



cincinnati
BIOCHAR



WHY CINCINNATI? WHY NOW?



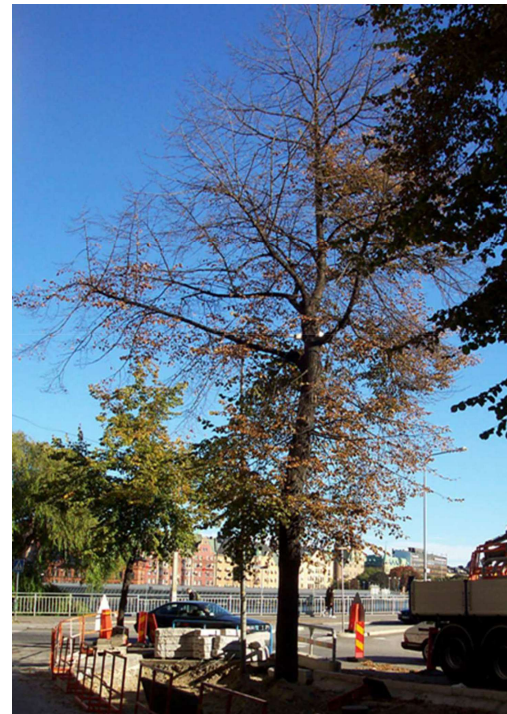
- Street trees are under assault
 - Compacted low nutrient soil
 - Increased drought conditions
 - Limited soil volume - Small tree wells
- Green Cincinnati Plan
 - Equitable tree canopy distribution
 - Environmental, economic, social, and health outcomes
- Innovative Urban Forestry Program
 - Identifying challenges and solutions
 - Working at the national level to advance new technologies
- Unprecedented funding opportunities
 - Bloomberg Philanthropies
 - Inflation Reduction Act sustainability initiatives



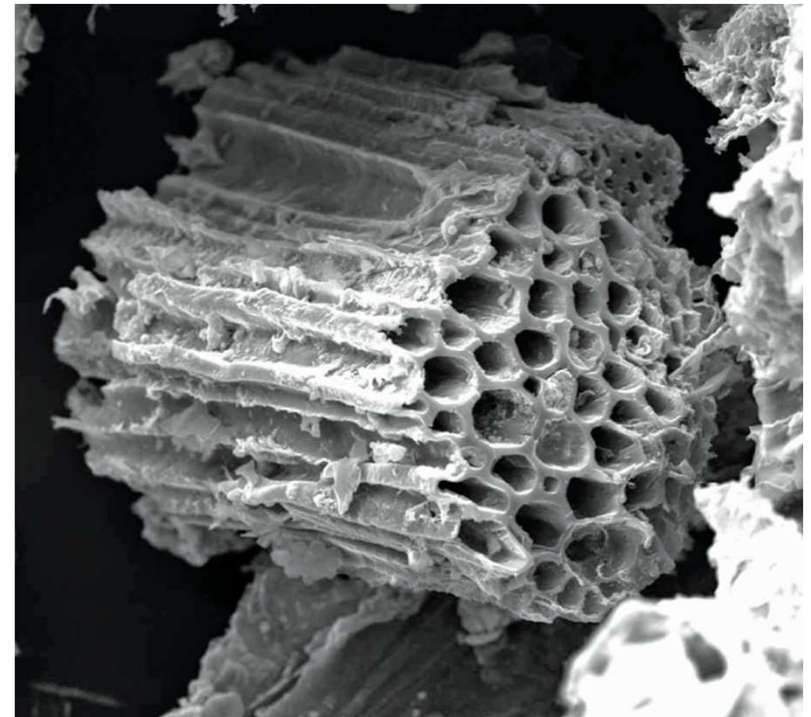
CINCINNATI BIOCHAR



- 2015 - Stockholm, Sweden pioneered municipal biochar production
- 2021 - Cincinnati was 1 of 10 cities in the world to complete feasibility study
- 2022 - One of 7 cities in the world to receive Bloomberg implementation grant (\$400K)
 - Selected Operating Partner: Carbon Harvest
- 2023 - Selected Equipment Provider
 - Complete Solutions Consulting International

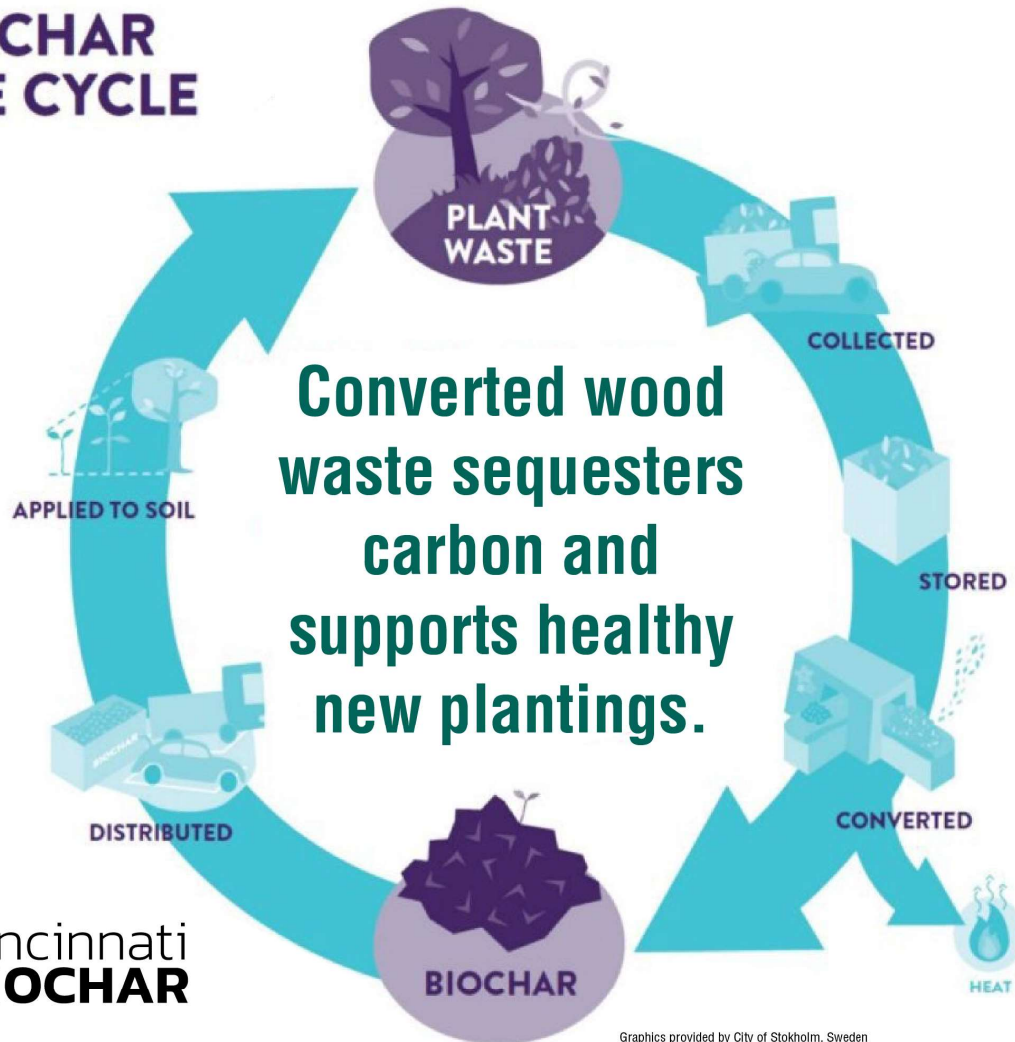


ANCIENT TECHNOLOGY/MODERN RELEVANCE

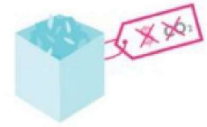


WHAT IS BIOCHAR?

BIOCHAR LIFE CYCLE



COLLECTED
Wood waste will be repurposed instead of being tossed.



STORED
The material supports climate resilience keeping carbon out of the environment.



CONVERTED
Requires upfront capital investment for the equipment and to prepare the site.



DISTRIBUTED
Biochar will be used by partners and sold to generate carbon credits, eventually becoming self-sustaining.



APPLIED TO SOIL
Biochar used when planting trees and gardens to increase growth, sequester carbon, and reduce stormwater.

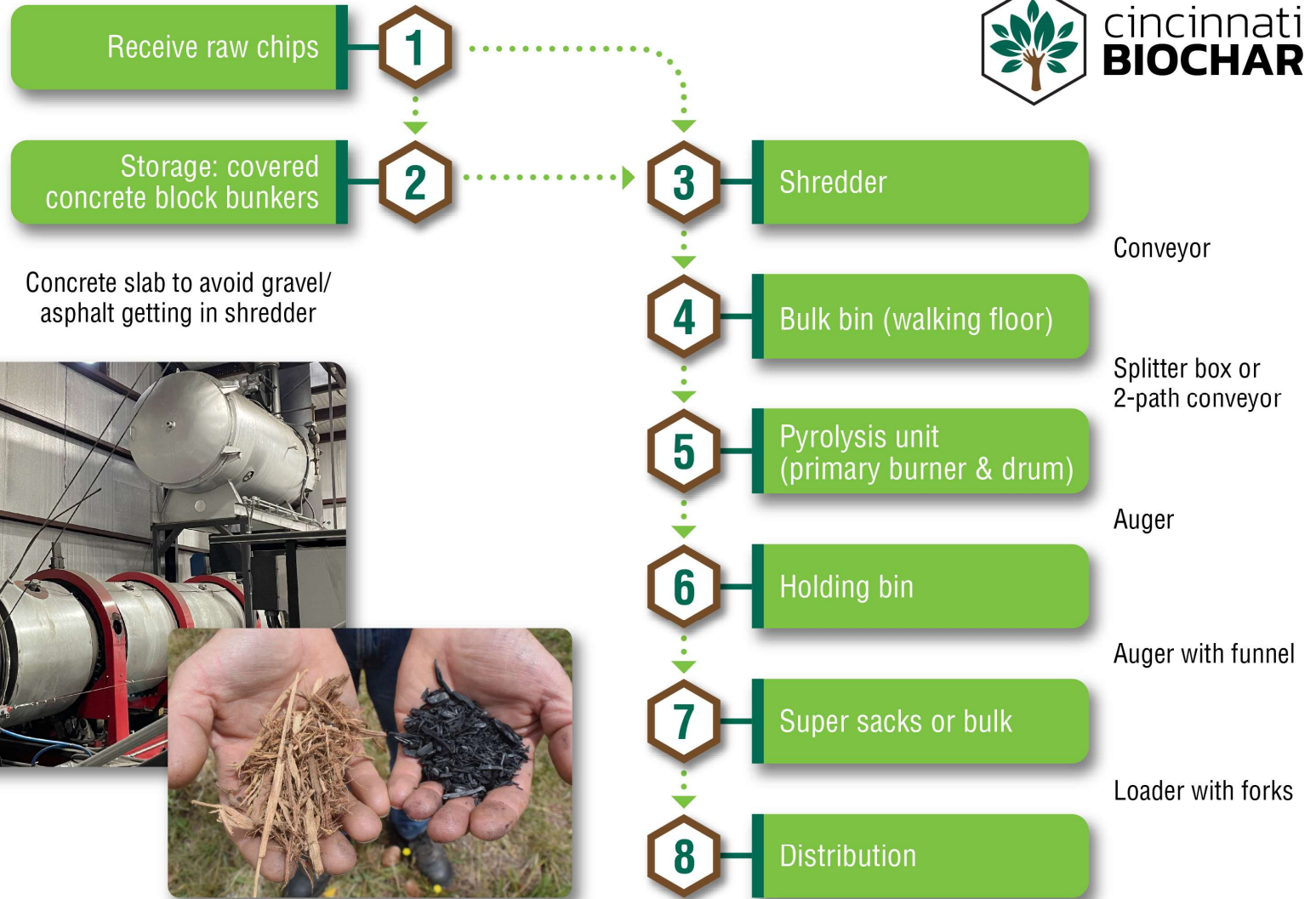
Graphics provided by City of Stockholm, Sweden



cincinnati
BIOCHAR



BIOCHAR PRODUCTION FLOW



BIOCHAR PRODUCTION OPERATION



**CARBON
HARVEST**



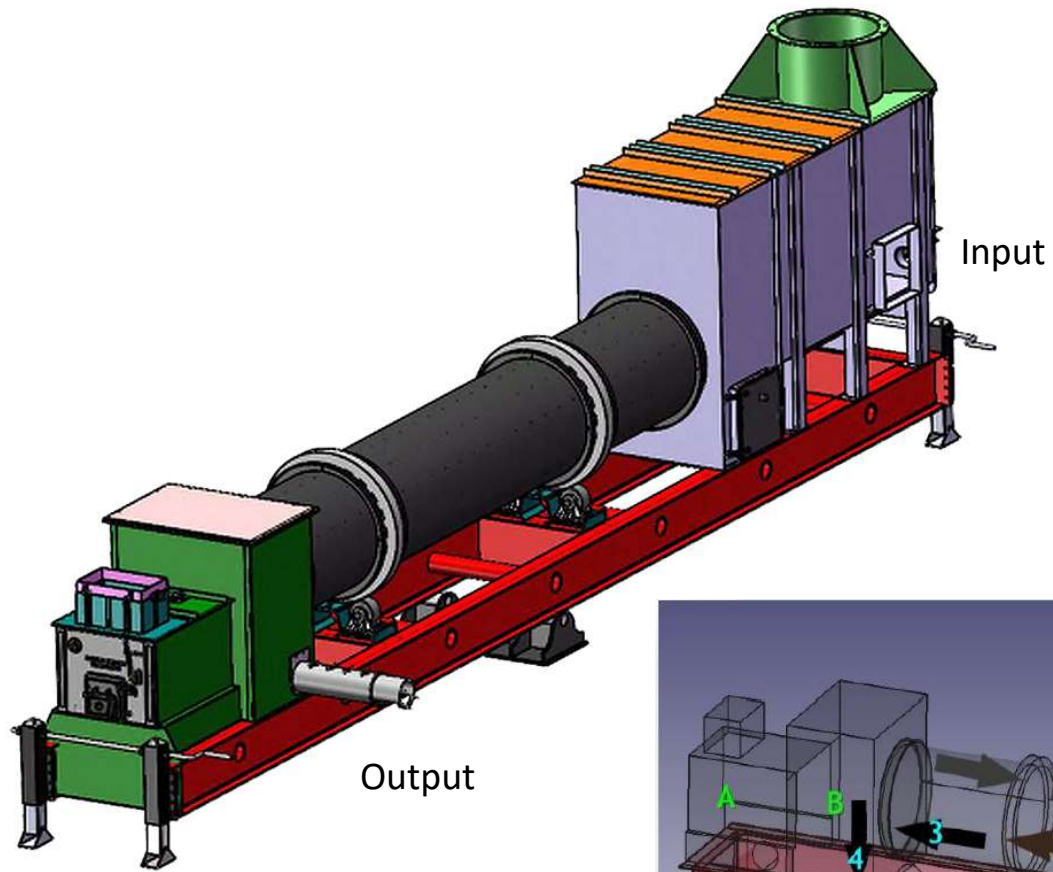
- Sam Dunlap, Carbon Harvest
 - Local expert in sustainable agriculture and education
 - Helped Cincinnati win the Bloomberg Grant
 - Led Urban Biochar Task Force for US Biochar Initiative
 - Founded Carbon Harvest in 2020 to create biochar and other soil improvement products to combat climate change
- 2 Staff:
 - Administrator (production/certification)
 - Operator
- Production 7 days/wk, 24hrs/day
 - Lower production rate when staff off-site
- Staff on site 6 days/wk and on-call
 - 24-hr remote monitoring



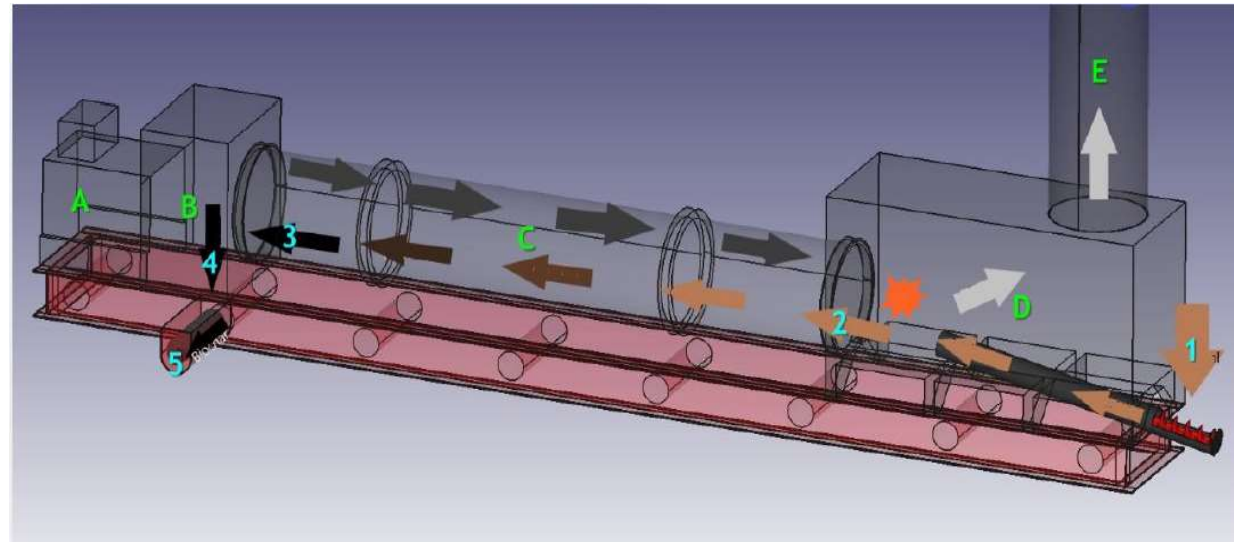
Shredder



Walking Floor



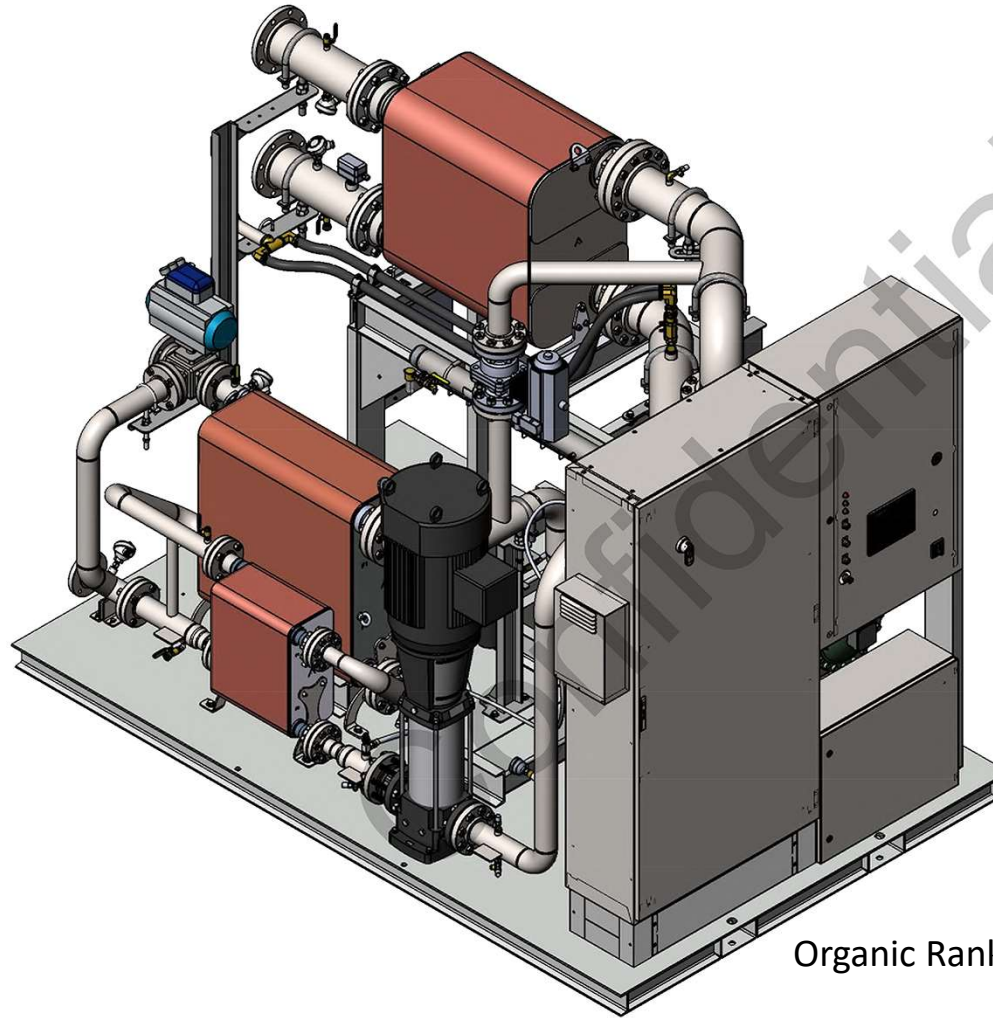
PYROLYSIS UNIT





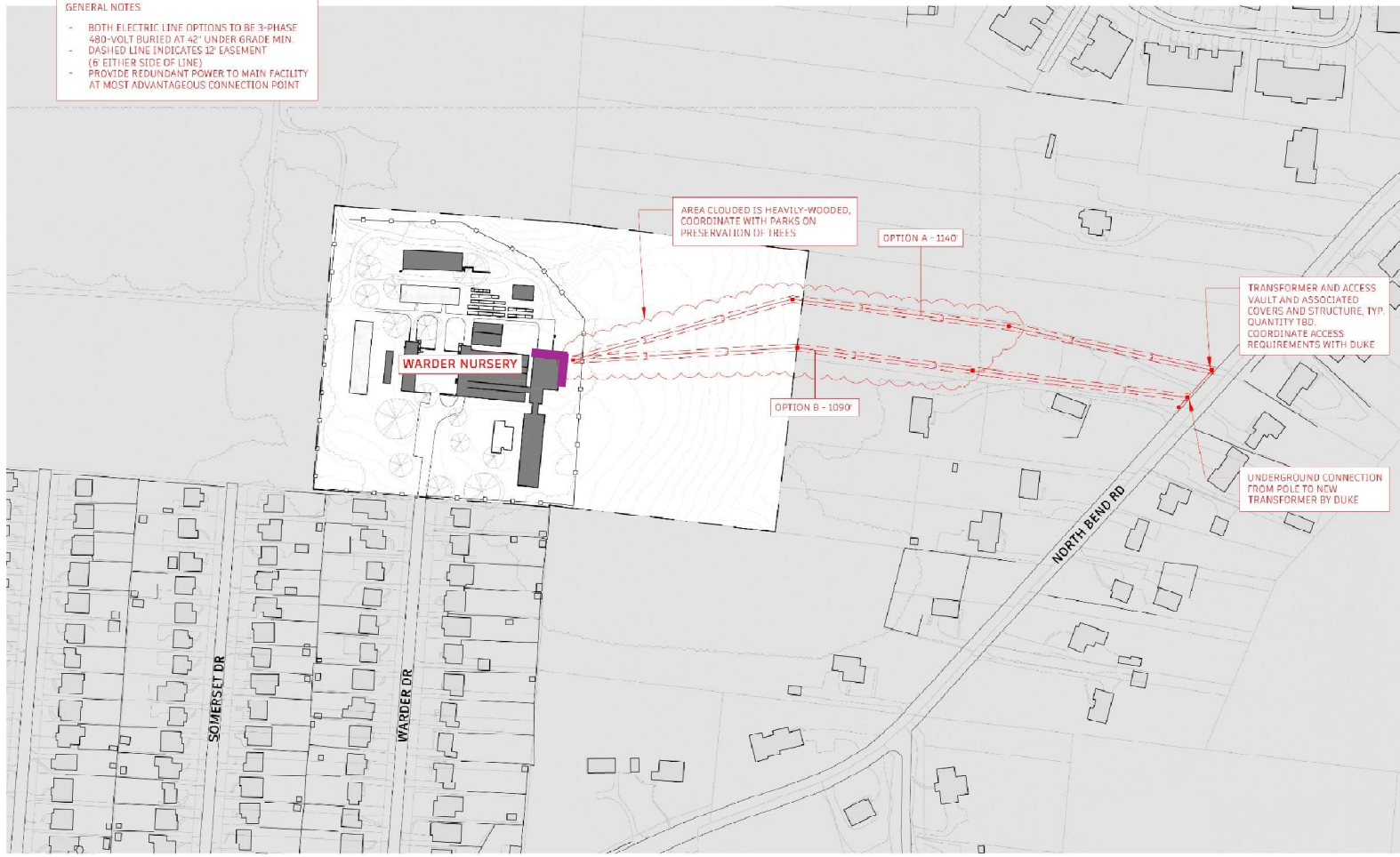
Boiler on top of Pyrolysis Unit

Harnessing Heat for Electricity



Organic Rankine Cycle - Generator

- GENERAL NOTES**
- BOTH ELECTRIC LINE OPTIONS TO BE 3-PHASE 480-VOLT BURIED AT 42" UNDER GRADE MIN.
 - DASHED LINE INDICATES 12' EASEMENT (6' EITHER SIDE OF LINE)
 - PROVIDE REDUNDANT POWER TO MAIN FACILITY AT MOST ADVANTAGEOUS CONNECTION POINT



WARDER SITE IMPROVEMENTS
WARDER NURSERY
 7000 WARDER DR, CINCINNATI, OH 45224

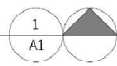
REV	DATE

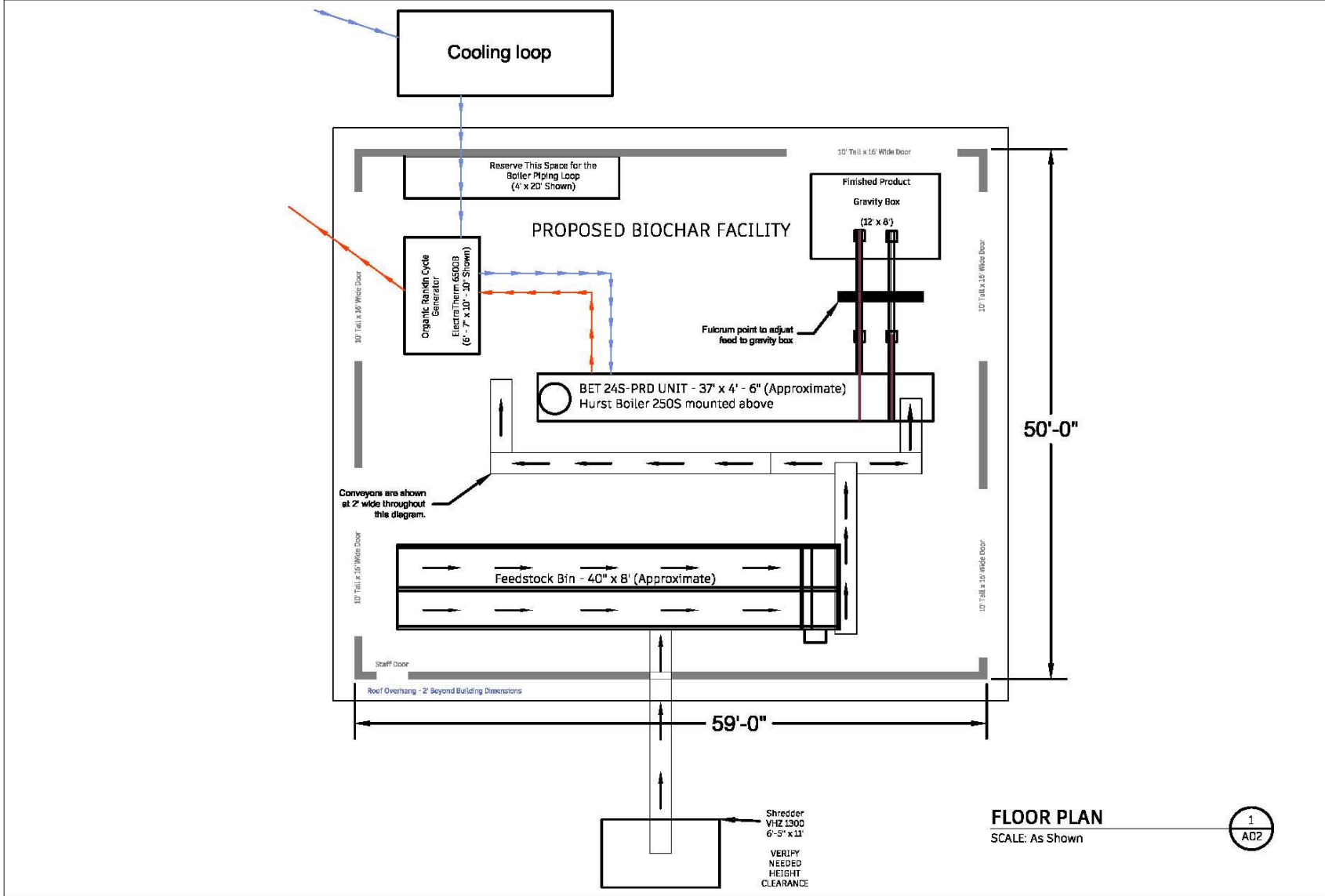
DATE
10/04/2023

SHEET NAME
SKETCH
UTILITY PLAN

DWG NO.
SK.U.P

SITE PLAN
SCALE: 12000





FLOOR PLAN
 SCALE: As Shown

1
 A02

REV	DATE
DATE	
SCALE	As Shown
SHEET NAME	FLOOR PLAN
SHEET #	A02

BIOCHAR REVENUE POTENTIAL

- Approximately 85% of biochar produced will be available for sale
 - ~15% will be used by City & County Parks
- Due to strong environmental benefits, project will result in Carbon Credits available for purchase by corporations, institutions, etc.
 - Revenue from biochar and carbon credits will ramp up over first 3 years of production
- Estimated surplus revenue would be reinvested in capital maintenance of system, and in expanding Tree Canopy outside of ROW.
 - Prioritizing J40 census tracts and low canopy neighborhoods



HOW WILL PARKS USE 15%?

- Raw Biochar sent to Parky's Farm
- Mixed with manure/compost at 1:5 ratio to create enriched Biochar
- Parks uses in our tree plantings (.8 cy/tree)
- Great Parks uses in their plantings



NEXT STEPS

- Springfield Township easement and zoning approvals
- Finalize site design and mechanical engineering
 - Contract with mechanical engineer
 - Construction Drawings ~> Bids ~> Build
- Finalize Operations and Business Plan



Inflation Reduction Act {Direct Pay}

Enables tax-exempt organizations to elect cash payments for energy improvements (such as solar & electric vehicles) instead of the tax credits that previously only benefited for-profit organizations with tax liability



What's Changed With the IRA? Eligible Technologies

Investment Tax Credit: ITC-eligible technologies now include:



Solar PV



Battery Energy Storage



Thermal Energy Storage



Microgrid Controllers



Ground Source Heat Pumps



Electric Vehicles



Small-Scale Wind



Qualified Biogas



Combined Heat & Power



Fuel Cells



EV Charging



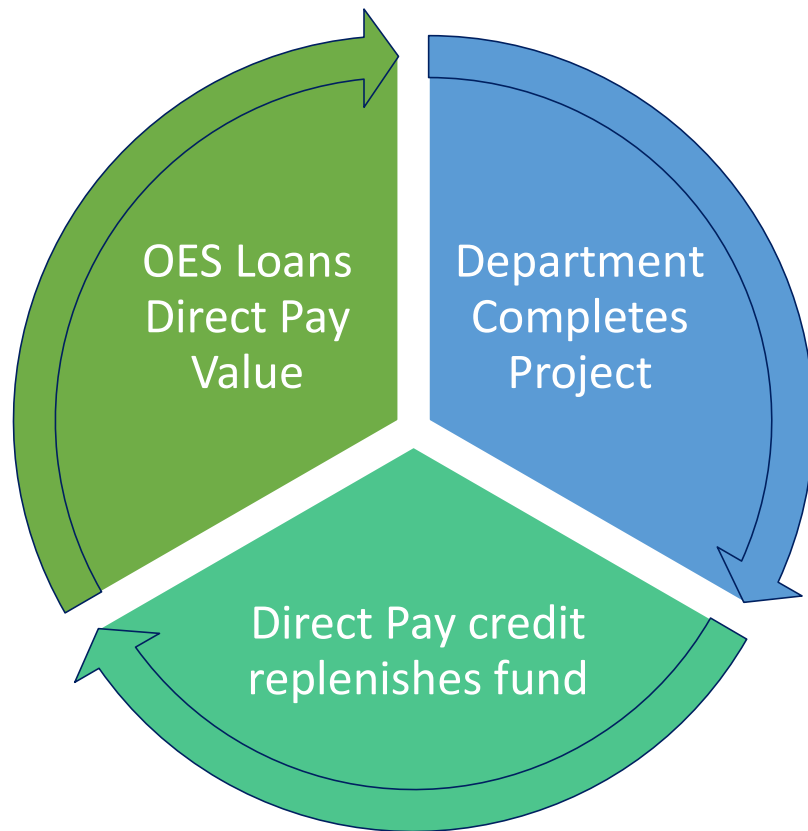


Credit “Layer Cake”

Credit Category	Credit Amount
Base Tax Credit (projects must pay prevailing wage)	+30%
Domestic Content Minimums (% attributable to U.S. Manufactured Products)	+10%
Siting in Energy Community ex. Brownfield site, area related to mining operations)	+10%
Siting in Low-Income Community or on Indian Land	+10%
Qualified Low-Income Residential Building Project or Economic Benefit Project	+20%



OES Revolving Loan Fund



- Provide funding to cover direct pay eligible costs
- Help address performance related deferred maintenance
- Subsidize the cost premium associated with high performance buildings & electric vehicles
 - Help departments avoid operational costs over time
- Recover direct pay benefits to reinvest the dollars
- \$2M of seed funding, seeking additional investment



Direct Pay Projects Underway



Solar on 9 city facilities – expecting **\$1.5M** return



Anaerobic Digester at MSD – expecting **~\$60M** return



Biochar Facility at Parks – expecting **\$850K** return



Battery backup at Rec Center Resilience Hubs –
expected **~\$150K**



Fleet Electric Vehicles - **\$7,500** per vehicle