


BIOMASS BOILER PROJECT



A LONG TIME AGO IN A COUNTY NOT SO FAR AWAY...

- Interested parties asked about a biomass facility around 2012
 - Grant opportunities were investigated, and we realized we needed more information and planning...
 - Secured grant funds for a Feasibility Study
 - Thanks to the Great Basin Unified Air Pollution Control District and the State Sustainable Communities Planning Grant!
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KEY STAKEHOLDERS & PARTNERS

- Bureau of Land Management
- Eastside Biomass Project Team
- GC Forest Products, Inc.
- Inyo National Forest
- Mammoth Lakes Fire Protection District
- Mammoth Mountain Ski Area
- Mono County
- Sierra Nevada Conservancy
- Town of Mammoth Lakes

Goal: utilization of sustainably-available forest biomass sourced as a byproduct of forest management and fuels treatment programs.

KEY PLANNING MILESTONES

Feasibility Study: Completed in early 2014

- Funded by Great Basin Unified Air Pollution Control District & State Sustainable Communities Planning Grant – THANK YOU!
- Analysis included: potential facility sites, feedstock supply & cost, economics & financial feasibility, technologies & selection process, permits
- Conclusion: Insufficient biomass feedstock for a combined heat and power facility – pursue a “thermal-only” facility
- Identified Pilot Project: Mammoth Mountain Ski Area Garage

Now What?



PROJECT IDENTIFICATION

- Need: The Bridgeport Road Shop boiler reached end of life and needed to be replaced.
- Opportunity: The feasibility study recommended a thermal-only biomass facility.
- Opportunity: The Sierra Nevada Conservancy was interested in funding a biomass project.
- AHA! What about a thermal biomass boiler for the Bridgeport Road Shop?

*Feasibility study provided us with the data necessary to
analyze and justify a project*

BIOMASS BOILER PROJECT ECONOMICS

THERMAL BIOMASS BOILER ASSUMPTIONS:

Biomass fuel cost = $\$45 \times 103 \text{ BDT} =$
 $\$4,635/\text{year}$

Biomass cost = $\$45/\text{bone dry ton (BDT)}$
delivered

Fuel input (147.25 lbs/hr @ 1,400
hours/year) = 206,157 lbs/year

1 BDT = 2,000 lbs

BDT consumed/year = ~103 BDT

Assumed increase in labor & parts =
 $\$20,000/\text{year}$

Total operating cost = $\$24,635/\text{year}$

PROPANE BOILER ASSUMPTIONS:

Propane fuel cost = $\$3.50 \times 29,920$
gallons = $\$74,800$

Market-rate propane cost* = $\$2.50$

Propane consumed/year = 29,920
gallons

Labor & parts (maintenance) = minimal

Total operating cost = $\$74,800/\text{year}$

**Cost Savings = $\$74,800 - \$24,635 =$
 $\sim \$50,165/\text{year}$**

AIR POLLUTION CONTROL DISTRICT PERMIT

Even after Feasibility Study due diligence, initial read was that thermal biomass would trigger Title V permitting requirements

Researched Code of Federal Regulation sections 40 CFR 241.2 & 241.3 (fun!) to prove:

- We are using “clean cellulosic biomass” which can be considered a “traditional fuel.”
- The biomass materials are not “discarded” at any point in the supply chain or comingled with the municipal solid waste stream.
- The biomass is a valuable fuel product rather.

Air Permit approved as “fuel burning equipment”

MAKING IT HAPPEN

Received an SNC grant for \$215,000, (+\$21,500 later)

Key Tasks:

Community Outreach

Thermal technology research and vendor selection (used sole source)

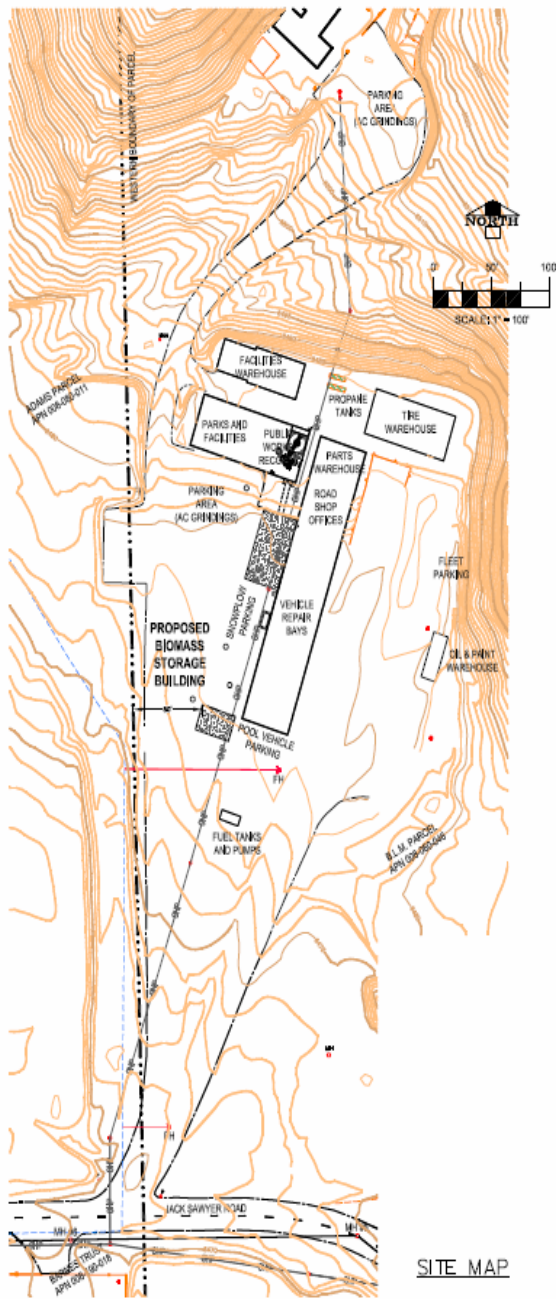
Permits & Environmental (used categorical exclusion)

Plans, Specifications, and Engineering

Equipment Acquisition

Construction, Installation and Training





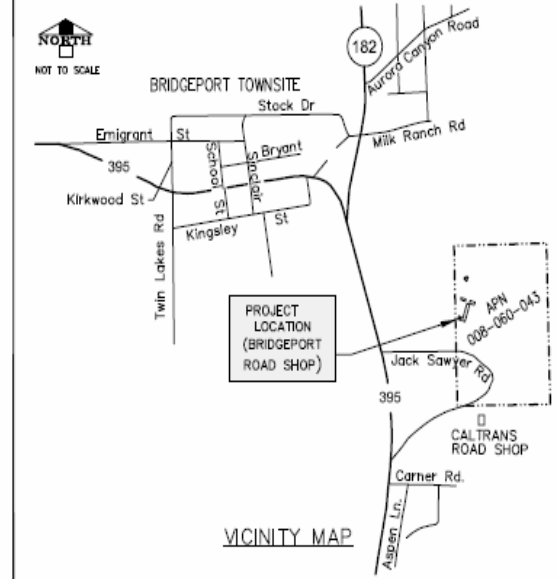
PROJECT SUMMARY & GENERAL CONSTRUCTION NOTES:

THE GOAL OF THIS PROJECT IS THE INSTALLATION OF A BIOMASS BOILER SYSTEM THAT WOULD HEAT THE EXISTING BRIDGEPORT ROAD SHOP BUILDING AND THE EXISTING PARKS & FACILITIES BUILDING, THIS INCLUDES THE CONSTRUCTION OF A NEW BIOMASS FUEL STORAGE SHED, THE REMOVAL OF THE EXISTING BOILER SYSTEM, RELOCATION OF A BOILER UNIT FROM THE BRIDGEPORT GENERAL HOSPITAL BUILDING FOR SYSTEM BACKUP, AND DEMOLITION OF WALLS WITHIN THE PARKS AND FACILITIES BUILDING.

1. ALL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE 2012 EDITION OF THE CALIFORNIA BUILDING CODE (TITLE 24) FOR TYPE V-B CONSTRUCTION, WHICH ADOPTS THE 2010 UMC, 2009 UPC; THE NEC, LATEST EDITION, AS WELL AS ALL APPLICABLE COUNTY OF MONO CODES AND ORDINANCES.
2. INFORMATION REGARDING THE SITE WAS OBTAINED FROM AVAILABLE MONO COUNTY PLANS AND RECORDS. THE PLAN DRAFTER HAS NOT VERIFIED ALL EXISTING FIELD CONDITIONS. WORKERS SHALL VERIFY ALL DIMENSIONS; REPORT ALL DISCREPANCIES TO THE PLAN PREPARER AND PROCEED ACCORDING TO THE PROJECT MANAGER.
3. WORKERS SHALL PROVIDE ALL SHORING AND BRACING REQUIRED TO PROTECT AND ENSURE SAFETY OF PROJECT WORK.
4. UNLESS OTHERWISE NOTED, DIMENSIONS ARE TO THE FACE OF FINISH. SPACING OF STUDS SHALL BE 16" ON CENTER, U.O.N., ALL LUMBER IN CONTACT WITH CONCRETE OR MASONRY SHALL BE FOUNDATION GRADE REDWOOD OR PRESSURE-TREATED DOUGLAS FIR, ALL LUMBER SHALL BE SURFACED FOUR SIDES, (S4S)
5. EXCEPT IN AREAS SCHEDULED AS EXPOSED STRUCTURE, THERE SHALL BE NO EXPOSED PIPE, CONDUITS, DUCTS, VENTS, ETC.; ALL SUCH LINES SHALL BE FURRED AND FINISHED, PROVIDE FIRE DAMPERS AT PENETRATIONS OF ALL 1-HOUR FIRE RATED PARTITIONS AND FLOOR CEILING ASSEMBLIES.
6. BEFORE STARTING ANY WORK ON OR OVER UNDERGROUND UTILITY EXTENSIONS, CONTACT THE BRIDGEPORT P.U.D, AT 760-932-7251, AND U.S.A. (UNDERGROUND SERVICE ALERT) AT 1-800-642-2444.

SITE AND FACILITY NOTES:

1. APN: 008-060-043-000 (±61.9 Acres),
PARCEL OWNER: B.L.M. (BLM TO MONO CO. LAND PATENT PENDING)
CALTRANS MAINTENANCE STATION SITE APPROVED BY BLM OCT. 2, 1961
2. PARCEL BOUNDARY ESTIMATED PER B.L.M. DEPENDENT RESURVEY AND SUBDIVISION OF SECTION 28, TOWNSHIP 5 NORTH, RANGE 25 EAST, MDB&M (JULY 26, 2002), HIGHWAY MAP BOOK 2, PG. 18 (OCT. 16, 1961), RSMB 1/62, RSMB 2/51, RSMB 4/35, AND RSMB 4/98. NEW RECORD OF SURVEY PENDING.
3. LATITUDE: 36°15'05"N, LONGITUDE: 119°11'02"W,
ELEVATION: ±6500' (GOOGLE EARTH)
4. TOPOGRAPHY AND BUILDING LAYOUT PER AERIAL PHOTOGRAPHY FLOWN SEPT. 20, 2001. INTERIOR WALL LOCATIONS ARE APPROXIMATE AND ARE NOT BASED UPON AS-BUILT PLANS.
5. PARKS & FACILITIES BUILDING TOTAL AREA = 4620 s.f. (42x110' exterior walls)
BP ROAD SHOP BUILDING TOTAL AREA = 9080 s.f. (40'x227' exterior walls)
6. JACK SAWYER ROAD UNDERGROUND UTILITIES ARE PER BRIDGEPORT MAINTENANCE STATION PROJECT PLANS PREPARED BY STATE OF CALIFORNIA, DEPARTMENT OF TRANSPORTATION (CALTRANS), CONTRACT NO. 08-268904, APPROVAL DATE AUGUST 26, 1996.



LEGEND

- OHP — OHP — EXISTING OVERHEAD POWER LINE
- G — G — EXISTING PROPANE LINE
- W — W — EXISTING WATER LINE
- S — S — EXISTING SEWER LINE
- × 6470.7 SPOT ELEVATION (IN FEET)
- FIRE HYDRANT
- ⊕ SEWER MANHOLE
- ⊖ POWER POLE

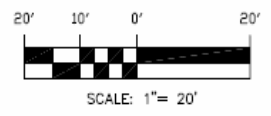
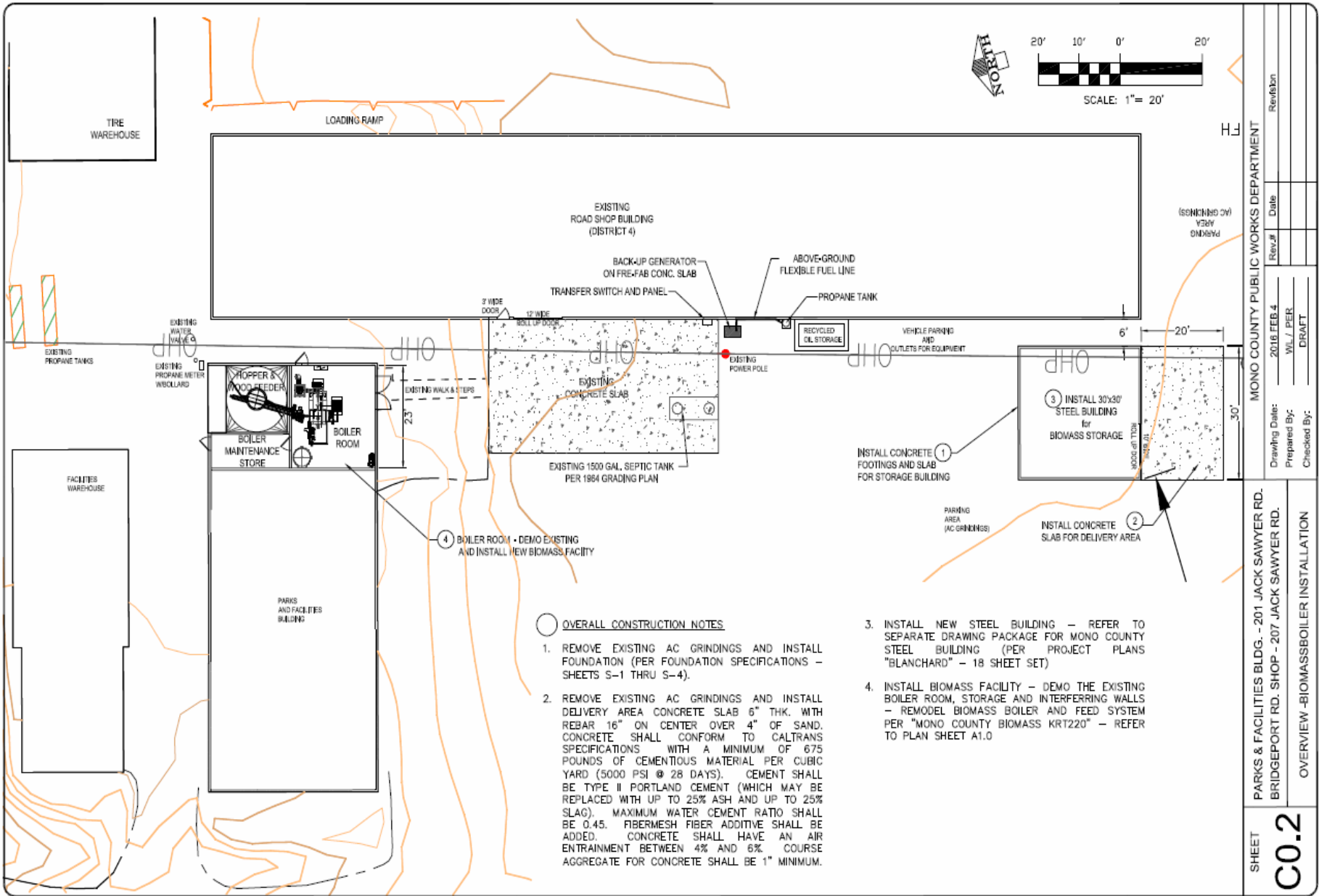
SHEET & PLAN SET INDEX

- MONO COUNTY DEPT. OF PUBLIC WORKS PLAN SET
- C0.1 : SITE UTILITIES & VICINITY MAPS, GENERAL CONSTRUCTION NOTES
 - C0.2 : SITE MAP, CONSTRUCTION CALL-OUTS
 - A-1.0 : DEMOLITION & IMPROVEMENT FLOOR PLANS
 - A-2.0 : DETAILS AND BUILDING SECTIONS
 - A-3.0 : HOPPER DETAILS
 - A-4.0 : HOPPER DOOR DETAILS

- BIOMASS METAL STORAGE BUILDING 16-SHEET PLAN SET FOR CONSTRUCTION PERMIT (PREPARED BY EMPIRE STEEL BUILDINGS, DATED 1-21-16)
- C1 : BUILDER CONTRACTOR RESPONSIBILITIES, PROJECT NOTES
 - F1 : ANCHOR BOLT PLAN
 - F2 : ANCHOR BOLT SUMMARY, ENDWALL COLUMNS & RIGID FRAME REACTIONS
 - F3 : FRAMED OPENING AIR LAYOUT
 - E1 : ROOF FRAMING PLAN
 - E2 : SIDEWALL FRAMING, SHEETING AND TRIM, LINE "A"
 - E3 : SIDEWALL FRAMING, SHEETING AND TRIM, LINE "E"
 - E4 : ENDWALL FRAMING, SHEETING AND TRIM, LINE "1"
 - E5 : ENDWALL FRAMING, SHEETING AND TRIM, LINE "3"
 - E6 : RIGID FRAME ELEVATION, "LINE 2"
 - DET1 THROUGH DET8 : DETAILS

- STORAGE BUILDING FOUNDATION 48-SHEET PLAN SET FOR CONSTRUCTION PERMIT (PREPARED BY AL EXANDER A. TOUNIAN, DATED 02-15-16)
- S-1 : FOUNDATION SPECIFICATIONS
 - S-2 : FOUNDATION PLAN
 - S-3 : FOOTING DETAILS
 - S-4 : ANCHOR BOLT & PERIMETER FOOTING DETAILS

MONO COUNTY PUBLIC WORKS DEPARTMENT	Revision	
	Date	
	Rev.#	
	2016 FEB. 4	
PARKS & FACILITIES BLDG. - 201 JACK SAWYER RD. BRIDGEPORT RD. SHOP - 207 JACK SAWYER RD.	Drawing Date:	
	Prepared By:	WJ / PER
	Checked By:	DRAFT
COVER SHEET - BIOMASSBOILER INSTALLATION		
SHEET	C0.1	



HI

SHEET	MONO COUNTY PUBLIC WORKS DEPARTMENT			
	2016 FEB 4	Rev.#	Date	Revision
C0.2	PARKS & FACILITIES BLDG. - 201 JACK SAWYER RD. BRIDGEPORT RD. SHOP - 207 JACK SAWYER RD.		W.L. PER	DRAFT
	OVERVIEW -BIOMASSBOILER INSTALLATION			

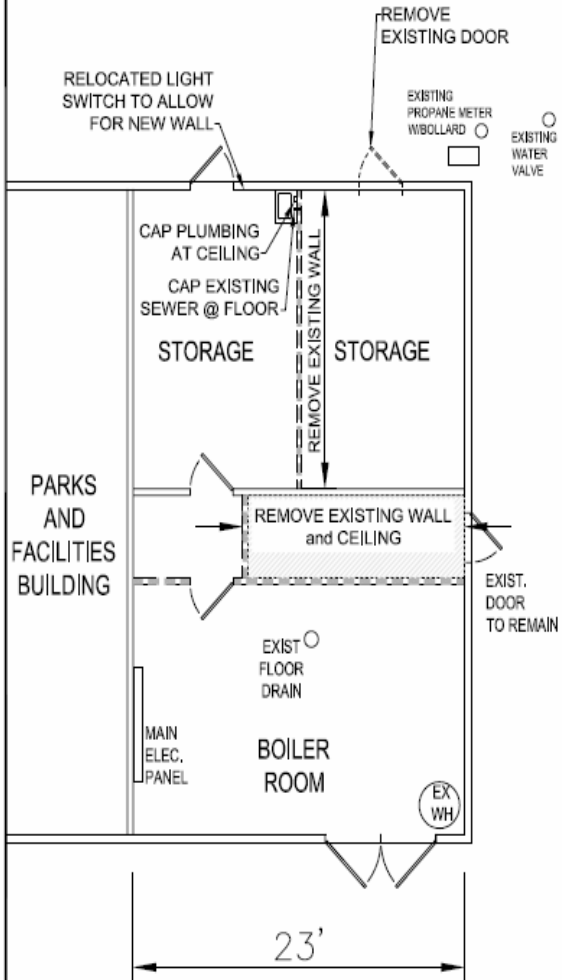
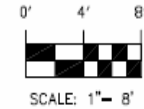
OVERALL CONSTRUCTION NOTES

1. REMOVE EXISTING AC GRINDINGS AND INSTALL FOUNDATION (PER FOUNDATION SPECIFICATIONS - SHEETS S-1 THRU S-4).
2. REMOVE EXISTING AC GRINDINGS AND INSTALL DELIVERY AREA CONCRETE SLAB 6" THK. WITH REBAR 16" ON CENTER OVER 4" OF SAND. CONCRETE SHALL CONFORM TO CALTRANS SPECIFICATIONS WITH A MINIMUM OF 675 POUNDS OF CEMENTIOUS MATERIAL PER CUBIC YARD (5000 PSI @ 28 DAYS). CEMENT SHALL BE TYPE II PORTLAND CEMENT (WHICH MAY BE REPLACED WITH UP TO 25% ASH AND UP TO 25% SLAG). MAXIMUM WATER CEMENT RATIO SHALL BE 0.45. FIBERMESH FIBER ADDITIVE SHALL BE ADDED. CONCRETE SHALL HAVE AN AIR ENTRAINMENT BETWEEN 4% AND 6%. COURSE AGGREGATE FOR CONCRETE SHALL BE 1" MINIMUM.

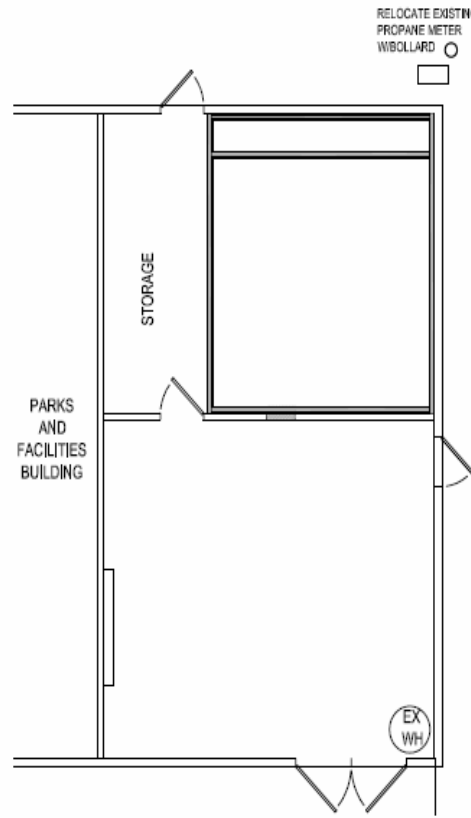
3. INSTALL NEW STEEL BUILDING - REFER TO SEPARATE DRAWING PACKAGE FOR MONO COUNTY STEEL BUILDING (PER PROJECT PLANS "BLANCHARD" - 18 SHEET SET)
4. INSTALL BIOMASS FACILITY - DEMO THE EXISTING BOILER ROOM, STORAGE AND INTERFERING WALLS - REMODEL BIOMASS BOILER AND FEED SYSTEM PER "MONO COUNTY BIOMASS KRT220" - REFER TO PLAN SHEET A1.0

DEMOLITION NOTES:

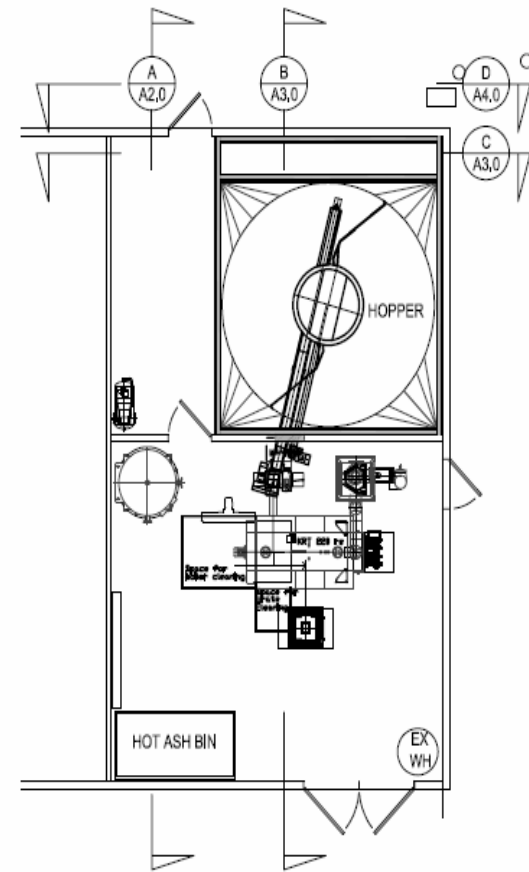
1. XXXXXX.
2. YYYYYY.
3. THE NEAREST PROPERTY LINE IS GREATER THAN 160 FEET FROM THIS PROJECT INSTALLATION AREA.



EXISTING AND DEMOLITION PLAN
PARKS AND FACILITIES BUILDING

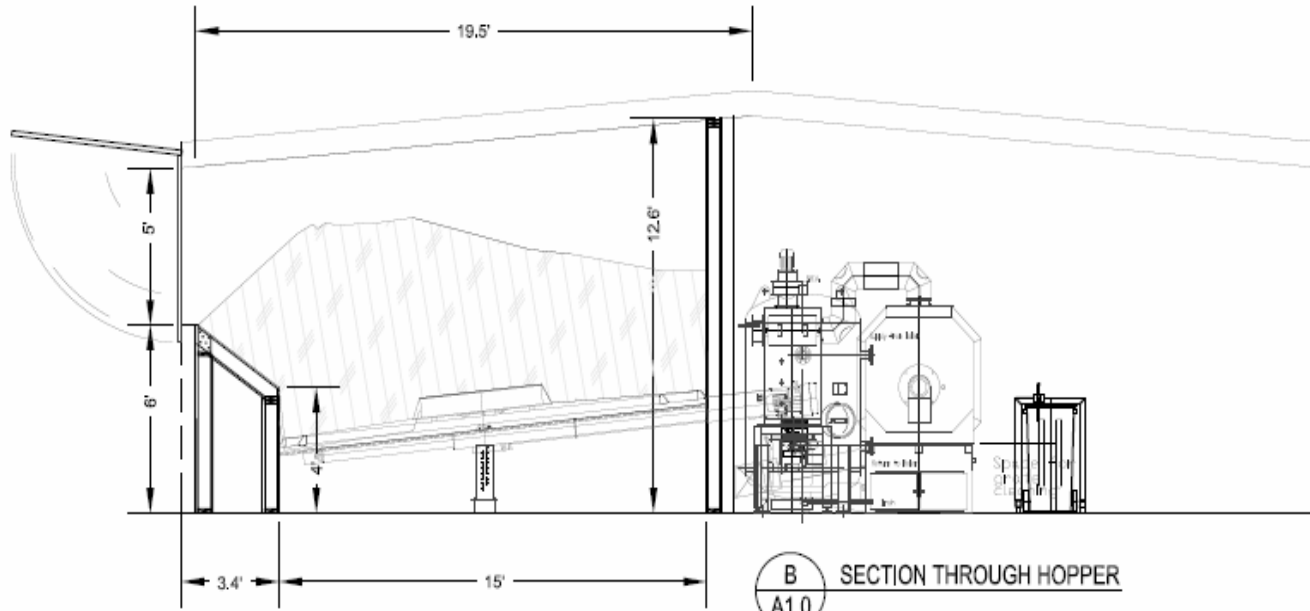


ROOM IMPROVEMENT PLAN
PARKS AND FACILITIES BUILDING

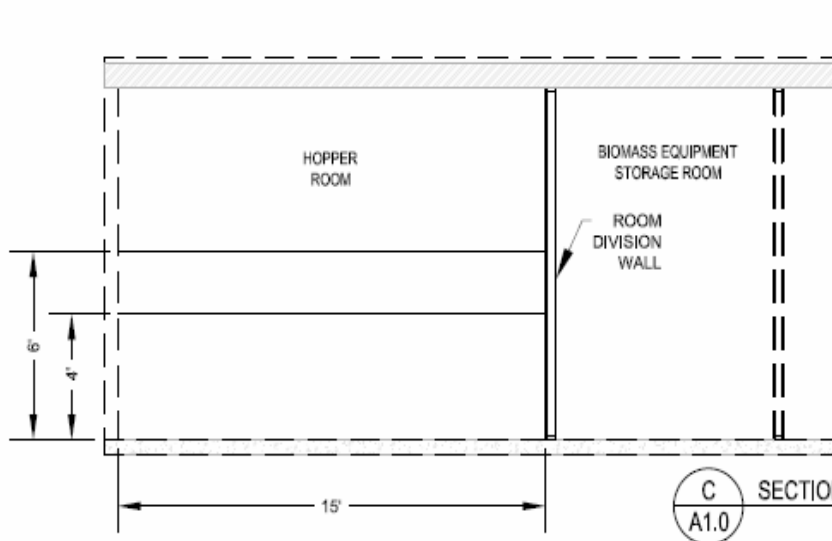


BIOMASS INSTALLATION PLAN
PARKS AND FACILITIES BUILDING

SHEET A1.0	PARKS & FACILITIES BLDG. - 201 JACK SAWYER RD. BRIDGEPORT RD. SHOP - 207 JACK SAWYER RD.		MONO COUNTY PUBLIC WORKS DEPARTMENT	
	DEMOLITION PLAN - BIOMASS BOILER INSTALLATION		Rev.#	Date
		2016 FEB 04		
	Prepared By:	W.L. PER	Checked By:	DRAFT
	Drawing Date:	2016 FEB 04	Rev.#	Date



B SECTION THROUGH HOPPER
A1.0



C SECTION THROUGH HOPPER
A1.0

SHEET

A3.0

PARKS & FACILITIES BLDG. - 201 JACK SAWYER RD.
BRIDGEPORT RD. SHOP - 207 JACK SAWYER RD.

DETAILS - BIOMASS BOILER INSTALLATION

MONO COUNTY PUBLIC WORKS DEPARTMENT

Drawing Date: 2016 FEB 18
Prepared By: PER
Checked By: DRAFT

Rev.# Date

Rev.# Date

PRE-EXISTING



PREPARATIONS



Thermal Tank
Delivery

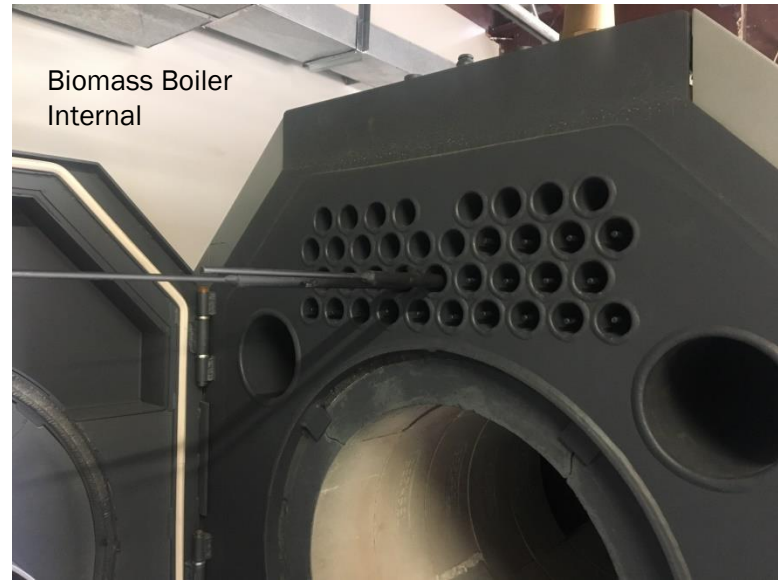


Boiler room
Demolition



Hopper room
Build

DELIVERY



ASSEMBLY



Agitator assembly

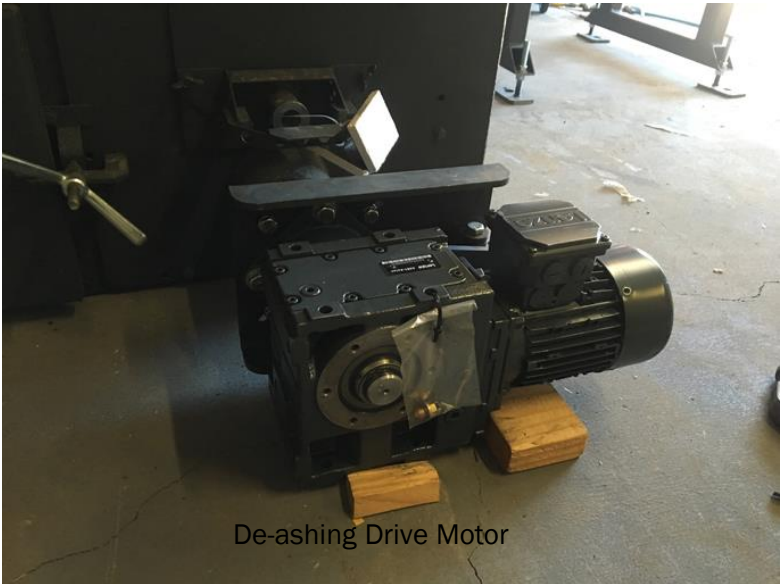


Flu and Automatic De-ashing



Hopper auger
Agitator drive

ASSEMBLY CONTINUED



De-ashing Drive Motor



Biomass Boiler



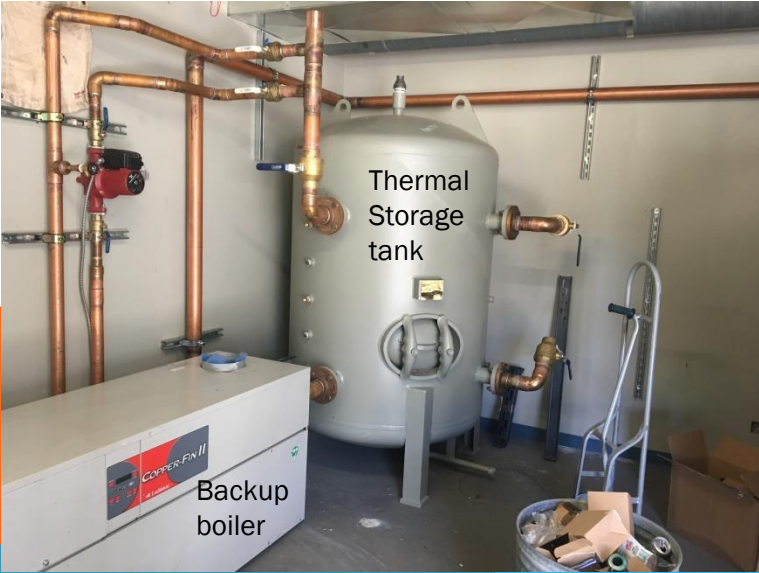
INTEGRATING



INTEGRATING CONTINUED



System piping



Thermal Storage tank

Backup boiler



System Control Center

OPERATION

Hopper / Agitator

