

Council Of Athabascan Tribal Governments (Ft. Yukon) : Fort Yukon Wood Energy Program – Wood Boiler Deployment (AK)

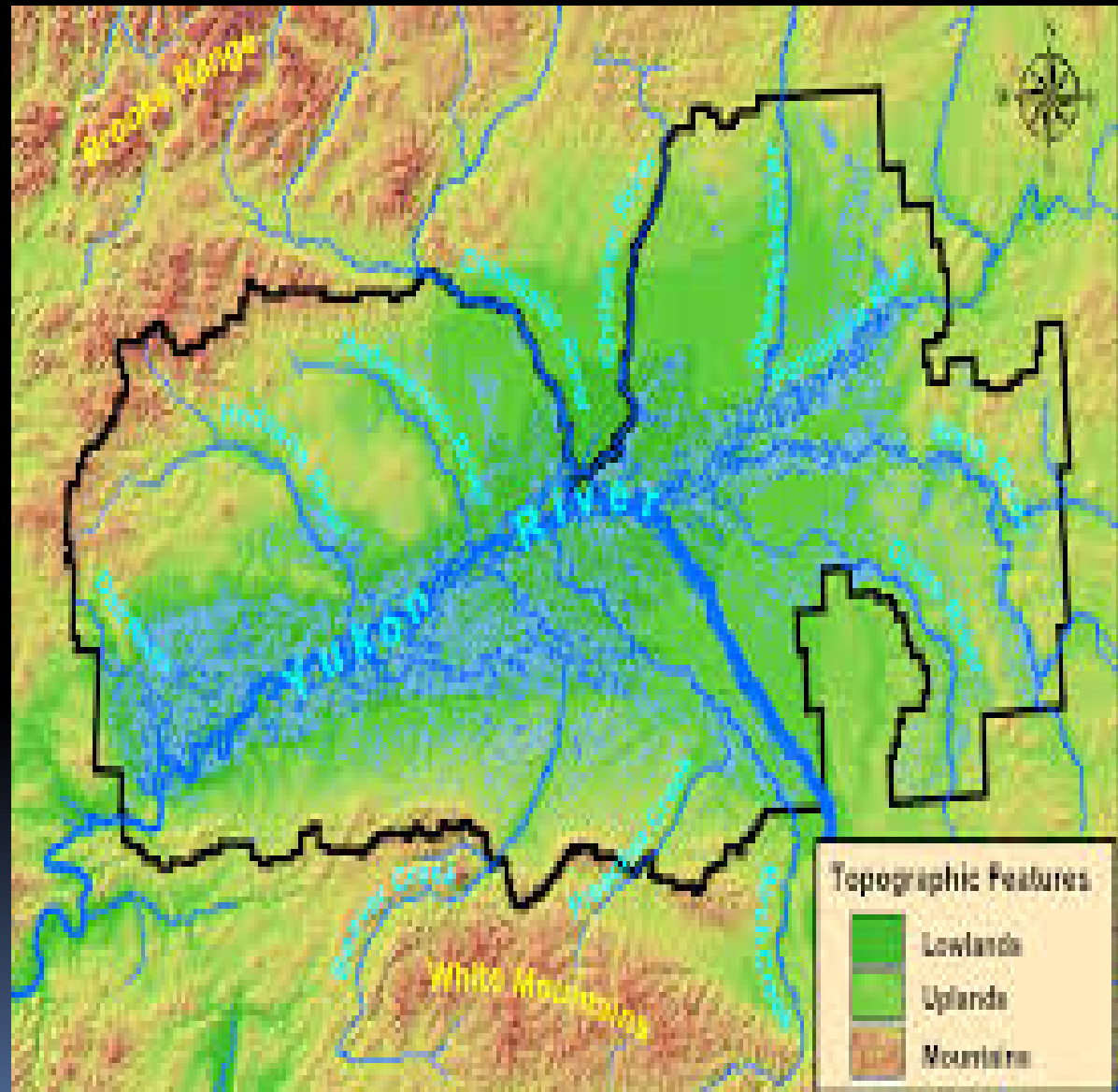
Presented by :

James Kelly Sr., CATG NR Director and
Frannie Hughes, GZ Corporation *CEO*



Yukon Flats

- 10 Athabascan villages in the Yukon Flats
- 8 Gwich'in villages and 2 Koyukon villages
- 55,000 sq. mi. Size of Wisconsin
- 1500 people
- Fort Yukon largest Hub Village 650 people
- Smallest Village Birch Creek 25 people
- Fort Yukon and Circle are the only villages with a City Government
- There is no organized Borough in the Yukon Flats
- Two villages on road system





Tribe

- Gwichyaa Zhee Gwichin Tribal Government formally known as the Native Village of Fort Yukon
- Council of Athabaskan Tribal Government is an consortium of 10 Gwichin/Koyukon villages
- Gwitchyaa Zhee Corporation
ANCSA Village Corporation



Overview of Project:

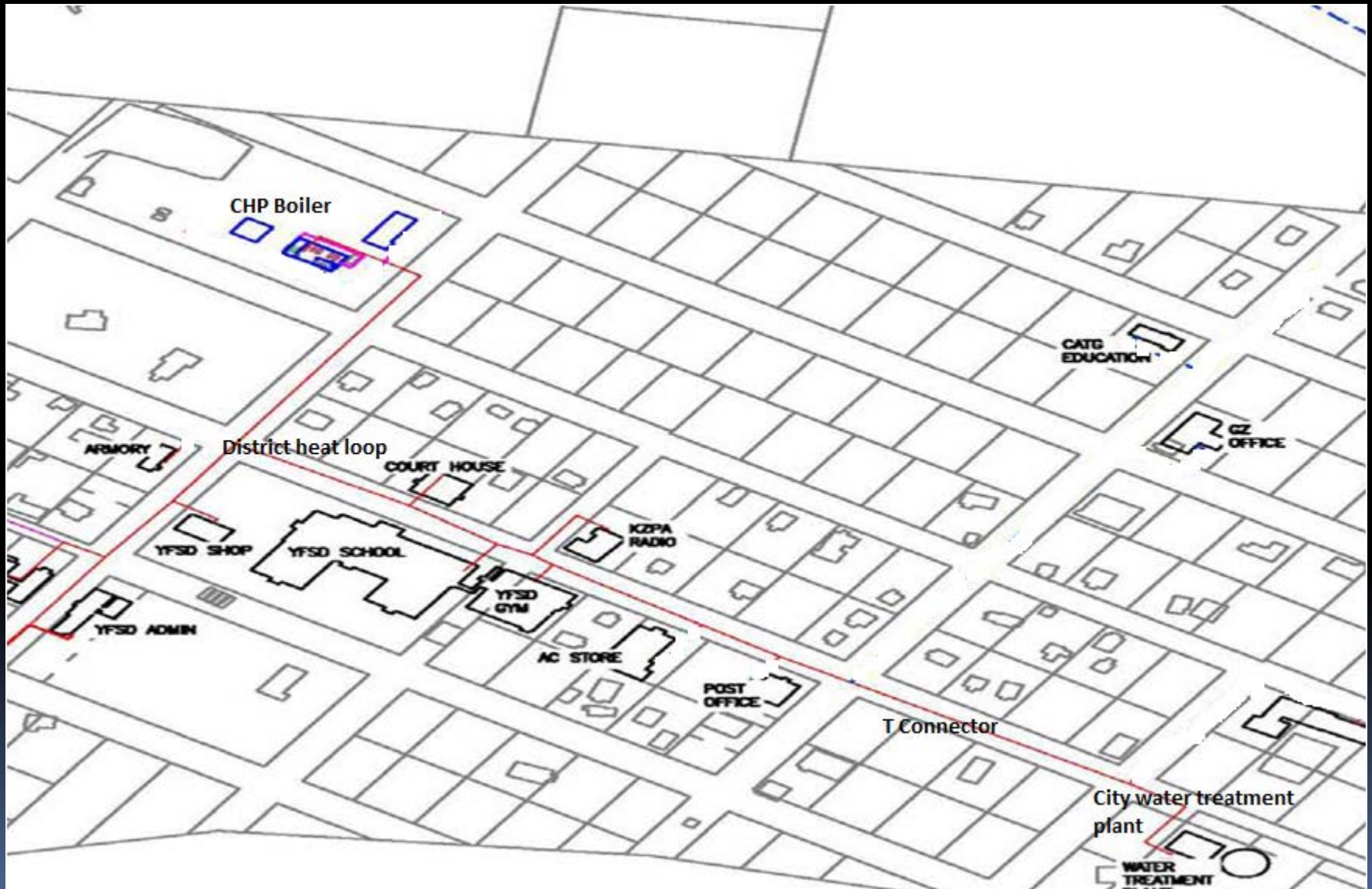
- ❑ Off Road system biomass CHIP
- ❑ New Power House (CHP) Facility construction
- ❑ Wood Chip Boiler
- ❑ District Heating loop providing heat to commercial buildings
- ❑ (6-10 buildings)
 - ❑ I.e. School, Radio Station, Water Plant, etc.
- ❑ Sustainable Forest Management program
- ❑ Create a for profit in-village wood energy utility to displace diesel energy
- ❑ Support training needs for field forestry technicians and supports workshops for education on key biomass issues for Fort Yukon and the Yukon Flats Villages





**Fort Yukon Combined Power & Heat
David Lee Thomas Building
Fort Yukon, AK**

Fort Yukon District Heating System



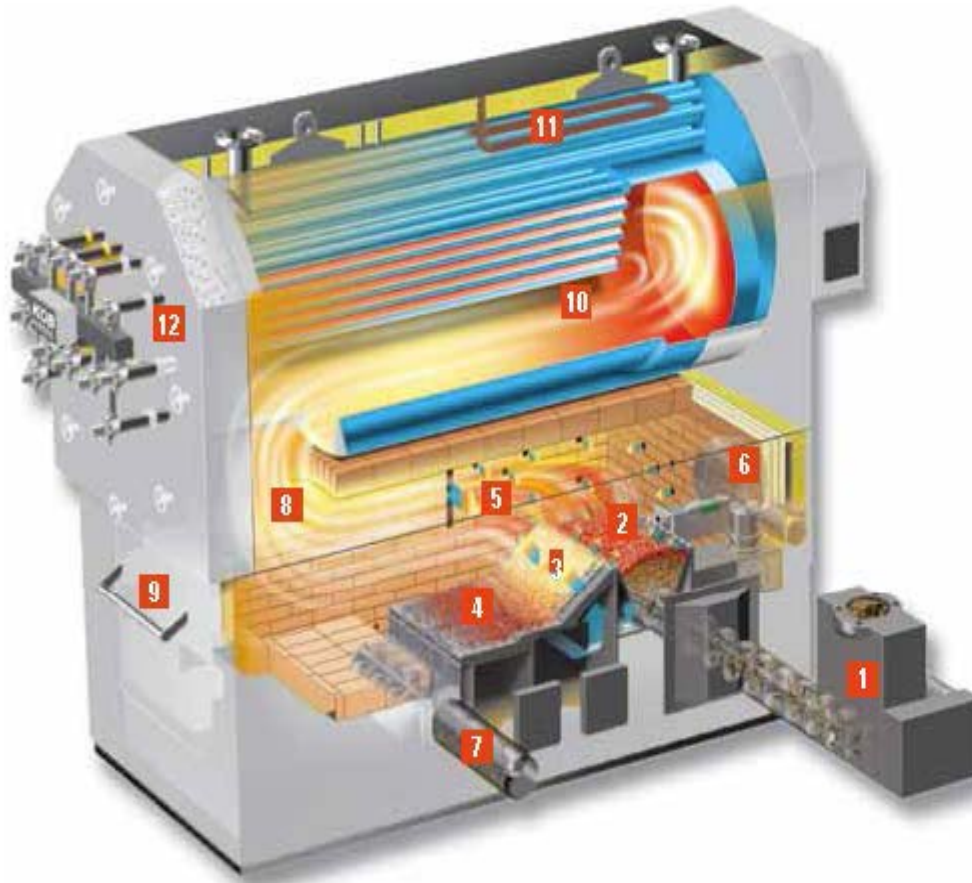


Installing District Heat Loop with Arctic Pipes, this was installed over the ANTHC's water-sewer infrastructure.



Kob Pyrotec Boiler

Our Biomass Chip Boiler !!!



- 1 Feed auger (with light barrier)
- 2 Burner trough with internal grate
- 3 External grate
- 4 Moving annealing grate
- 5 Secondary air flow
- 6 Ignition fan
- 7 Deashing system
- 8 High-temperature burnout zone
- 9 Combustion chamber door
- 10 Triple-pass heat exchanger
- 11 Safety heat exchanger
- 12 Pneumatic pipe cleaning system





Boiler Delivered to the CHP site from the Barge Sept 29, 2017
The manufacture did not get the boiler loaded onto the barge in Austria, was delayed a month, which created a domino effect with all the other logistic planning.

**BOILER IN
CONNEX**



NEW PLANT





Boiler inside the bay



Our
boiler
at the
site in
boiler
bay

Biomass Boiler Stack





**Our above the Arctic Circle Style
Chipper Bin beginning
construction**



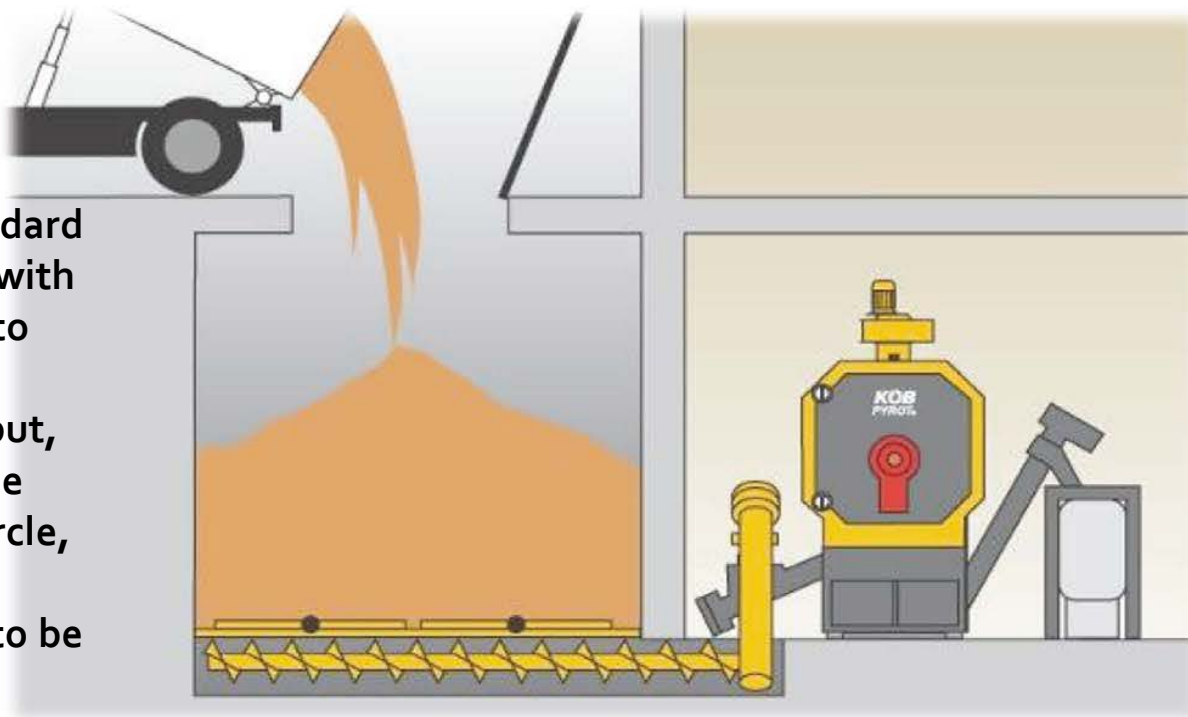


Continued
construction work
for the chipper
bay



Fuel Conveyance Systems

The standard chip bin with hopper to feed the boiler...but, above the Arctic Circle, we must modify to be in compliance







CHIPPER TRAILER ARRIVAL







MOVING FLOOR & HYDROLIC S Chipper Trailer



Design Considerations

- ❑ - 4-Bay Generator Power Plant
- ❑ w/ 2 Detroit Diesels and 2-3508B CAT
- ❑ – Biomass Bay, Biomass Chipper Bay & Garage
- ❑ – 20,000 gallon fuel tank
- ❑ - 14 days + 5-day fuel reserve at peak loads
- ❑ - District Heating System to Serve 7-10 Commercial Buildings
- ❑ – Displaces 60,000 plus gallons of heating fuel

Design Considerations (Cont'd)

- Connect other potential sites
- Transport of biomass Chips to CHP site –
- Used Oil for heating existing Power Plant /
and Shop areas

Grants / Bookkeeping

- RUS USDA
- DOE Tribal Energy
- AEA REF
- REAP USDA
- 3rd Party Accounting

Integrated Biomass Program

Rural
Economic
Development

Energy Cost
Reduction

Wildfire
Mitigation

Community Biomass
Utilization Program

Habitat
Enhancement

Environmental
Improvement

Organizational Overview:

- ❑ **Council of Athabascan Tribal Governments (CATG)**
- ❑ Consortia of 10 Tribal Governments of Interior Alaska
- ❑ **Gwitchyaa Zhee Corporation (GZ Corp)**
- ❑ Alaska Native Claims Settlement Act Village Corporation

Harvest Equipment Operator and Safety Training

Held Classroom instruction & Field time instruction

Selections based on:

Previous experience

Attentiveness

Safety Awareness

Work Ethic

Comradely

Common Sense

Overall Objectives:

Operational Safety

Operational efficiency

Regulatory compliance





Our chip site, we will cross water ways to our harvest site upon freeze up so the equipment can cross safely.



Must cross this Yulotta Slough



WOOD BOILER PREPARATIONS:

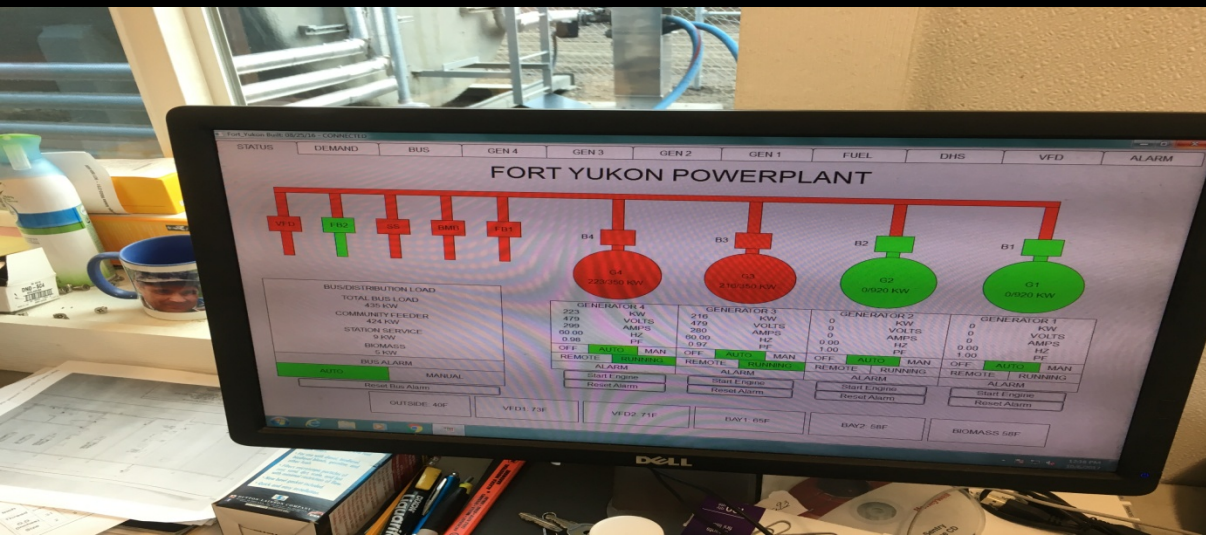
SITE PREPARATIONS


- ADDED GRAVEL TO CHIP SITE
- HAUL OUR HARVEST FROM HARVEST SITE TO CHIP STAGING SITE

THE HEAT LOOP HAS A READING OF 180 GOING OUT OF THE CHP AND A RETURN OF 165.

WHEN TEMPS DROP TO MINUS 20, WE WILL NEED THE BIOMASS BOILER KEEP THE HEAT LOOP TEMP UP.

- THE Pyrotec 390, requires at least 35% Moisture Content
- Our Poplar Wood Harvest has been drying for 3 years
- We will have to Harvest Birch as Galena, AK is doing





Equipment Training New Holland Tractor and Kubota

Kubota Training:

- Cutting and Loading Capabilities
- Maintenance
- Falling Debris
- Proper timber cutting layout

New Holland Training:

- Safety
- Maintenance
- Proper functions, in the woods and around other machinery and hazards
- Proper log skidding techniques



Fort Yukon Wood Energy Program

Lessons Learned

Be Vigilant

Monitor the overall project
Budget

Be willing to stop project to
Get the updates & answers
You will need to
Make good decisions
Always & Always check
theWeather!

Activities Yet to be Completed

Electrical work on Biomass
Boiler

Run through of all Harvest
Equipment, Trial Chipping

Hauling the Harvest wood to
Chipper Staging Site

Commission Biomass Boiler
Heat Sales Agreement W City
Update Heat Utility Business
Plan.



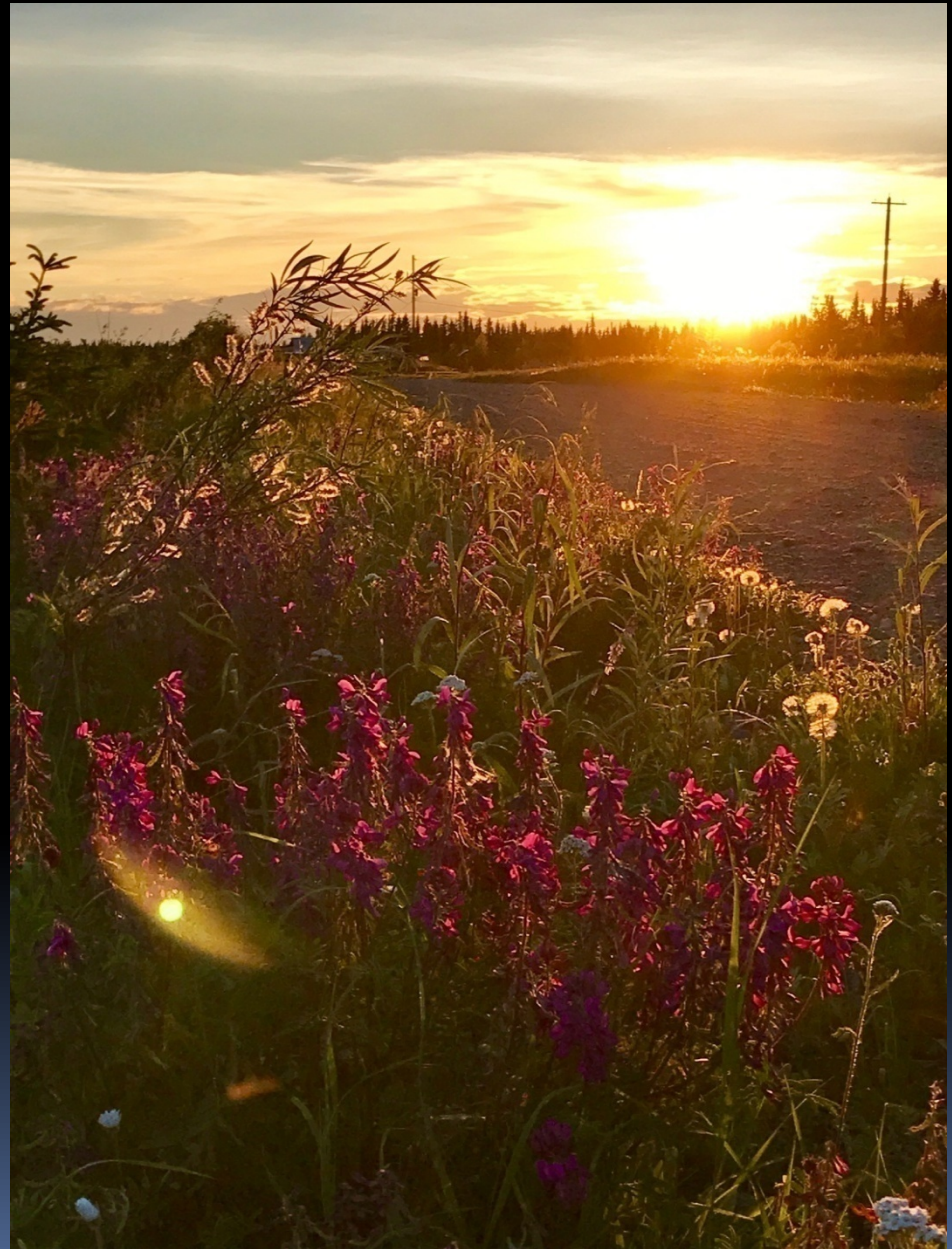
- ❑ Only accessible by boat during the summer, snow machine during winter, plane, and Yukon Barge.

For-Profit Wood Energy Business Model Fort Yukon

- ❑ Forest Management Service- CATG
- ❑ For-Profit Wood Utility Company-Vertically Integrated
- ❑ Gwitchyaa Zhee Native Corporation
 - ❑ Wood Harvest Company
 - ❑ Village Wood Yard/Distribution Company
 - ❑ Wood Energy Utility- Diesel Biomass
 - ❑ Wood diesel hybrid power plant CHP – still dreaming for 200 – 700 Kwh technology

Future Plans

Once a program has been established in Fort Yukon, it is the intent of CATG Natural Resource Department in collaboration with the Village Tribes, Native Corporations and Private Lands to support the installation of programs in each of the villages in the Yukon Flats Region. The model program being developed in Fort Yukon will serve as the basis for all projects in interior Alaska





FORT YUKON AIRPORT

U.S. SURVEY No. 439

TRACT III, PARCEL B

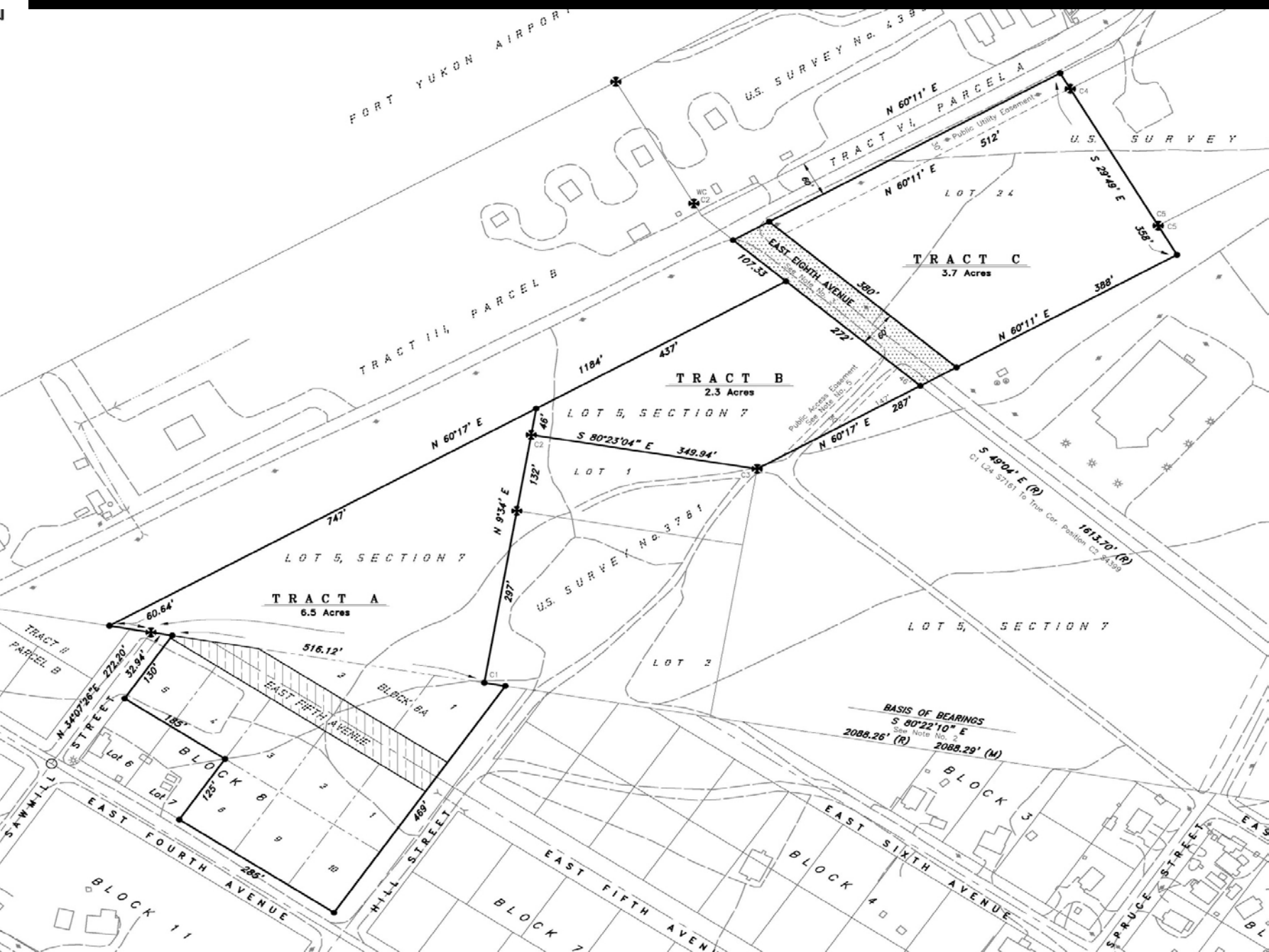
TRACT VI, PARCEL A

TRACT C
3.7 Acres

TRACT B
2.3 Acres

TRACT A
6.5 Acres

BASIS OF BEARINGS
S 80°22'10" E
2088.26' (R) 2088.29' (M)



LOT 5, SECTION 7

LOT 1

U.S. SURVEY No. 3781

LOT 2

LOT 5, SECTION 7

TRACT II, PARCEL B

Lot 6

Lot 7

128°

128°

128°

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SAWMILL

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Fort Yukon's new Combined Heat and Powerhouse (CHP)





**FORTYKON CHP STARTED DIESEL ELECTRICAL
GENERATION DEC 2016**

BIOMASS BOILER INSTALLATION END OF NOVEMBER 2017

COMMISSION BIOMASS BOILER DECEMBER 2017

Fort Yukon's Old Power Plant





Mashii Choo for the new CHP and Biomass System for Fort Yukon & the Yukon Flats

A photograph of the Aurora Borealis (Northern Lights) over a lake at night. The sky is dark blue and purple, with numerous stars visible. The aurora appears as vibrant green and yellow-green curtains of light, some of which are reflected in the calm water below. The horizon shows a dark silhouette of a forest and a body of water.

Questions & Answers