FCPC Biogas Generation Facility

POTAWATOMI
BUSINESS DEVELOPMENT CORPORATION

FOREST COUNTY
POTAWATOMI
Keeper of the Fire

GREENFIRE
MANAGEMENT SERVICES, LLC

Environmental Mission Statement

The traditional values of the Forest County Potawatomi Community teach us to ***respect all living things****, to take only what we need from mother earth, and to* ***preserve the air, water, and soil*** *for our children. Reflecting these values, we take* ***leadership in creating a sustainable and healthy world****.*

We resolve to ***reduce our own environmental impacts and to take steps to remedy the impacts of others****. We encourage others to do the same. We also* ***seek legislative and policy changes that protect the environment*** *for all people, including generations to come.*

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Project Greenfire

- Economic diversification & energy sovereignty driving principles
- Establishes a goal of energy independence using carbon-free or carbon-neutral renewable resources
- Energy audit to establish a baseline of energy use and to identify projects (list of 100) to reduce carbon footprint
- Purchased RECs (from wind) to offset energy as bridge to energy independence

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Project Greenfire

- Initial focus on the low-hanging fruit: energy efficiency
- Realized the need to produce own energy in order to meet goals
- Obtained $2.6M of competitive funding through the Department of Energy's Community Renewable Energy Deployment ("CRED") program
- Started small: installed 30 kW solar photovoltaic panels at Milwaukee Administration Building during the 3rd quarter of 2011

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Overview of Facility

- 2.0 megawatt anaerobic biodigester and biogas facility located near Potawatomi Bingo Casino in Milwaukee, WI
- Operates on liquid (pumpable) food wastes
- Generates revenue from a combination of tipping fees and electricity sold through a WE Energies Renewable Energy Tariff (local utility)
- Partners: Miron Construction Co., Inc., Symbiont, Biothane LLC

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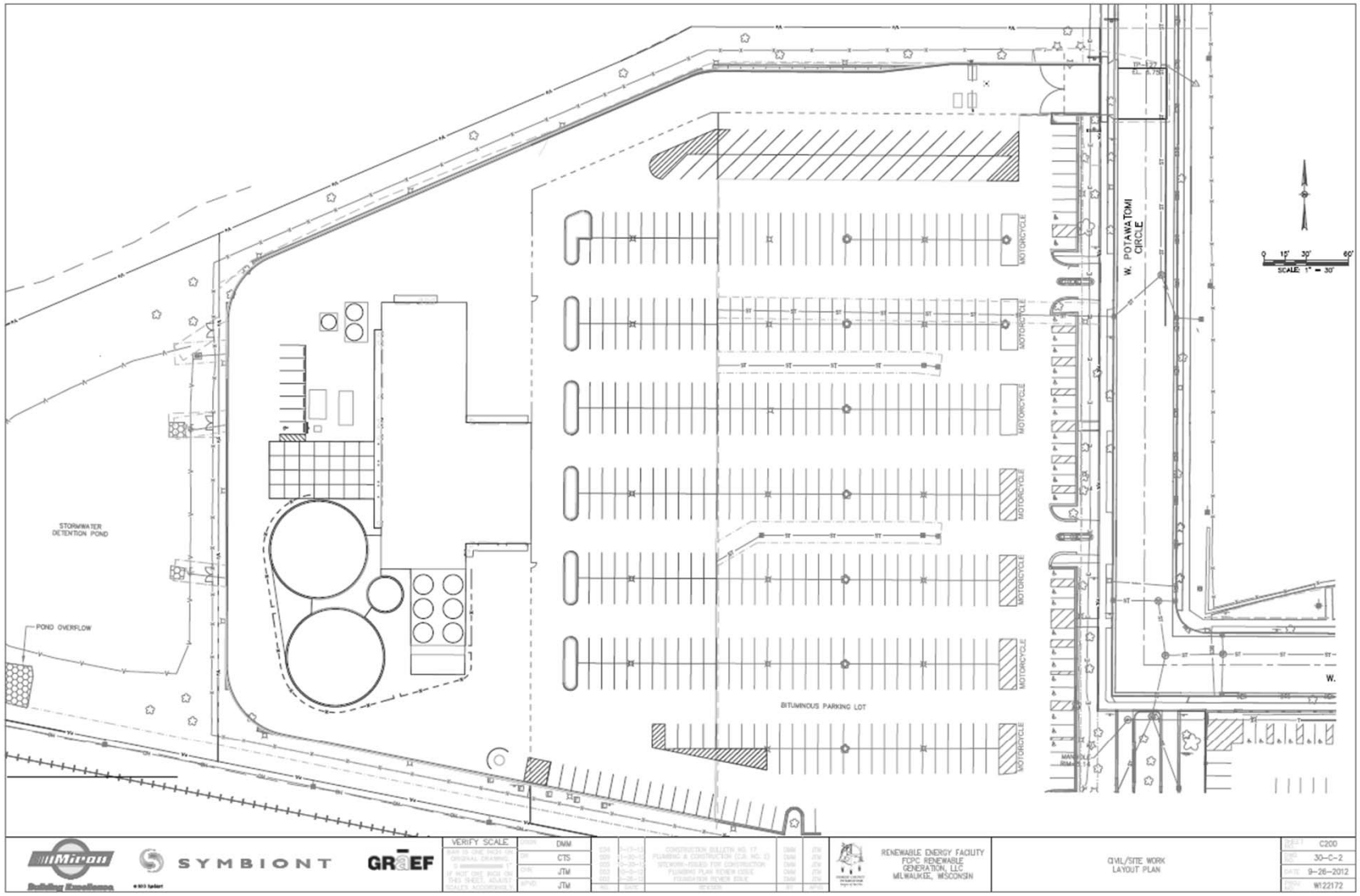
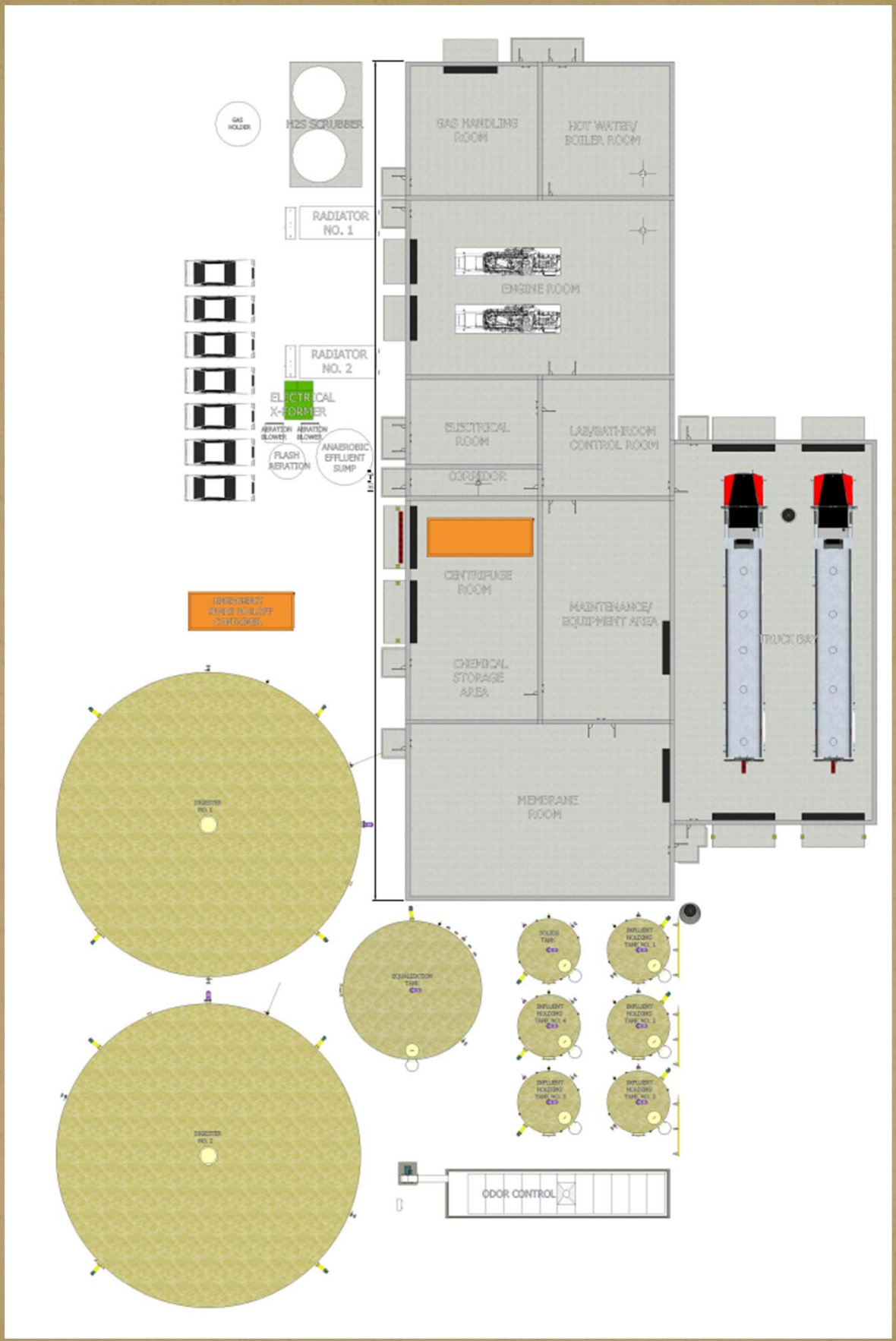
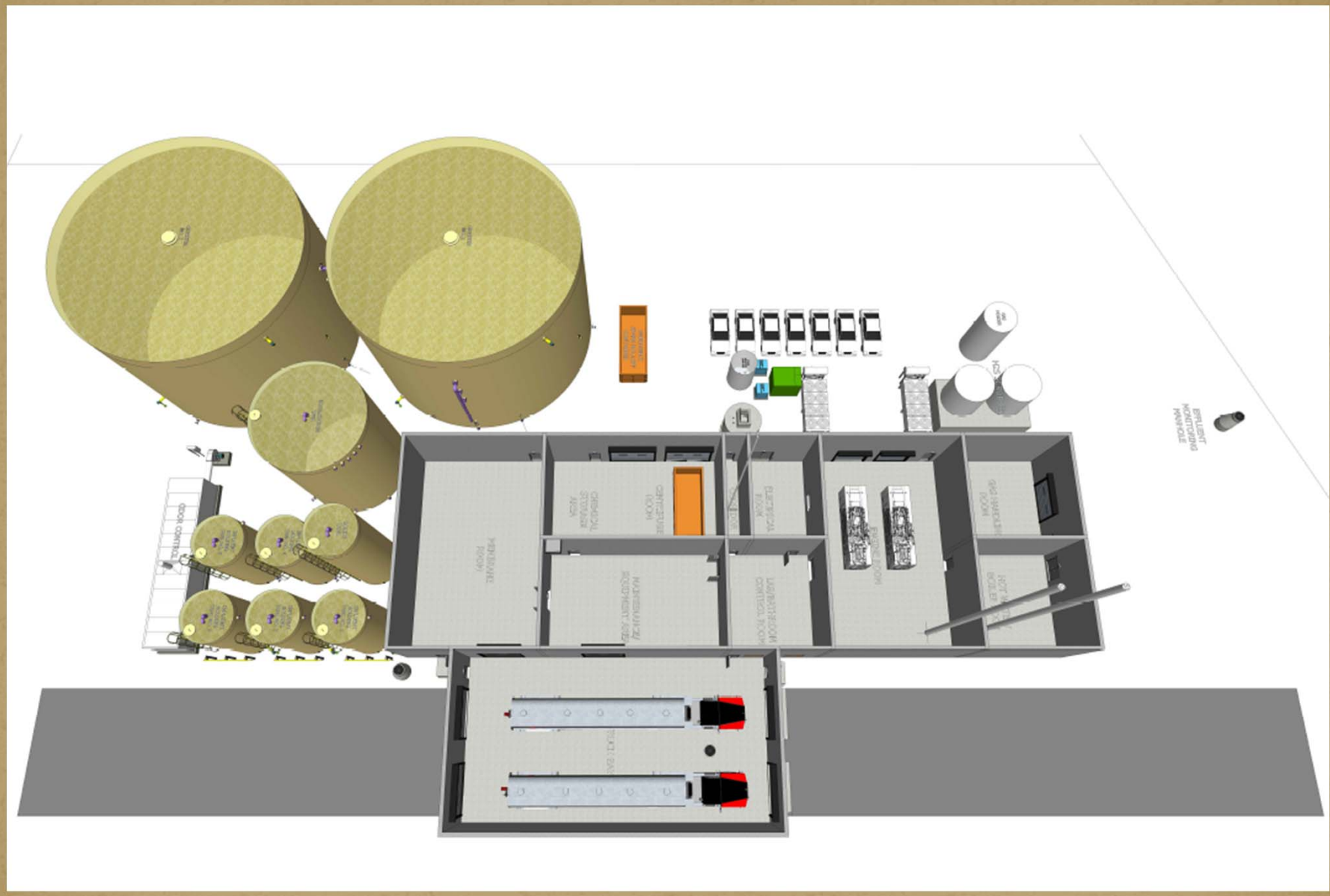
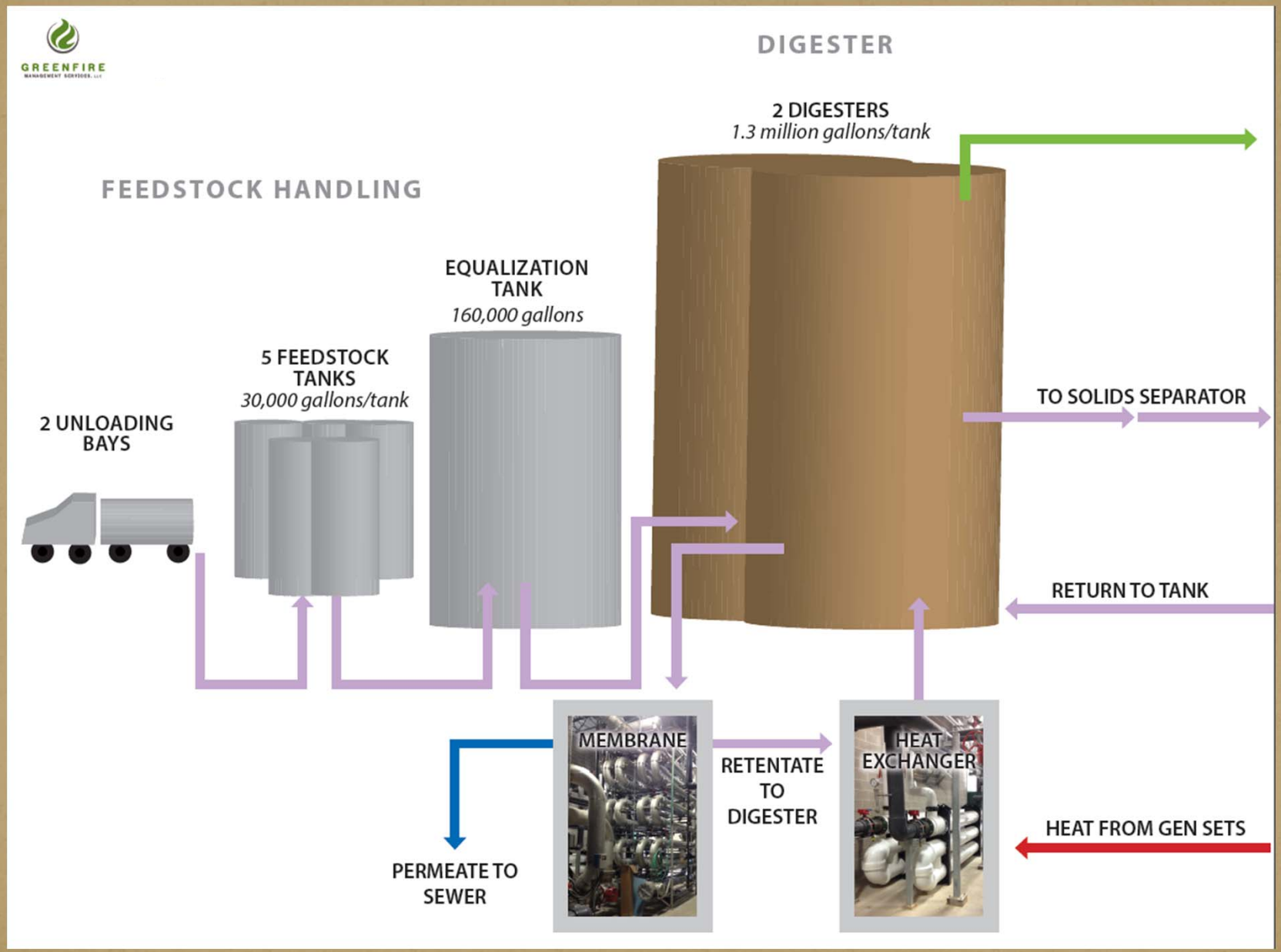
Lake Michigan
Downtown
Milwaukee
I94


POTAWATOMI
BINGO • CASINO

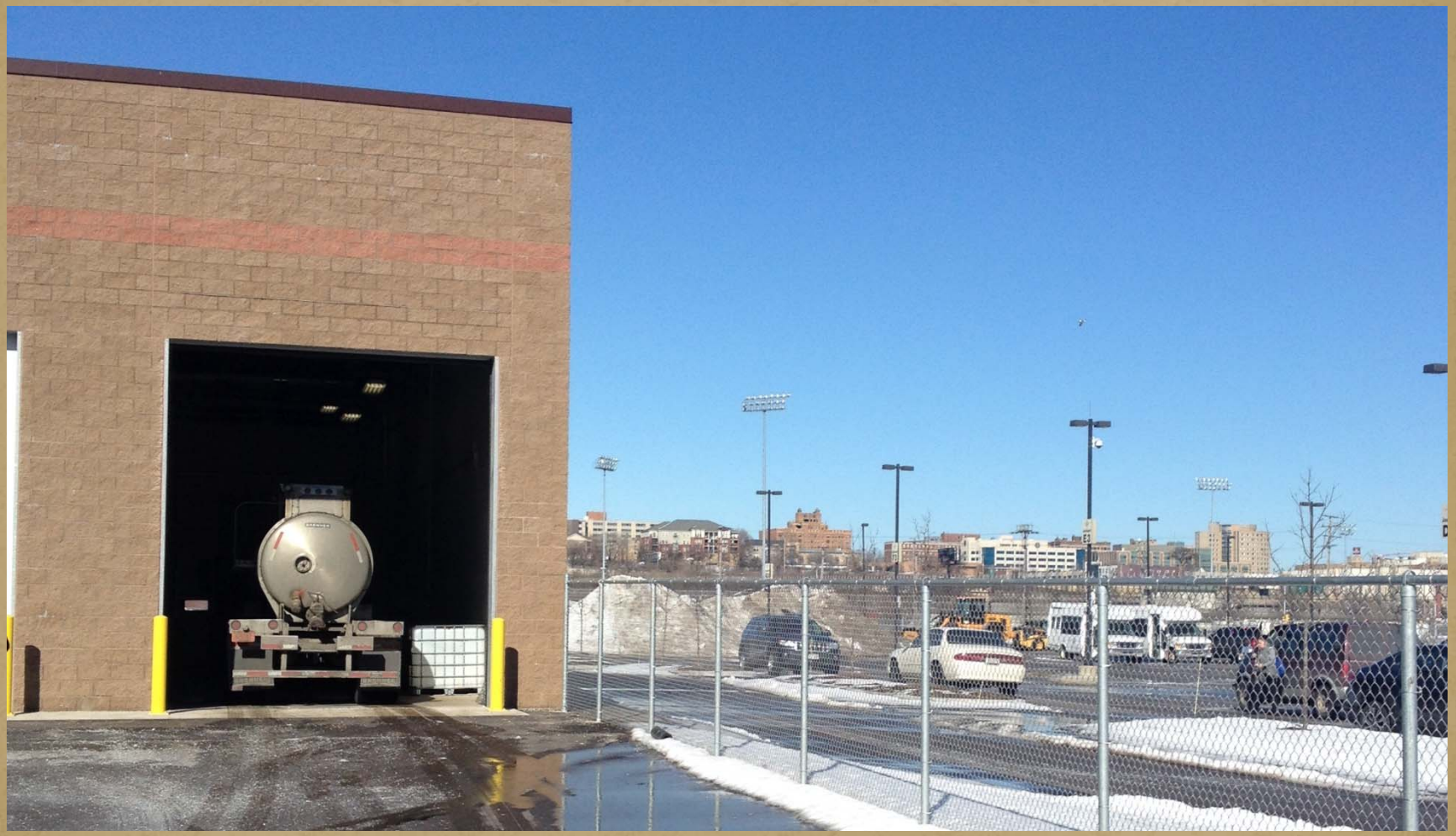

STORMWATER DETENTION POND
POND OVERFLOW
BITUMINOUS PARKING LOT
MOTORCYCLE
W. POTAWATOMI CIRCLE
SCALE: 1" = 30'
SYMBIONT
GRAEF
RENEWABLE ENERGY FACILITY
FOPC RENEWABLE ENERGY GENERATION, LLC
MILWAUKEE, WISCONSIN
CIVIL/SITE WORK LAYOUT PLAN
C200
30-C-2
9-26-2012
W122172


GAS HOLDER
H2S SCRUBBER
GAS HANDLING ROOM
HOT WATER/ BOILER ROOM
RADIATOR NO. 1
ENGINE ROOM
RADIATOR NO. 2
ELECTRICAL X-FORMER
ELECTRICAL ROOM
LAB/SAN-ROOM CONTROL ROOM
AERATION BLOWER
AERATION BLOWER
FLASH AERATION
ANAEROBIC EFFLUENT SUMP
CORRIDOR
CENTRIFUGE ROOM
MAINTENANCE/ EQUIPMENT AREA
TRUCK BAY
CHEMICAL STORAGE AREA
MEMBRANE ROOM
DIGESTER NO. 1
DIGESTER NO. 2
ODOR CONTROL




GREENFIRE
DIGESTER
2 DIGESTERS
1.3 million gallons/tank
FEEDSTOCK HANDLING
EQUALIZATION TANK
160,000 gallons
5 FEEDSTOCK TANKS
30,000 gallons/tank
2 UNLOADING BAYS
TO SOLIDS SEPARATOR
RETURN TO TANK
MEMBRANE
HEAT EXCHANGER
RETENTATE TO DIGESTER
PERMEATE TO SEWER
HEAT FROM GEN SETS

Feedstock Delivery



Feedstock Delivery

Pumpable Feedstock Samples

Food Waste from Casino

Membrane

Heat Exchanger

GREENFIRE

RAW BIOGAS

FILTER

IRON SPONGE

GAS SKID

GAS CONDITIONING

SOLIDS STORAGE TANK
40,000 gallons

SOLIDS SEPARATOR

SOLIDS OUT

CENTRATE TO AERATOR

RETURN TO DIGESTER

SOLIDS HANDLING

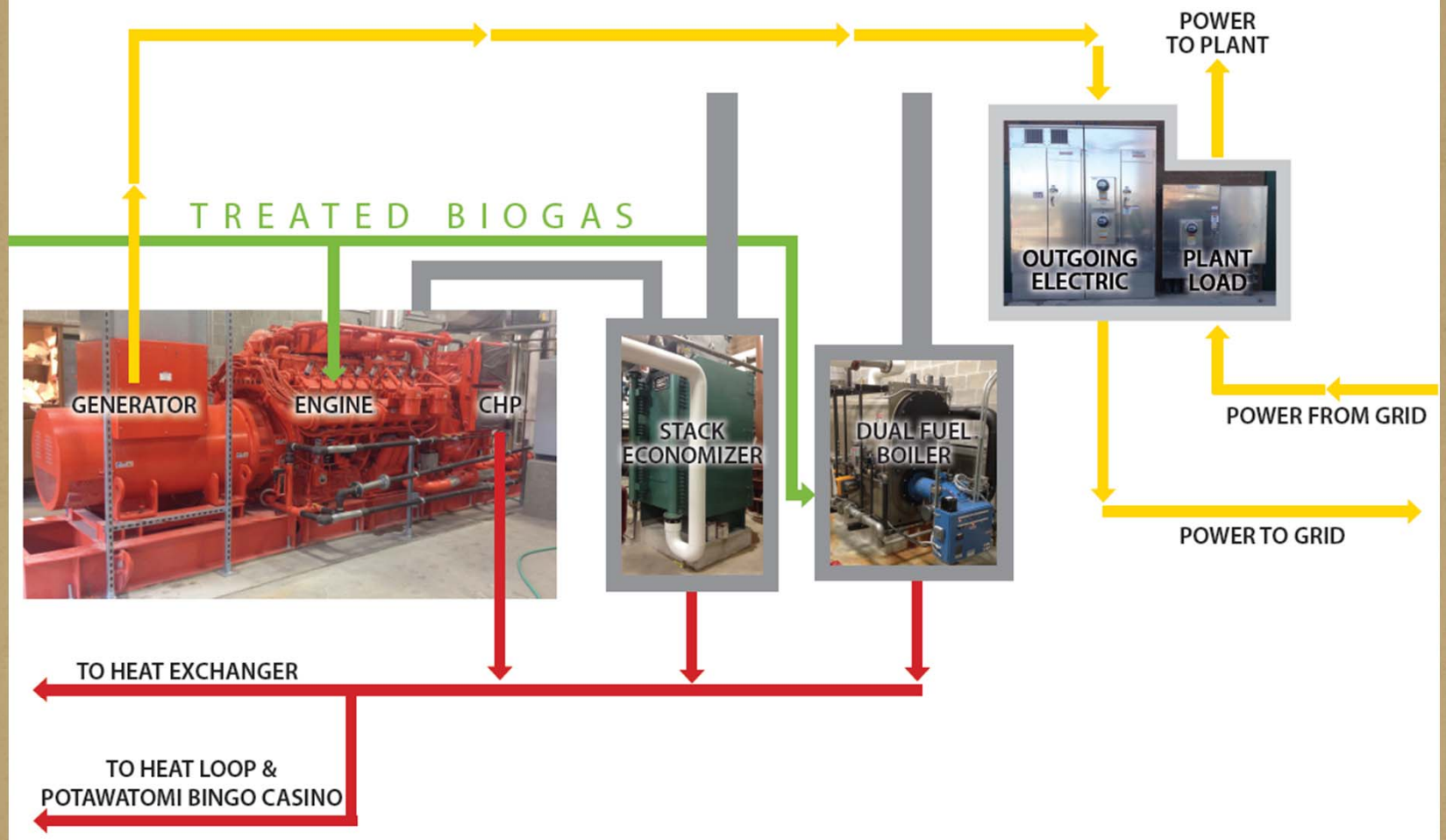
AERATOR

CENTRATE TO SEWER

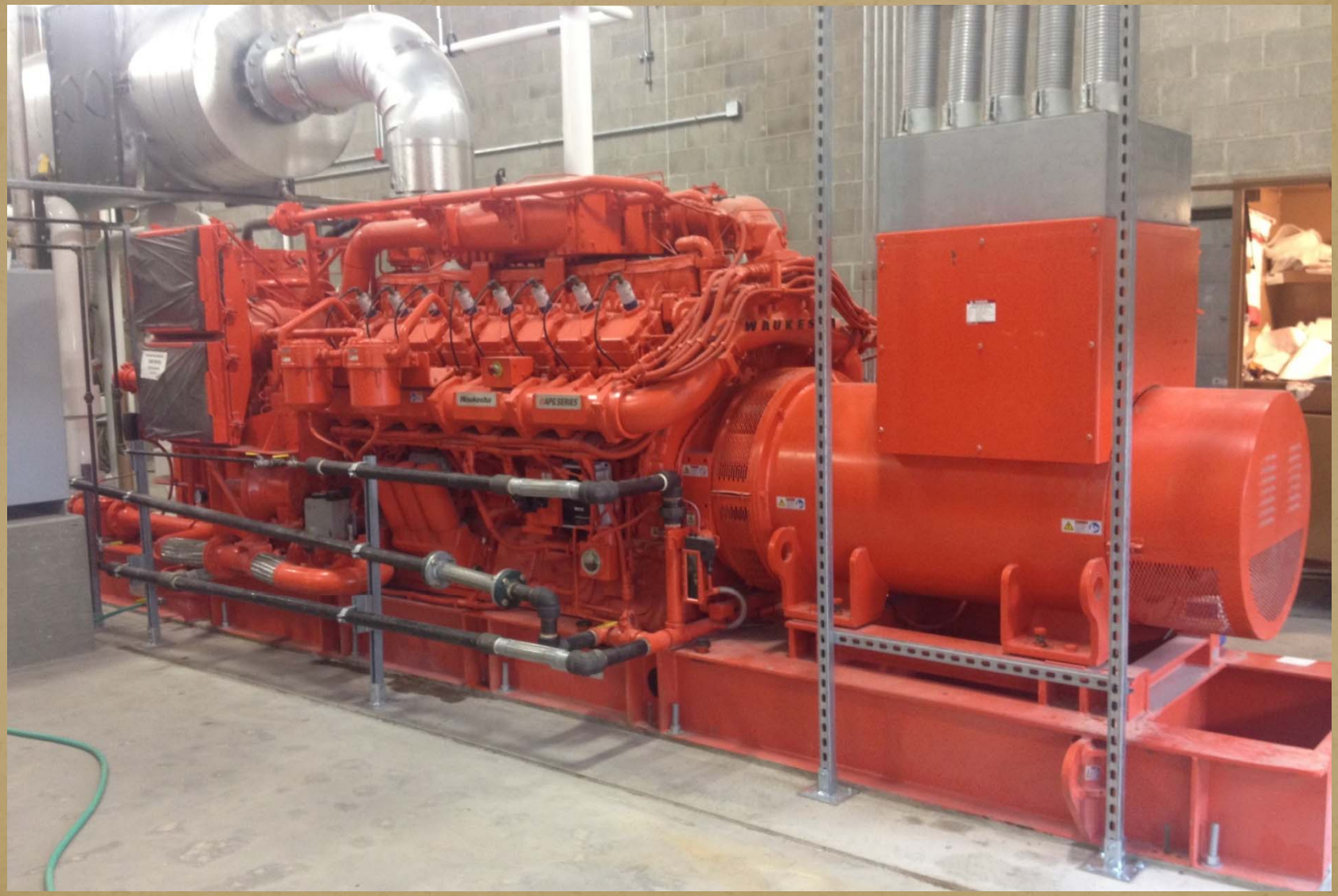
Solids Processing

GREENFIRE

ELECTRICITY/HEAT GENERATION



Generator



Stack Economizer

Dual Fuel Boiler

Challenges

- Funding
- Entity Selection
- Permitting
- Sourcing
- Operating
- Timing

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Funding

- Section 1603 Grant
  - Purchased two GE/Waukesha generators in 2011 to qualify for safe harbor
- Remaining DOE CRED Funding
  - Grant terms and conditions limit flexibility
- Focus on Energy Grant
- New Markets Tax Credits
  - No allocations available for this type of project
- Securing remaining funds?
  - Third party financing could eliminate profit

Entity Selection

- Created a taxable entity, FCPC Renewable Generation, LLC, to directly take advantage of tax benefits through a Section 1603 Grant
  - Grant in lieu of tax credits
  - Typically equal to 30% of the project's eligible cost basis
  - Required LLC to incur expenses of at least 5% of project's eligible costs basis prior to December 31, 2011 in order to "Safe Harbor"
  - Expiring program unavailable for future projects

Permitting

- Local
  - Zoning
    - General Plan Development
    - Detailed Plan Development
  - Certified Survey Map to Subdivide the Property
  - Out of Program Agreement with City of Milwaukee
    - To extend water and sewer lines
  - Footing and Foundation Permit
    - Erosion Control Plan
    - Stormwater Management Plan
  - Sewer Discharge Permit
  - Plumbing Permit
  - Building Permit
    - HVAC and Electrical
- State
  - Air Permit
  - Conditional Exemption Allowing Construction on Historic Fill
  - Wastewater Discharge Permit
- Federal
  - NEPA Review
  - Section 106 of NHPA
    - Confirmation for State Historic Preservation Officer and Tribal Historic Preservation Officer

Sourcing

- Merchant facility without guaranteed supply
- Market research indicates sufficient supply available, but it is difficult to obtain long term contracts
- Market resistance to long-term contracts that would guarantee supply
- Suppliers' reluctance to commit before project becomes real
- Quantity and quality requirements
  - High chemical oxygen demand (COD) required for electricity generation
  - Economics of project require a tipping fee
- Unknown how available feedstock will change in future
  - Second reactor added to allow for wider array of potential feedstock and maximize operational flexibility

Operating

- Unlike solar or wind projects, requires significant operation and maintenance
- Cannot interfere (noise, smell, traffic) with casino operations
  - Pumpable wastes reduce smell and allow for ease in operation but reduces potential feedstock supply
- Marketing solids
  - Outlets looking for stable quality

Timing

- We Energies Biogas Tariff - Power Purchase Agreement
  - Tariff has sunset
    - Construction commenced by November 2, 2012
    - Operate the generators and establish interconnection with WE Energies system in 2013
- Section 1603 grant
    - Needed to purchase engines in 2011
    - Needed to place in service by end of 2013

Throughput

FLOW	132,000	gpd
BIOGAS	516	SCFM *(65% METHANE)*
COD *Chemical Oxygen Demand*	92,500	lb/day
ELECTRICITY	2	MW
EXCESS HEAT	4.1 – 5.0	MM BTUH

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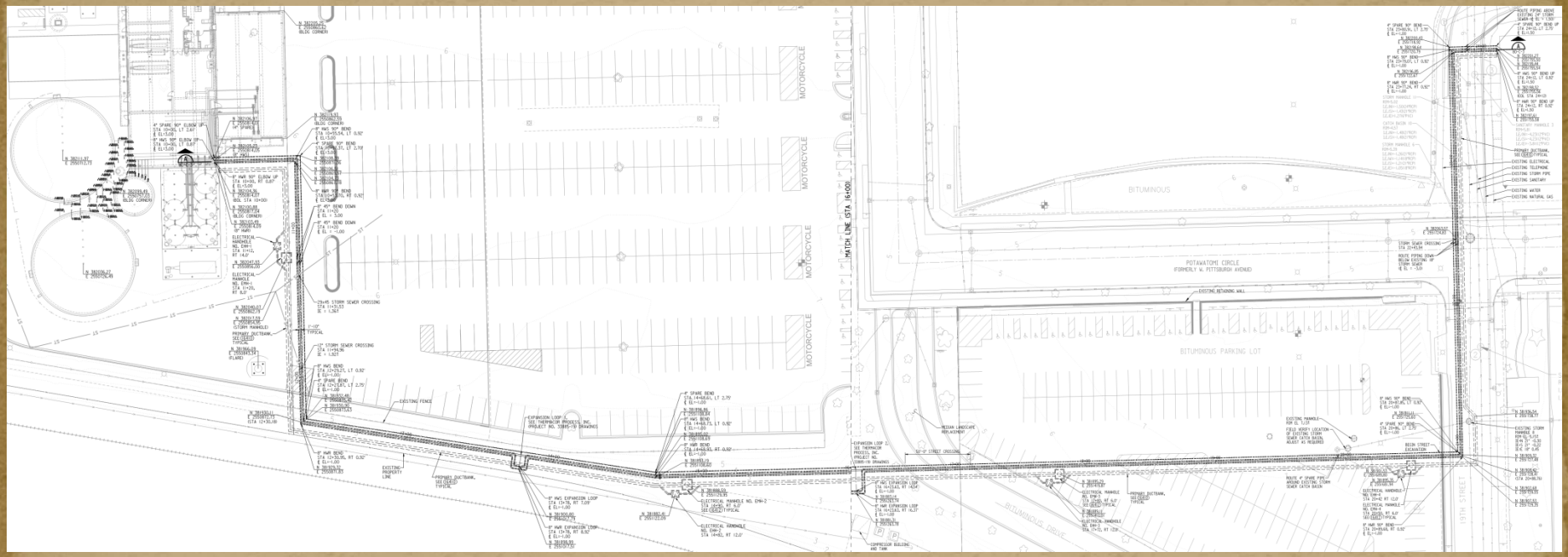
Heat Loop



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Conclusions

- Important project for region as it will remove waste streams and provide clean energy
- Important project for the Tribe's energy goals - energy sovereignty and economic development
- Economic feasibility dependent on convergence of factors – power sales, feedstock availability, use of heat, and grants

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Mii Gwetch

Thank you

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