label containers; instruct and educate employees and subcontractors; coordinate with reuse and recycling markets; monitor trash and recycling bins for compliance. WasteCap activities included: provide recycling and reuse technical assistance and research support; conduct site visits; summarize waste results; evaluate the demolition waste management results; evaluate the project economically. WasteCap also investigated and located markets for various reusable and recyclable materials. This report addresses each of these tasks.

1. Provide Technical Assistance, Market Information and Research Support to facilitate increased reuse and recycling

Since recycling began in March 2004, WasteCap, Boldt, and all contractors helped facilitate the recycling and reuse of materials for many materials generated from the demolition site. Instead of hauling the **concrete foundations of the 24 homes** to the landfill, WasteCap suggested that Boldt test the concrete for the presence of lead based paint. The tests concluded that only one wall of one foundation needed to be landfilled due to lead based paint; the remaining foundations were recycled. As a result, 2,270 tons of concrete was recycled and only 40 tons needed to be landfilled, resulting in a savings to the project of \$76,045 through this step alone.

Madison Crushing and Terra Construction recycled the **concrete and asphalt** from the site. Madison Crushing recycled a total of 5,416 tons of concrete from the site. Terra Construction recycled 4,705 tons of concrete and 907.73 tons of asphalt from the site. The asphalt recycled was from the roads which were removed as part of this project. It was recycled and used in site improvements at Terra Construction. The concrete



recycled by Terra Construction was a combination of the concrete from footings from the houses which were removed, concrete from demolition which needed to be done on the existing St. Marys Hospital in order to do the addition, and concrete from the commercial buildings. Concrete is being ground and used as road base or as aggregate for new concrete.

Concrete and asphalt was recycled from roads, the existing building, and removal of commercial buildings.

The **trash** was primarily generated from the demolition of 15 houses and 11 garages. Trash quantities were

provided by Royal Container and Madison Crushing, who hauled and disposed of the trash from the demolition.

WasteCap provided contact information and set up initial discussions between Habitat for Humanity and the project. Before the 15 homes were demolished, the Madison chapter of Habitat for Humanity went through each home pulling out valuable materials which can be reused on future homes. Habitat Restore pulled over 37 tons of material out of the homes. **Materials reused** included light fixtures, kitchen cabinets, doors, maple flooring, oak trim, shelving – even the kitchen sinks.

Approximately 114 tons of **wood** was also recycled and reused from the St. Marys site. Much of the wood was taken by site workers to be used as firewood. The Centennial Oaks which needed to be cut down for the project were given to Bjorn Karlsson, a local woodworker, who turned them into commemorative furniture for the new hospital. 34

tons of wood was sent to a local dairy farm and ground into wood chips for animal bedding and soil additives.

Nine houses and three garages were kept out of landfills by being **moved for reuse**. The total square footage of these houses (without basements) is 16,740.7. If these houses and garages were landfilled, using US EPA estimates of 61 pounds per square foot for residential demolition debris¹, 1,021,182.7 pounds of demolition debris would have gone into WI landfills. Moving the structures kept 510.59 tons of demolition debris out of landfills, and saved all of the resources that building new homes and garages would have used.

WasteCap provided a list of markets by material for use by Boldt Construction and investigated the potential for recycling of metal and brick. Many **other** materials were taken off site to be recycled or reused. A comprehensive list can be found at the end of this report in Section 3 Document Waste Management Results, Table 3.

2. Instruct and Educate Employees and Subcontractors

WasteCap provided Boldt Construction with various educational materials for the education of employees and subcontractors, and provided them copies of the Reuse Tracking Form to record any materials they removed from the site destined for reuse. A



copy of this Reuse Tracking Form can be found in Appendix B.

3. Document Waste Management Results

WasteCap collected records from haulers, processors and end markets to document the weight of trash, reusable and recyclable materials removed from the work site.

To document results, records were collected from contractors, haulers, processors, end markets, and others

Foremen or other workers filled out the Reuse Tracking Form and returned them to Boldt, providing information about materials (such as firewood) that were removed from the site for

reuse or recycling. WasteCap and Boldt Construction emphasized to foremen that it is very difficult to track reuse of these materials without their assistance. Off-site reuse and recycling is by far the most difficult category of material to track and document. Our measurements of off-site reuse or recycling are based on estimates made by those who received the recycled materials. We believe that our measurements are conservative.

¹ Franklin & Associates. "Characterization of Building-Related Construction and Demolition Debris in the United States" 6/15/1998. Order number EPA 530-R-98-010

WasteCap created summaries from these records to report the quantity of each material recycled and reused. We also documented the recycling process through the use of digital photography.

Table 1 shows the waste and recycling results during demolition. A total of 12,278 tons of debris would have been generated from this project. 557.45 tons of debris was actually landfilled from this project. The rest was reused – nine houses and three garages moved, materials reused by Habitat for Humanity, wood reused to make commemorative furniture, etc. or recycled – metal recycled into new metal products, asphalt made back into asphalt and concrete ground for aggregate for new concrete. Concrete accounts for the highest proportion of recycled materials by weight. The total recycling rate for the 13-month period from March 2004 to April 2005 was 95.46% by weight and 83.78% by volume.

Table 1: Demolition Waste Reuse and Recycling Results from March 2004 to April 2005.

Material	Trash		Recycling and Reuse	
	Weight (tons)	Volume (cubic yards)	Weight (tons)	Volume (cubic yards)
Trash	557.45	2,285.37		
Concrete			10,121.35	6,992.00
Asphalt			907.73	448.26
Metal			4.265	32
Moved Houses & Garages			510.59	3,405.64
Wood Reuse			114.2	713.71
Other Reuse			61.8	211.17
Total	557.45	2,285.37	11,720.37	11,802.78
Recycling Rate by weight			95.46%	
Recycling Rate by volume			83.78%	



Without reuse and recycling, 12,278 tons of material would have been landfilled. 557.45 tons was actually landfilled.

Table 2, below, details the reuse of the nine houses and three garages, the square footage of each, and the calculated weight and volume that they would have generated if landfilled:

Table 2: Reuse of Houses and Garages

Material	Address	Total square footage(1)	Weight (tons) if landfilled(2)	Volume (yd ³) if landfilled(3)
House	915 Beacon	1,550.25	47.28	315.38
House	921 Beacon	1,090.20	33.25	221.78
House	922 Beacon	1,073.25	32.73	218.34
House	931 Beacon	2,022.75	61.69	411.50
House	709 Brooks	2,871.00	87.57	584.06
House	717 Brooks	1,215.00	37.06	247.17
House	809 Brooks	2,045.25	62.38	416.08
House	918 Delaplaine	1,377.00	42.00	280.13
House	919 Erin	2,600.00	79.30	528.93
Garage	Garage	320.00	9.76	65.10
Garage	914 Deplaine	257.00	7.84	52.28
Garage	914 Beacon	319.00	9.73	64.90
Reuse Total	9H, 3G	16,740.70	510.59	3,405.64

(1) Total square footage does not include basements. Basements recycled separately.

(2) US EPA estimates 61 pounds per square foot for single family demolition.

(3) Volume based on EPA estimate of 6.67 cubic yards per ton of trash.

Nine houses and three garages were moved for reuse by Anchor Management, under contract with Boldt Construction



Table 3: Reuse Detail. Table 3 details the materials, other than the houses and garages, which were reused instead of landfilled from the project

Name	Material Reused or Recycled	Weight (pounds)	Volume (yd³)
Madison Fire Dept	Wood pallets (32)	1,440	2.40
Firewood Producers	Logs delivered to firewood producers	36,000	74.00
Dairy Farm	Wood chips for bedding and soil additives	66,527	136.75
Habitat ReStore	Reused materials from houses	30,227	100.81
Kenny Kedler	Firewood (truck load)	5,920	18.50
David Uselman	Two water heaters	300	4.00
David Uselman	Two furnaces	200	4.40
Gerald Erdahl	About 3,000 cream city bricks	15,000	4.44
Boldt	Paint 453#, non-latex, Madison Clean Sweep	453	10.00
Midwest Lamp Recyclers	Fluorescent Lights & Ballasts	938	0.28
Madison Recycling	21 mercury thermostats	1	0.00
Jack Johnson	Wrought iron railing	100	1.00
Habitat ReStore	Reused materials from houses	24,829	82.76
Bjorn Karlsson	Centennial Oaks to make furniture for hospital	4,000	16.54
Boldt	800 ft of phone line salvaged	200	2.00
Madison Crushing	Handicap Ramp to be used as pier	1,000	5.00
Madison Crushing	Two furnaces	200	4.40
Madison Crushing	Two water heaters	300	4.00
Madison Crushing	One water softener	50	1.50
Robert Reeoe Jr.	Firewood - 1 cord	4,600	4.74
John Foss	Firewood - 1 cord	4,600	4.74
Matt Carpenter	Firewood - 1 cord	4,600	4.74
Warren Sterken	Firewood - 4 x 8 trailer load	4,600	4.74
Habitat ReStore	Reused materials from houses	22,484	74.98
Travis Neuberger, Boldt	Firewood - 1 1/2 cords	6,900	7.11
Ron Shutuet	Firewood - two cords	9,200	9.48
MG&E	Miscellaneous power line	1,330	2.00
Mike Roark	Firewood - 20 cords	80,000	250.00
Habitat ReStore	Reused materials from houses	26,870	89.57
	Total	352,868	924.88
	Total Tons	176	

Table 4. Conversion Figures. In order to calculate the volume or the weight of materials for which complete data was not available, conversion figures were used. For example, for firewood, it was known how many cords of wood were used from the project. This number had to be converted into volume and weight. In order to come up with the most accurate conversion numbers, we asked those in the industry who would be the most familiar with the material, or used numbers from US EPA. The conversion numbers used are below.

Table 4: Conversion Figures

EPA Conversion (1)	Trash	Cardboard	Metal	Wood	Concrete
Average Yards Per Ton	6.67	28.57	8.27	6.25	2.00
Average Tons Per Yard	0.15	0.035	0.12	0.16	0.50

(1) EPA Standard Volume-to-Weight Conversion Factors:

http://www.epa.gov/recycle.measure/docs/guide_b.pdf.

- BTL Pallet estimates that one pallet weighs 45 pounds and 600 lbs = 1 yd³.
- Wisconsin Firewood estimates that one cord of wood is 4' x 4' x 8'. Dry weight: 2,700 lbs. Green wood: between 4,200 and 5,000 lbs. 1 cord = 4.74 yd³ and since this is from new trees, 4,600 lbs.
- Champion Brick estimates that Cream City Brick weighs 5 pounds each and is 3 5/8" x 2 1/4" x 7 5/8" long. (3.625 x 2.5 x 7.625 = 69.10 cubic inches. 1 cubic yard = 46,656 inches. 1 brick = .00148 yd³).
- Furnace, water heaters and water softener weights and volumes were estimated by a licensed plumber.
- Onyx Special Services, a fluorescent tube recycler, stated that 4' bulbs weigh 1/2 pound each, 8' bulbs and U bend bulbs weigh 1 pound each, these ballasts likely weigh 4 pounds each and the bulbs are likely t-12 and thus 1" in diameter.
- Terra Construction provided conversion figures for concrete and asphalt as follows: Average weight of load = 37,050 lbs/load. Average = 150 lbs per cubic foot.

4. Evaluate the Project Economically

WasteCap collected data from haulers and processors regarding the actual costs paid by this project for hauling and disposal fees for trash and recyclable materials and rebates for materials where applicable. Companies who provided information included Oscar J. Boldt Construction, Royal Container Service, All Metals Recycling, Habitat for Humanity, Madison Crushing, Terra Construction, Mike Roark Forestry, and Anchor Management. To calculate the costs without reuse or recycling, the actual cost to the project for trash of \$36 per ton was used. Table 5 shows a summary of costs with and without recycling from March 2004 to April 2005.

As shown below, even with the significant additional cost of moving the houses instead of demolishing them, the project saved **\$ 234,622.64** by reusing and recycling materials rather than landfilling all materials.

Table 5: Summary of Actual Disposal Cost and Calculated Disposal Costs Without Reuse and Recycling

Material	Actual Cost	Cost if Trash
Trash	\$20,455.20	\$20,455.20
Concrete	\$25,303.38	\$364,368.60
Asphalt	\$2,269.33	\$32,678.28
Metal	\$0.00	\$153.54
Moved Houses & Garages*	\$170,625.00	\$37,881.29
Reuse	\$0.00	\$6,351.63
Total	\$227,265.90	\$461,888.54
Savings By Recycling/Reuse		\$234,622.64

This amounts to a 50% savings in disposal costs over the 13-month period from March 2004 to April 2005 during deconstruction for St. Marys Hospital.

* The moved houses and garages compare the actual cost with labor for moving them and the projected cost of disposal plus labor for putting them in the landfill.

Table 6 details the house/garage reuse vs. landfilling comparison referred to above. It compares the actual cost to move the nine houses and three garages to the calculated cost if the houses were landfilled. The costs include the actual labor cost and all other associated actual costs with the projected labor cost and disposal cost.

Table 6: House and Garage Reuse Cost vs. Demolition Cost

Material	Address	Cost of Trash if demolished (1)	Cost of Labor if demolished (2)	Total Cost if demolished	Actual Cost (3)
House	915 Beacon	\$1,702.17	\$2,000.00	\$3,702.17	\$17,500.00
House	921 Beacon	\$1,197.04	\$2,000.00	\$3,197.04	\$17,500.00
House	922 Beacon	\$1,178.43	\$2,000.00	\$3,178.43	\$17,500.00
House	931 Beacon	\$2,220.98	\$2,000.00	\$4,220.98	\$17,500.00
House	709 Brooks	\$3,152.36	\$2,000.00	\$5,152.36	\$17,500.00
House	717 Brooks	\$1,334.07	\$2,000.00	\$3,334.07	\$17,500.00
House	809 Brooks	\$2,245.68	\$2,000.00	\$4,245.68	\$17,500.00
House	918 Delaplaine	\$1,511.95	\$2,000.00	\$3,511.95	\$17,500.00

Material	Address	Cost of Trash if demolished (1)	Cost of Labor if demolished (2)	Total Cost if demolished	Actual Cost (3)
House	919 Erin	\$2,854.80	\$2,000.00	\$4,854.80	\$17,500.00
Garage	Garage	\$351.36	\$500.00	\$851.36	\$4,375.00
Garage	914 Deplaine	\$282.19	\$500.00	\$782.19	\$4,375.00
Garage	914 Beacon	\$350.26	\$500.00	\$850.26	\$4,375.00
Reuse Total					
	9H, 3G	18,381.29	19,500.00	37,881.29	170,625.00

(1) Using \$36 per ton - actual cost charged to job

(2) Per Oscar J. Boldt Construction

(3) Cost of moving houses incurred by Anchor Management.

Although it was more expensive to relocate the 15 houses than it would have been to demolish them, a great deal of landfill space was saved. Had the homes been demolished, they would have taken up over 3,400 cubic yards of space in Wisconsin landfills. In addition, as shown above, reusing and recycling overall provided a significant cost savings to the project.

Summary and Conclusions

Overall, much more concrete and asphalt was generated than was anticipated and less trash and recyclables from the overall project were generated. It was anticipated that 2,100 cubic yards of concrete and asphalt would be generated. There was actually 7,440 cubic yards of concrete and asphalt generated. Project projections showed 2,691 projected tons of other trash, reusables and recyclables. Actual generation was 1,248.74 tons of these additional materials.

Thus, providing more documentation of actual tonnages and volumes from projects will help provide better estimates for the future, allowing contractors to better estimate and recycling plans to be in place ahead of time.

In addition, this project did an excellent job of reusing and recycling. Challenges included knowledge and availability of reuse markets. Thought and knowledge by project staff was key to the reuse of materials from the site. A lesson of this project is that when it is make clear that a project is committed to reuse and recycling, staff creativity can result in significant cost and environmental savings.

The project would have spent approximately twice as much in disposal costs without reuse and recycling. Also, of course, the 95% recycling rate is impressive. It could be argued that asphalt from road removal and the moved houses and garages should be removed from the recycling rate as these activities “would have been done anyway.” If they are removed from the total, the project still achieved a 94.87% recycling rate.

The cooperation and commitment of all project partners was key to success. WasteCap Wisconsin congratulates St. Marys Hospital, Boldt Construction, and all partners on their reuse and recycling leadership.

Contact Information

For more information, contact:

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Appendix A

Demolition Waste Management and Recycling Plan St. Marys Hospital Expansion July, 2004

I. Contact:

Mr. Gus Schultz,
Director, Madison Operations
Oscar J. Boldt Construction
740 Regent Street, Suite 202
Madison, WI 53715
Phone: 608-257-2430
Fax: 608-257-4278
gus.schultz@boldt.com

II. Scope of Project:

St. Marys Hospital in Madison, Wis. plans a major expansion and renovation of their facilities over the next several years. Oscar J. Boldt Construction is the construction manager.

The hospital will expand eastward to occupy two square blocks of land currently utilized primarily for mixed single- and multi-family housing. There are also two commercial properties in this area.

The first phase of this project involves clearing the two square block area of all structures and preparing the site for construction to begin. Both the hospital and the construction manager desire that removal of the existing buildings be handled in a way that will permit the reuse and recycling of as much material as possible from the site.

Phase 1 environmental analysis of materials on this site has been completed. Phase 2 environmental work is currently in process.

III. Site Description and Description of Materials Anticipated to be Generated

A. Site Description

The area to be cleared is bounded north, east, south and west by Erin Street, Park Street, Delaplane Court, and South Brooks Street, respectively. It is a fairly typical urban mixed residential and commercial neighborhood featuring quiet tree-lined streets and well-kept homes, interspersed with busy traffic corridors and declining properties.

Within this area there are 28 major structures: two commercial properties fronting on Park Street; two brick 6-unit apartment buildings; and 24 wood frame single- and multi-family dwellings. There are also 14 garage/outbuildings.

B. Materials Anticipated to be Generated -- Commercial

- Built-up roof
- Carpeting
- Concrete
- Bricks and concrete block (mostly painted)
- Painted Drywall
- Electrical components and wiring
- Plumbing fixtures and piping
- Lighting fixtures
- Doors and hardware
- Glass windows
- HVAC systems
- Metals
- Steel beams
- Floor Tile
- Painted wood

C. Materials Anticipated to be Generated – Residential

- Asphalt roof shingles
- Unpainted brick (from apartment buildings and garages)
- Cabinets, counters, countertops, shelving
- Carpeting
- Concrete and block foundations (some painted)
- Concrete driveways and curbs
- Doors and hardware
- Painted Drywall
- Electrical components and wiring
- Insulation
- Land-clearing debris
- Lighting fixtures
- Linoleum and other types of composite flooring
- HVAC systems (furnaces and ductwork)
- Plaster
- Stairways and railings
- Plumbing fixtures and piping
- Siding
- Windows
- Structural dimensional lumber
- Painted wood
- Wood flooring

D. Quantities Anticipated: Assuming an average of 1,600 square feet for single-family houses and 1,000 square feet for multifamily houses, US EPA estimates 61 pounds per square foot (ppsf) for single family and 115 ppsf for multifamily houses. Assuming an average building size of 13,300 square feet for buildings built between 1920 and 1969, US EPA used 155 ppsf for nonresidential buildings. Thus, the total project will generating the following, some of which will be diverted due to reuse or recycling:

- Recovered due to reuse of nine homes: 439 tons (1,600 ft² x 61 ppsf x 9)
- Residential demolition debris from remaining 15 homes: 732 tons (1,600 ft² x 61 ppsf x 15)
- Demolition debris from 14 garages: 107 tons (250 ft² x 61 ppsf x 14)
- Demolition debris from two multi-family homes: 690 tons (1,000 ft² per unit x 12 units x 115 ppsf)
- Commercial demolition debris from two structures: 1,162 tons (15,000 ft² x 155 ppsf)

Total projected material from project: 2,691 tons (3,130 total tons – 439 tons in nine homes which will be moved)

In addition, the construction manager estimates there are 600 cubic yards of asphalt and 1,500 cubic yards of concrete in the project area.

IV. Project Timing

Construction of new hospital facilities is scheduled to begin in early 2005. Clearing of the land for the project will be conducted in two stages. Stage one, which involves removal of the buildings immediately east of South Brooks Street, is scheduled to begin in August 2004 and be completed by the end of 2004. The two buildings fronting on Park Street and some buildings along Erin Street and Delaplaine Court will remain on the site temporarily to serve as a visual barrier from the Park Street traffic corridor until later in the construction project. Their removal is anticipated in mid to late 2005.

V. General Demolition and Recycling Plan

The general demolition/recycling plan for this project incorporates waste reduction, removal and reuse of materials, salvage, and waste recycling as primary strategies.

Waste reduction and reuse will be achieved by moving several of the homes on the site for use at other locations. St. Marys Hospital and its partner in this endeavor, Anchor Property Management, have identified 9 of the 24 homes in the project area as suitable for this process. Sites for three of the homes to be moved have been identified. Work continues on finding locations for the other six homes.

Reuse, salvage and recycling will be the overall responsibility of the demolition contractor. The owner, or its representative, will prepare a request for proposal (RFP) specifying that this project desires that as many materials as possible from this project be reused, salvaged or recycled in order to minimize the impact of waste in landfills and reduce project expenses. At a minimum, the demolition project will require concrete from sidewalk, driveways, curb and gutter, building slabs and foundations, and asphalt paving from streets driveways and parking lots to be recycled.

Demolition and salvage contract bidders will be asked to evaluate the potential for recycling metal components (e.g. furnaces, ductwork, plumbing pipes, and electrical wiring) and brick from the buildings. The bidders will also be asked to evaluate the possibility of salvaging other building components, such as fixtures, flooring, cabinets, etc. They will also be encouraged to work with local and state recycling organizations to find as many markets for these items as possible.

The demolition and/or salvage contractor(s) selected for this project will be required to document all material taken from the project site and report at least monthly to the owner or general contractor. That report will contain a list of the materials taken from the site, the weight and volume of the material, the destination of the material, and the final market for the material. At the conclusion of the demolition phase of the St. Marys Hospital Expansion Project, WasteCap Wisconsin will issue a final report summarizing the results of these recycling efforts.

The RFP will be sent to a list of qualified demolition and salvage contractors in the region. (See Appendix B for a partial bid list.) Selection of the successful bidder(s) will be based on the bid price, the ability of the contractor to meet the project schedule, contractor qualifications to do the work, and the ability of the contractor to meet the owner's desire to divert material from landfill.

A recycling rate of at least 30 percent is expected for this project.

VI. Materials-handling procedures

All contractors and subcontractors involved in the demolition project will abide by the guidelines stated below. The goal is to minimize the environmental impact of the demolition and properly manage all waste materials.

A. Hazardous Materials

Asbestos abatement has begun and asbestos-containing materials will be removed. In addition, the properties are being inspected for any other hazardous materials including lead, mercury thermostats and fluorescent tubes. A local fluorescent tube recycler will recycle fluorescent tubes. If any mercury or other hazardous materials are found, they will be properly managed as hazardous waste.

B. Concrete, Brick, and Block

Concrete will be tested for lead bearing paint. If there is no lead based paint on the concrete, it will be recycled for aggregate. If there is lead bearing paint on the concrete, the material will be taken to a licensed solid waste landfill.

C. Scrap Metal

An effort will be made to recover and recycle as much scrap metal as possible from the buildings in the project area. Scrap metal includes furnaces and ductwork, plumbing pipe, electrical wiring, and steel structural members. There is concern however, that extensive recovery of metal from these buildings may not be possible due to safety concerns. Metal that is recovered will be placed in designated containers on the job site and hauled to a metal recycler for processing.

D. Trash

Trash will include all materials not removed by the deconstruction/salvage operation. It is expected that most of the wood, roofing, drywall, siding, doors, windows, etc. will become trash. Trash will be placed into dumpsters or directly into trucks and hauled to a licensed solid waste landfill.

E. Plastic, aluminum and steel bottles, jars and cans (commingled recyclables)

Commingled recycling containers will be provided for all workers on the site, and all workers will be instructed to use them when on the site.

F. Appliances

Many of the vacant homes contain abandoned appliances – stoves, refrigerators, washers, and dryers. The owner, or its representative will remove and recycle these items prior to demolition.

G. Trees

The owner commissioned a tree survey to determine if the trees in the project area can be salvaged. Most of the trees are probably too large for relocation, but a few may be candidates for reuse. Every effort will be made to relocate the trees that can be saved. (See Appendix C.)

VII. Worker Education

All workers on this site during the demolition phase of the St. Marys Hospital Expansion Project will be educated about the goals of the recycling effort and instructed in the proper methods and procedures to use in carrying out this work safely and effectively.

VIII. Waste Auditing Procedures

Contractors and subcontractors are responsible for daily site cleanup and ensuring that recycling containers are kept free of contamination. The construction manager, or its designee, will monitor performance to see that the recycling program is being properly carried out, and that contaminants are removed from recycling containers. The demolition and/or salvage contractor(s) will be responsible for checks of trash and recycling loads to ensure they are free of contamination when they are removed from the site. Contractors or persons who contaminate recycling containers will be required to re-sort any misplaced waste and, if the problem continues, pay the cost to sort recyclables from the trash.

Appendix B

Tracking Form for Materials Taken Off-Site St. Marys Hospital

We will track all materials from this site, including those removed by contractors. **Use this form to track demolition material removed from the job site.** Reuse is encouraged, and contractors should try to find reuse options before disposing of items as trash. Reuse and recycling will help us toward our goal of reusing or recycling as much as possible from this demolition site. Thank you.

Name: _____ Date: _____

Company Name: _____

No materials taken off site this month. (If this box is checked, do *not* fill out rest of form. **Turn in this sheet to Ryan Yoho, Oscar J. Boldt Construction.**)

Material Taken Off Site: _____

Material Removed By: (check one) contractor supplier other _____

Type of Material: _____

Destination (check one) Reuse Recycling Landfill. Please describe briefly (e.g. wood reused in household woodworking projects) _____

Amount Removed (cubic yards, tons, or number – e.g. 5 cubic yards of wood or 25 electrical spools) _____

FILL OUT AND RETURN TO RYAN YOHO, OSCAR J. BOLDT CONSTRUCTION