



Market Potential  
Narrative

Missouri  
University of  
Science and  
Technology



SILO is designed for scenic Colorado with large windows and doors to fully appreciate the variety of views. The abundance of lakes, forests, and mountains give a variety of beautiful views, allowing the couple to get in touch with nature. The roof is structured to support heavy rains and snows. Even the solar panels are positioned for optimal peak sun-hours of Colorado.

### Target Demographic

Many parents across the country have purchased homes to accommodate the needs of a growing family. They needed houses with extra bedrooms and play rooms, filling it with kid friendly furniture and appliances. These homes had to be close enough to good schools and other activities to keep everyone happy. However, the location and house design come at a cost. After the kids are gone, the parents are left with things they no longer need. The homeowners traded natural beauty for convenience and luxury for necessity.

SILO is designed for a couple in their late 40's or early 50's that no longer have kids living at home. They are ready to cut the unnecessary space, upgrade quality, and live sustainably. Appealing to those who want a practical and well-engineered design, SILO combines the characteristics and designs of farmhouse architecture with modern style. Together with technology the house incorporates the innovations of today. SILO spans just under one thousand square feet of indoor conditioned space separated into public and private spaces to give the residents exactly what they need when they need it. Fitted with a large open living room, inviting kitchen, and office, one that can transform into a spare bedroom, SILO is designed to entertain and host.

### Transitioning to Green

People are discovering that if they want change in the world, they must make a difference themselves. Most people think that living sustainably requires them to give up the comforts of their modern lives. However, full size appliances, reliable power, hot water, large windows, and evenly dispersed heating are all components that SILO incorporates. SILO shows that you do not have to sacrifice comfort to live smart. SILO acts as a transitional step, showing how easy switching to a sustainable lifestyle can be.

Solar and sustainable features are often confusing and overwhelming especially when trying to incorporate them to an existing home. Change is difficult even when it is desired. Couples have immediate issues to deal with on a daily basis and sustainable choices often get put on hold. People do want to go green but making the switch can be hard. Life is easier when you just pay your electric bill and use the systems already in place. A large issue that couples face when trying to become more sustainable is determining when to make the change. Should you replace the lightbulbs when they burn out or all at once? Do you invest in solar if you might be moving in the near future? Is it best to buy energy efficient appliances now or should you wait until the old one stops functioning?

The sustainable techniques built into SILO make the transition to green living easy and painless. SILO is the perfect transitional step for those with steady incomes and who are ready to upgrade quality with less quantity.

## Features of the Home

When first entering the house, the homeowner steps into a space to conveniently hang up their coat and put away their shoes. Walking into the kitchen, they find a large island and plenty of counter space. Full sized energy efficient appliances provide modern comfort. Exposed shelves and grey cabinets provide elegance and class to the space.

After the kids have left, there is a quiet void where social events and parties bring energy and life back into the home. An open kitchen, dining, and living room gives the ability to host such events. In the living room a 14-foot-tall curved ceiling is exposed to steel roof bar joists. The room is filled with modern furniture and a large eight-person dining table. Bar stools and lounge chairs around the island comfortably allow engagement and conversation to stay where the life of the party is: the kitchen. The office also has a built in Murphy bed providing a bedroom that can be used when the kids come to visit.



When weather permits, the kitchen space can expand outside using a five-panel accordion door into a space with additional seating and a small table. In the

morning, this space can be used to relax and enjoy coffee and breakfast. To block unwanted summer sun through the glass, two movable walls filled with plants can be easily moved and provide a thermal barrier.

The master bedroom contains a queen size bed and plenty of storage to meet the needs of the residents. The large glass accordion doors leading onto the back deck gives a view from the comfort of the bedroom. These doors allow the homeowner to awake with the morning sun and can open up the space and allow a refreshing breeze into the room. Radiant flooring in the bedroom, office, kitchen, and bathroom completes the rooms, giving the homeowner the comfort of the modern home.



Outside the master bedroom, seating and a soothing water wall and bring the oasis outdoors. Throughout the house, large accordion doors and clerestory windows supply the home with ample amounts of fresh air to create a healthy, open environment.

Directly across from the master bedroom is the bathroom. Clean and modern fixtures line the bathroom walls. The bathroom has all the standard utilities along with a stackable and efficient washer and dryer.

The house utilizes an Amazon Echo to communicate with other programmed features. The interface allows the homeowner to control almost everything within the home: the fan, windows, HVAC, stereo system, and lights. Because the system is hands free and

intuitive, it gives the couple the ability to focus their time on the things that matter most, like spending time together.

## Mechanical Design

An important factor considered in buying a home is the longevity of the systems and equipment. Products with warranty, credibility, durability, and access to maintenance and repairs are essential when making such a large purchase. Each appliance, sustainable product, and system in SILO is designed with these aspects in mind. The mechanical room consolidates equipment from SILO's heating, ventilation and air conditioning, greywater reclamation, and electrical components. The room is built to keep equipment accessible, such as the circuit breakers and control panels. Additionally, the team addressed a common problem of sound pollution created by mechanical equipment. The house is designed with a breezeway that separates the mechanical room from the interior of the house. This minimizes sound pollution and creates a comfortable environment.

The solar array, inverters, and batteries form an innovative system that acknowledges efficiency and

safety as its core goals. SILO utilizes LG's latest model solar panel with an overall module efficiency of 20.6%. The panels are fitted with small, efficient, and convenient microinverters. The power storage system is equally competitive with a 96.1% round trip efficiency. Using the first residential battery to be UL 9540 certified, the system is designed for safety. SILO's home automation system tracks energy generation, temperature, humidity, and CO2 levels. Data is tracked and stored into a database to give insight to the homeowner through a monitor incorporated within the house. This data allows them to understand the energy usage to be smarter homeowners.

## Conclusion

Couples that no longer have children in the house want to live in a smaller home, one that is easier to maintain. They want the luxury and convenience of modern homes in a location where they can really appreciate what this world has to offer. SILO makes the transition to sustainability easy while enjoying modern convenience, style and luxury. The design and features of the home come together to form a truly smart innovative living oasis, SILO.



# SILO

Missouri University of Science and Technology

Solar Decathlon 2017

As-Built Estimates

Denver, CO

August 9, 2017

August 9, 2017

SILO

Missouri University of Science and Technology

As-Built Estimates

Denver, CO

GFA 1,101

**CONSTRUCTION COST SUMMARY**

SYSTEM DESCRIPTION		SUB-TOTAL	TOTAL	\$/SF	%	
<b>A10</b>	<b>FOUNDATIONS</b>					
	A1020	Special Foundations	\$8,427			
	A1030	Lowest Floor Construction	\$0	\$8,427	7.65	3.3%
<b>A20</b>	<b>BASEMENT</b>					
	A2010	Basement Excavation	\$0			
	A2020	Basement Walls	\$0	\$0	\$0.00	0.0%
<b>B10</b>	<b>SUPERSTRUCTURE</b>					
	B1010	Upper Floor Construction	\$46,806			
	B1020	Roof Construction	\$7,408	\$54,214	\$49.24	21.3%
<b>B20</b>	<b>EXTERIOR CLOSURE</b>					
	B2010	Exterior Walls	\$14,391			
	B2020	Windows	\$27,200			
	B2030	Exterior Doors	\$1,000	\$42,591	\$38.68	16.7%
<b>B30</b>	<b>ROOFING</b>					
	B3010	Roof Coverings	\$1,785			
	B3020	Roof Openings	\$0	\$1,785	\$1.62	0.7%
<b>C10</b>	<b>INTERIOR CONSTRUCTION</b>					
	C1010	Partitions	\$2,613			
	C1020	Interior Doors	\$700			
	C1030	Specialties/Millwork	\$11,928	\$15,240	\$13.84	6.0%
<b>C20</b>	<b>STAIRCASES</b>					
	C2010	Stair Construction	\$0			
	C2020	Stair Finishes	\$0	\$0	\$0.00	0.0%
<b>C30</b>	<b>INTERIOR FINISHES</b>					
	C3010	Wall Finishes	\$4,409			
	C3020	Floor Finishes	\$10,044			
	C3030	Ceiling Finishes	\$3,442	\$17,895	\$16.25	7.0%
<b>D10</b>	<b>CONVEYING</b>					
	D1010	Elevator	\$0			
	D1020	Escalators and Moving Walkways	\$0			
	D1090	Other Conveying Systems	\$0	\$0	\$0.00	0.0%
<b>D20</b>	<b>PLUMBING</b>					
	D2010	Plumbing Fixtures	\$4,124			
	D2020	Domestic Water Distribution	\$2,767			
	D2030	Sanitary Waste	\$0			
	D2040	Rain Water Drainage	\$2,683			
	D2090	Other Plumbing Systems	\$0	\$9,574	\$8.70	3.8%
<b>D30</b>	<b>MECHANICAL</b>					
	D3010	Energy Supply	\$0			

	D3020	Heat Generating Systems	\$0			
	D3030	Cooling Generating Systems	\$0			
	D3040	Distribution Systems	\$3,353			
	D3050	Terminal & Package Units	\$9,150			
	D3060	Controls & Instrumentation	\$1,500			
	D3070	Systems Testing & Balancing	\$0	<b>\$14,003</b>	\$12.72	5.5%
<b>D40</b>	<b>FIRE PROTECTION</b>					
	D4010	Fire Protection	\$3,021			
	D4020	Standpipes	\$0			
	D4030	Fire Protection Specialties	\$0	<b>\$3,021</b>	\$2.74	1.2%
<b>D50</b>	<b>ELECTRICAL</b>					
	D5010	Electrical Service & Distribution	\$4,349			
	D5020	Lighting & Branch Wiring	\$13,080			
	D5030	Communications & Security Systems	\$590			
	D5090	Other Electrical Systems	\$21,909	<b>\$39,928</b>	\$36.27	15.7%
<b>E10</b>	<b>EQUIPMENT</b>					
	E1010	Commercial Equipment	\$0			
	E1020	Institutional Equipment	\$0			
	E1030	Vehicular Equipment	\$0			
	E1090	Other Equipment	\$4,050	<b>\$4,050</b>	\$3.68	1.6%
<b>E20</b>	<b>FURNISHINGS</b>					
	E2010	Fixed Furnishings	\$0			
	E2020	Movable Furnishings	\$0	<b>\$0</b>	\$0.00	0.0%
<b>F10</b>	<b>SPECIAL CONSTRUCTION</b>					
	F1010	Special Structures	\$10,079			
	F1020	Integrated Construction	\$0			
	F1030	Special Construction Systems	\$0			
	F1040	Special Facilities	\$0	<b>\$10,079</b>	\$9.15	4.0%
<b>F20</b>	<b>SELECTIVE BUILDING DEMOLITION</b>					
	F2010	Building Elements Demolition	\$0			
	F2020	Hazardous Components Abatement	\$0	<b>\$0</b>	\$0.00	0.0%
<b>G10</b>	<b>SITE PREPARATION</b>					
	G1010	Site Clearing	\$0			
	G1020	Site Demolition and Relocations	\$0			
	G1030	Site Earthwork	\$0			
	G1040	Hazardous Waste Remediation		<b>\$0</b>	\$0.00	0.0%
<b>G20</b>	<b>SITE IMPROVEMENT</b>					
	G2010	Roadways	\$0			
	G2020	Parking Lots	\$0			
	G2030	Pedestrian Paving	\$0			
	G2040	Site Development	\$7,360			
	G2050	Landscaping	\$4,000	<b>\$11,360</b>	\$10.32	4.5%
<b>G30</b>	<b>SITE MECHANICAL UTILITIES</b>					
	G3010	Water Supply	\$0			
	G3020	Sanitary Sewer	\$0			
	G3030	Storm Sewer	\$0	<b>\$0</b>	\$0.00	0.0%
<b>G40</b>	<b>SITE ELECTRICAL UTILITIES</b>					
	G4010	Electrical Distribution	\$0			
	G4020	Site Lighting	\$0			
	G4030	Site Communications and Security	\$0			
	G4090	Other Electrical Utilities	\$0	<b>\$0</b>	\$0.00	0.0%
<b>TOTAL DIRECT COST (Trade Costs)</b>				<b>\$232,166</b>	\$210.87	91.3%

<b>MARKUPS</b>						
General Conditions, Overhead & Profit	0.00%	\$0	<b>\$0</b>	0	0.0%	
<b>SUBTOTAL CONSTRUCTION</b>			<b>\$232,166</b>	\$210.87	91.3%	
<b>CONTINGENCIES/ESCALATION</b>						
Design and Pricing Contingency		\$0				
Trucking	3 trucks	\$6,000				
Crane time	1 days	\$1,625				
Lull/Forklift	9 days	\$14,625	<b>\$22,250</b>	\$20.21	8.7%	
<b>TOTAL PROJECT COST</b>			<b>\$254,416</b>	\$231.08	100.0%	

-	\$232,166
\$232,166	\$232,166
<b>\$0</b>	<b>\$0</b>

This cell is pulling the Total Direct Cost from the DETAIL tab.

Totals from this SUMMARY tab

**THESE FORMULAS SHOULD EQUAL \$0. This is simply a check to ensure that the spreadsheet is functioning properly**

August 9, 2017

**SILO**

Missouri University of Science and Technology

As-Built Estimates

Denver, CO

GFA 1,101

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
<b>A10</b>	<b>FOUNDATIONS</b>						
<b>A1010</b>	<b>STANDARD FOUNDATIONS</b>						
	SUBTOTAL					\$0	
<b>A1020</b>	<b>SPECIAL FOUNDATIONS</b>						
	Screw jack support base	53.00	ea	159.00	\$8,427		
	SUBTOTAL					\$8,427	
<b>A1030</b>	<b>SLAB ON GRADE</b>						
	SUBTOTAL					\$0	
<b>TOTAL - FOUNDATIONS</b>							<b>\$8,427</b>
<b>A20</b>	<b>BASEMENT</b>						
<b>A2010</b>	<b>BASEMENT EXCAVATION</b>						
	SUBTOTAL					\$0	
<b>A2020</b>	<b>BASEMENT WALLS</b>						
	SUBTOTAL					\$0	
<b>TOTAL - BASEMENT CONSTRUCTION</b>							<b>\$0</b>
<b>B10</b>	<b>SUPERSTRUCTURE</b>						
<b>B1010</b>	<b>FLOOR CONSTRUCTION</b>						
	Steel beam W6x15	1.50	tons	3,700.00	\$5,550		
	Steel C channel; 6'	9.60	tons	3,700.00	\$35,520		
	(2L) 3/4" plywood sub floor	1,101.00	sf	2.70	\$2,973		
	3" closed cell spray foam insulation	1,101.00	sf	2.51	\$2,764		

August 9, 2017

**SILO**

Missouri University of Science and Technology

As-Built Estimates

Denver, CO

GFA

1,101

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
	SUBTOTAL					\$46,806	
<b>B1020</b>	<b>ROOF CONSTRUCTION</b>						
	3/4" Plywood roof sheathing	1,007.00	sf	0.93	\$937		
	10' monotrus	260.00	sf	2.00	\$520		
	12' monotrus	528.00	sf	2.50	\$1,320		
	12" batting insulation	788.00	sf	2.51	\$1,978		
	Curved bar joist	0.50	ton	3,700.00	\$1,850		
	3" closed cell spray foam insulation	320.00	sf	2.51	\$803		
	SUBTOTAL					\$7,408	
	<b>TOTAL - SUPERSTRUCTURE</b>						<b>\$54,214</b>
<b>B20</b>	<b>EXTERIOR CLOSURE</b>						
<b>B2010</b>	<b>EXTERIOR WALLS</b>						
	Exterior assembly, 2x6 wood stud, 7/16" zip plywood, 5" spray foam	1,656.00	sf	8.69	\$14,391		
	SUBTOTAL					\$14,391	
<b>B2020</b>	<b>EXTERIOR WINDOWS</b>						
	Storefront	400.00	sf	55.00	\$22,000		
	Windows; aluminum framed	80.00	sf	65.00	\$5,200		
	SUBTOTAL					\$27,200	
<b>B2030</b>	<b>EXTERIOR DOORS</b>						
	3x7 Exterior Doors; glazed with transom	2.00	ea	500.00	\$1,000		
	Large Accordion door	1.00			\$0		
	Small Accordion Door	1.00			\$0		
	SUBTOTAL					\$1,000	
	<b>TOTAL - EXTERIOR CLOSURE</b>						<b>\$42,591</b>
<b>B30</b>	<b>ROOFING</b>						
<b>B3010</b>	<b>ROOF COVERINGS</b>						
	Solar panel assembly, sloped	49.00	sf	15.00	\$735		
	Fasia	350.00	lf	3.00	\$1,050		
	SUBTOTAL					\$1,785	

August 9, 2017

**SILO**

Missouri University of Science and Technology

As-Built Estimates

Denver, CO

GFA

1,101

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
B3020	ROOF OPENINGS						
	SUBTOTAL					\$0	
<b>TOTAL - ROOFING</b>							<b>\$1,785</b>
C10	INTERIOR CONSTRUCTION						
C1010	PARTITIONS Interior wall assembly- 2x4 wood, batt insol, 1/2" gyp type 2 side	368.00	sf	7.10	\$2,613		
	SUBTOTAL					\$2,613	
C1020	INTERIOR DOORS 30"x6"10" Interior Doors; slab 30"x6"10" Interior Doors; pocket	2.00 1.00	ea ea	200.00 300.00	\$400 \$300		
	SUBTOTAL					\$700	
C1030	FITTINGS Base cabinets Closet Built in Kitchen Shelves Bathroom Shelves Bathroom Vanity Entertainment centered shelf; wall mounted Entry built in Kitchen counter tops	18.00 10.00 18.00 7.50 1.00 10.50 12.00 46.00	lf lf lf lf ls lf lf sf	275.00 60.00 10.00 10.00 700.00 125.00 75.00 85.00	\$4,950 \$600 \$180 \$75  \$1,313 \$900 \$3,910		
	SUBTOTAL					\$11,928	
<b>TOTAL - INTERIOR CONSTRUCTION</b>							<b>\$15,240</b>
C20	STAIRCASES						
C2010	STAIR CONSTRUCTION						
	SUBTOTAL					\$0	
C2020	STAIR FINISHES						

August 9, 2017

SILO

Missouri University of Science and Technology

As-Built Estimates

Denver, CO

GFA

1,101

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
	SUBTOTAL					\$0	
	<b>TOTAL - STAIRCASES</b>						<b>\$0</b>
<b>C30</b>	<b>INTERIOR FINISHES</b>						
<b>C3010</b>	<b>WALL FINISHES</b>						
	Paint	922.00	sf	1.00	\$922		
	Paint at mech and storage; assumed	282.00	sf	1.00	\$282		
	Ceramic wall tile	185.00	sf	11.00	\$2,035		
	American Clay Plaster	585.00	sf	2.00	\$1,170		
	SUBTOTAL					\$4,409	
<b>C3020</b>	<b>FLOOR FINISHES</b>						
	Bathroom flooring; tile	82.00	sf	8.00	\$656		
	Bath base	32.00	lf	5.00	\$160		
	Luxury Vinyl Tile	861.00	sf	10.00	\$8,610		
	Kitchen Base	10.00	lf	5.00	\$50		
	Living area base	30.60	lf	5.00	\$153		
	Master bed base	25.00	lf	5.00	\$125		
	Bedroom/Office base	29.00	lf	5.00	\$145		
	Mech rm base	29.00	lf	5.00	\$145		
			lf	5.00	\$0		
			lf	5.00	\$0		
	SUBTOTAL					\$10,044	
<b>C3030</b>	<b>CEILING FINISHES</b>						
	Painted gyp.board	943.00	sf	3.65	\$3,442		
	SUBTOTAL					\$3,442	
	<b>TOTAL - INTERIOR FINISHES</b>						<b>\$17,895</b>
<b>D10</b>	<b>CONVEYING</b>						
<b>D1010</b>	<b>ELEVATORS &amp; LIFTS</b>						
	SUBTOTAL					\$0	
<b>D1020</b>	<b>ESCALATORS &amp; MOVING WALKWAYS</b>						
	SUBTOTAL					\$0	
<b>D1090</b>	<b>OTHER CONVEYING SYSTEMS</b>						

August 9, 2017

SILO

Missouri University of Science and Technology

As-Built Estimates

Denver, CO

GFA

1,101

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
	SUBTOTAL					\$0	
	<b>TOTAL - CONVEYING SYSTEMS</b>						<b>\$0</b>
<b>D20</b>	<b>PLUMBING</b>						
<b>D2010</b>	<b>PLUMBING FIXTURES</b>						
	Domestic water pump	1.00	ea	500.00	\$500		
	40 gal water heater	1.00	ea	580.00	\$580		
	Expansion tank	1.00	ea	280.00	\$280		
	Kitchen sink and faucet	1.00	ea	624.00	\$624		
	Vanity faucet	1.00	ea	200.00	\$200		
	Shower/sub and mixing valve	1.00	ea	932.00	\$932		
	Water closet	1.00	ea	518.00	\$518		
	Fridge ice maker connection	1.00	ea	135.00	\$135		
	Dishwasher connection	1.00	ea	135.00	\$135		
	Washer connection	1.00	ea	220.00	\$220		
	SUBTOTAL					\$4,124	
<b>D2020</b>	<b>DOMESTIC WATER DISTRIBUTION</b>						
	Plumbing supply pipe; PEX	220.00	lf	9.85	\$2,167		
	Misc valved and fittings	1.00	ls	600.00	\$600		
	SUBTOTAL					\$2,767	
<b>D2030</b>	<b>SANITARY WASTE</b>						
	SUBTOTAL					\$0	
<b>D2040</b>	<b>RAIN WATER DRAINAGE</b>						
	Waste and vent piping; PVC	120.00	lf	22.36	\$2,683		

August 9, 2017

SILO

Missouri University of Science and Technology

As-Built Estimates

Denver, CO

GFA

1,101

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
	SUBTOTAL					\$2,683	
D2090	OTHER PLUMBING SYSTEMS						
	SUBTOTAL					\$0	
<b>TOTAL - PLUMBING</b>							<b>\$9,574</b>
D30	MECHANICAL						
D3010	ENERGY SUPPLY						
	SUBTOTAL					\$0	
D3020	HEAT GENERATING SYSTEMS						
	SUBTOTAL					\$0	
D3030	COOLING GENERATING SYSTEMS						

August 9, 2017

SILO

Missouri University of Science and Technology

As-Built Estimates

Denver, CO

GFA

1,101

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
	SUBTOTAL					\$0	
D3040	<b>DISTRIBUTION SYSTEMS</b>						
	Refridgeration piping	1.00	ls	1,120.00	\$1,120		
	Rigid Ductwork	150.00	lf	13.45	\$2,018		
	Flex duct	25.00	lf	8.60	\$215		
	SUBTOTAL					\$3,353	
D3050	<b>TERMINAL &amp; PACKAGE UNITS</b>						
	Air handler	1.00	ea	3,520.00	\$3,520		
	Heat pump; 2 ton outdoor unit	1.00	ea	2,120.00	\$2,120		
	GRD's	20.00	ea	57.00	\$1,140		
	Energy recovery ventilator	1.00	ea	2,200.00	\$2,200		
	Outside grill for intake/exhaust	2.00	ea	85.00	\$170		
	SUBTOTAL					\$9,150	
D3060	<b>CONTROLS &amp; INSTRUMENTATION</b>						
	Temperature control	1.00	ls	1,500.00	\$1,500		
	SUBTOTAL					\$1,500	
D3070	<b>SYSTEMS TESTING &amp; BALANCING</b>						
	SUBTOTAL					\$0	
	<b>TOTAL - HVAC</b>						\$14,003
D40	<b>FIRE PROTECTION</b>						

August 9, 2017

**SILO**

**Missouri University of Science and Technology**

**As-Built Estimates**

**Denver, CO**

GFA

1,101

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
<b>D4010</b>	<b>SPRINKLERS</b>						
	Sprinkler head	7.00	ea	33.70	\$236		
	Pipe-PEX	100.00	lf	9.85	\$985		
	Misc valves and fittings	1.00	ls	500.00	\$500		
	Pump station and controller	1.00	ea	1,300.00	\$1,300		
	<b>SUBTOTAL</b>					<b>\$3,021</b>	
<b>D4020</b>	<b>STANDPIPES</b>						
	<b>SUBTOTAL</b>					<b>\$0</b>	
<b>D4030</b>	<b>FIRE PROTECTION SPECIALTIES</b>		ea				
	<b>SUBTOTAL</b>					<b>\$0</b>	
<b>TOTAL - FIRE PROTECTION</b>							<b>\$3,021</b>
<b>D50</b>	<b>ELECTRICAL</b>						
<b>D5010</b>	<b>ELECTRICAL SERVICE &amp; DISTRIBUTION</b>						
	200A pannel; including AFCI circuit breakers	1.00	ea	1,450.00	\$1,450		
	Electrical meter	1.00	ea	465.00	\$465		
	Service entrance conductors; (3) 2/0 THNN (1) #4 ground	15.00	lf	13.25	\$199		
	200A SE cable	50.00	lf	24.71	\$1,236		
	Grounding allowance	1.00	ls	1,000.00	\$1,000		
	<b>SUBTOTAL</b>					<b>\$4,349</b>	
<b>D5020</b>	<b>LIGHTING &amp; BRANCH WIRING</b>						
	<b>Devices</b>						
	Duplex	20.00	ea	29.00	\$580		
	Quad	2.00	ea				
	Ground fault interrupter	8.00	ea	53.00	\$424		
	Weatherproof ground fault interruptor	4.00	ea	71.00	\$284		
	30A dryer outlet	1.00	ea	55.50	\$56		
	50A range outlet	1.00	ea	60.00	\$60		
	30A vehicle charging station	1.00	ea	1,322.00	\$1,322		

August 9, 2017

SILO

Missouri University of Science and Technology

As-Built Estimates

Denver, CO

GFA

1,101

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
			ea	5,500.00			
	<b>Branch</b>						
	14-2 NM Cable	880.00	lf	1.97	\$1,734		
	12-2 NM Cable	260.00	lf	2.37	\$616		
	13-3 NM Cable	20.00	lf	2.91	\$58		
	10-3 NM Cable	80.00	lf	3.51	\$281		
	6.3 NMM Cable	50.00	lf	5.59	\$280		
	<b>Lighting</b>						
	6' LED Surface Mounted can	16.00	ea	215.00	\$3,440		
	Pendant Lights	3.00	ea	115.00	\$345		
	Vanity	1.00	ea	75.00	\$75		
	Exterior Sconce	5.00	ea	165.00	\$825		
	LED Strip Light	1.00	ea	115.00	\$115		
	Track Lighting	2.00	ea				
	Ceiling fan	1.00	ea	600.00	\$600		
	Dining Room Light	1.00	ea				
	<b>Mech</b>						
	Air handler	1.00	ea	195.00	\$195		
	Heat pump; 2-ton outdoor unit	1.00	ea	250.00	\$250		
	Energy recovery ventilator	1.00	ea	250.00	\$250		
	Pump	1.00	ea	135.00	\$135		
	Electric water heater; 40-gallon	1.00	ea	196.00	\$196		
	Dishwasher connection	1.00	ea	165.00	\$165		
	<b>Branch</b>						
	12-2 NM Cable	40.00	lf	2.37	\$95		
	12-3 NM Cable	120.00	lf	2.91	\$349		
	10-3 NM Cable	100.00	lf	3.51	\$351		
	<b>SUBTOTAL</b>					\$13,080	
<b>D5030</b>	<b>COMMUNICATIONS &amp; SECURITY</b>						
	TV Opening	1.00	ea	77.50	\$78		
	Smoke detector	4.00	ea	128.00	\$512		
	<b>SUBTOTAL</b>					\$590	
<b>D5090</b>	<b>OTHER ELECTRICAL SYSTEMS</b>						
	LG, LG335N1C-A5	24.00	ea	304.85	\$7,316		
	Enphase, IQ 6+	24.00	ea	133.80	\$3,211		
	Enphase Q Cable	24.00	ea	12.40	\$298		
	Enphase Combiner box with IQ Envoy	1.00	ea	588.00	\$588		
	Enphase IQ AC Battery	6.00	ea	1,664.00	\$9,984		
	Enphase Branch Endcap	2.00	ea	12.90	\$26		
	PV rack system, roof, penetrating	24.00	ea	3.60	\$86		



August 9, 2017

SILO

Missouri University of Science and Technology

As-Built Estimates

Denver, CO

GFA

1,101

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
E2010	FIXED FURNISHINGS						
	SUBTOTAL					\$0	
E2020	MOVABLE FURNISHINGS						
	SUBTOTAL					\$0	
<b>TOTAL - FURNISHINGS</b>							<b>\$0</b>
F10	SPECIAL CONSTRUCTION						
F1010	SPECIAL STRUCTURES						
	Deck structure; back	222.00	sf	7.88	\$1,749		
	Deck structure; front	592.00	sf	7.88	\$4,665		
	Sloped Walkway	465.00	sf	7.88	\$3,664		
	SUBTOTAL					\$10,079	
F1020	INTEGRATED CONSTRUCTION						
	SUBTOTAL					\$0	
F1030	SPECIAL CONSTRUCTION SYSTEMS						
	SUBTOTAL					\$0	
F1040	SPECIAL FACILITIES						

August 9, 2017

**SILO**

Missouri University of Science and Technology

As-Built Estimates

Denver, CO

GFA

1,101

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
	SUBTOTAL					\$0	
<b>TOTAL - SPECIAL CONSTRUCTION</b>							<b>\$10,079</b>
<b>F20</b>	<b>SELECTIVE BUILDING DEMOLITION</b>						
<b>F2010</b>	<b>BUILDING ELEMENTS DEMOLITION</b>						
	SUBTOTAL					\$0	
<b>F2020</b>	<b>HAZARDOUS COMPONENTS ABATEMENT</b>						
	SUBTOTAL					\$0	
<b>TOTAL - SELECTIVE BUILDING DEMOLITION</b>							<b>\$0</b>
<b>G10</b>	<b>SITE PREPARATION</b>						
<b>G1010</b>	<b>SITE CLEARING</b>						
	SUBTOTAL					\$0	
<b>G1020</b>	<b>SITE DEMOLITION AND RELOCATION</b>						
	SUBTOTAL					\$0	
<b>G1030</b>	<b>SITE EARTHWORK</b>						
	SUBTOTAL					\$0	
<b>G1040</b>	<b>HAZARDOUS WASTE REMEDIATION</b>						
	SUBTOTAL					\$0	
<b>TOTAL - SITE PREPARATION</b>							<b>\$0</b>
<b>G20</b>	<b>SITE IMPROVEMENT</b>						
<b>G2010</b>	<b>ROADWAYS</b>						
	SUBTOTAL					\$0	
<b>G2020</b>	<b>PARKING LOTS</b>						

August 9, 2017

**SILO**

Missouri University of Science and Technology

As-Built Estimates

Denver, CO

GFA 1,101

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
	SUBTOTAL					\$0	
<b>G2030</b>	<b>PEDESTRIAN PAVING</b>						
	SUBTOTAL					\$0	
<b>G2040</b>	<b>SITE DEVELOPMENT</b>						
	Deck planters; exterior	228.00	sf	20.00	\$4,560		
	Raised planters; exterior, multi-level	140.00	sf	20.00	\$2,800		
	SUBTOTAL					\$7,360	
<b>G2050</b>	<b>LANDSCAPING</b> (interior plants are excluded)						
	Small plantings	20.00	ea	10.00	\$200		
	Medium plantings	20.00	ea	15.00	\$300		
	Vegetation wall	2.00	ls ea	1,750.00	\$3,500		
	SUBTOTAL					\$4,000	
<b>TOTAL - SITE IMPROVEMENT</b>							<b>\$11,360</b>
<b>G30</b>	<b>SITE MECHANICAL UTILITIES</b>						
<b>G3010</b>	<b>WATER SUPPLY</b>						
	SUBTOTAL					\$0	
<b>G3020</b>	<b>SANITARY SEWER</b>						
	SUBTOTAL					\$0	
<b>G3030</b>	<b>STORM SEWER</b>						
	SUBTOTAL					\$0	
<b>TOTAL - SITE MECHANICAL UTILITIES</b>							<b>\$0</b>
<b>G40</b>	<b>SITE ELECTRICAL UTILITIES</b>						
<b>G4010</b>	<b>ELECTRICAL DISTRIBUTION</b>						
	SUBTOTAL					\$0	

August 9, 2017

SILO

Missouri University of Science and Technology

As-Built Estimates

Denver, CO

GFA

1,101

<i>CSI CODE</i>	<i>DESCRIPTION</i>	<i>QTY</i>	<i>UNIT</i>	<i>UNIT COST</i>	<i>EST'D COST</i>	<i>SUB TOTAL</i>	<i>TOTAL COST</i>
G4020	SITE LIGHTING						
	SUBTOTAL					\$0	
G4030	SITE COMMUNICATION AND SECURITY						
	SUBTOTAL					\$0	
G4090	OTHER SITE ELECTRICAL UTILITIES						
	SUBTOTAL					\$0	
<b>TOTAL - SITE ELECTRICAL UTILITIES</b>							<b>\$0</b>
<b>TOTAL DIRECT COST (Trade Costs)</b>							<b>\$232,166</b>
					232,165.78	232,165.78	232,165.78