NEEGAN BURNSIDE

Whitesand First Nation
Cogeneration and Pellet Mill Project

Project Description Report

Sagatay Cogeneration LP

October 2014

Whitesand First Nation
Cogeneration and Pellet Mill Project

Project Description Report

Prepared By:

Neegan Burnside Ltd.
292 Speedvale Avenue West Unit 20 Guelph ON N1H 1C4

Prepared for:

Sagatay Cogeneration LP, with its General Partner, Sagatay Cogeneration Ltd., and Whitesand First Nation as agent

October 2014

File No: 300030895.0000

Record of Revisions

Revision	Date	Description
0	June 18, 2013	Initial Submission to Ministry of the Environment and Ministry of Natural Resources
1	December 18, 2013	Draft Report Submission for Consultation
2	October 17, 2014	Application to the Ministry of the Environment and Climate Change for Renewable Energy Approval

Executive Summary

Sagatay Cogeneration LP, with its General Partner, Sagatay Cogeneration Ltd., and Whitesand First Nation as agent is proposing to develop, construct and operate a biomass fueled electric power and heat cogeneration plant, and wood pellet facility. The Project is located on Crown Land in an unorganized territory of the Thunder Bay District near Whitesand First Nation and Armstrong, Ontario. The unorganized territory is administered by the Armstrong Local Service Board and the Project will be located solely on the traditional territory of Whitesand First Nation.

The Project consists of the following main components:

- a Woodyard with material handling and storage components, as well as access roads, a maintenance garage, diesel fuel storage/filling station, and waste oil building;
- a Biomass Cogeneration Plant, which will generate electricity for the Project and the nearby community, having a nameplate capacity of up to 3.6 MW. It will also generate process steam and heat for use in the Pellet Plant and on-site buildings;
- a Pellet Plant, which will create approximately 60,000 metric tons per year of residential and/or industrial grade wood fuel pellets;
- wells to supply process water and domestic potable water for the facility;
- an on-site wastewater management system for facility process wastewater and domestic sewage;
- a water storage pond and pump building; and,
- a transformer substation to interface between the cogeneration plant and the local grid operated by Hydro One Remote Communities.

The Biomass Cogeneration Plant is classified as a Class 1 Thermal Facility under Ontario Regulation 359/09 (O.Reg. 359/09) of the *Environmental Protection Act*. As such, an Application for Renewable Energy Approval is being prepared under O.Reg. 359/09. Project components that are not considered part of the renewable energy generation facility are being permitted under Environmental Compliance Approval and the Ministry of Natural Resources (MNR) Class Environmental Assessment for MNR Resource Stewardship and Facility Development Projects.

This Project Description Report has been prepared in accordance with O.Reg. 359/09, and serves as the central summary document for the Project, including the following:

- general information regarding the Project and Applicant;
- Project Location and land use details;
- descriptions of each component at the facility;

- activities that will take place during the various phases of the Project; and,
- potential negative effects that may result from engaging in the Project, including mitigation, monitoring, and contingency measures that will be implemented to address each potential negative effect.

Further details are provided in the comprehensive set of reports that have been prepared in support of an Application for Renewable Energy Approval for the Project, including the following:

- Stage 1 Archaeological Assessment
- Natural Heritage Assessment
  - Records Review
  - Site Investigation
  - Evaluation of Significance
  - Environmental Impact Study
- Water Assessment Report
  - Records Review
  - Site Investigation
- Surface Water Assessment Report
- Effluent Management Plan Report
- Construction Plan Report
- Design and Operations Report
  - Cultural Heritage Self-Assessment
  - Hydrogeological Assessment
- Emission Summary and Dispersion Modelling Report
- Noise Study Report
- Decommissioning Plan Report
- Consultation Report

The Whitesand First Nation Cogeneration and Pellet Mill Project can be constructed, operated, maintained, and decommissioned without causing significant negative environmental effects. This will be achieved through proper implementation of the mitigation, monitoring, and contingency measures outlined in this report.

Table of Contents

Table of Contents (Continued)

Tables

Appendices

1.0 Introduction

1.1 Project Overview

Sagatay Cogeneration LP, with its General Partner, Sagatay Cogeneration Ltd., and Whitesand First Nation ("Whitesand") as agent, is proposing to develop, construct and operate a biomass fueled electric power and heat cogeneration plant, and wood pellet facility (the "Project"). The Project is located on Crown Land in an unorganized territory of the Thunder Bay District near Whitesand First Nation and Armstrong, Ontario. The unorganized territory is administered by the Armstrong Local Service Board and the Project will be located solely on the traditional territory of Whitesand First Nation.

The general Project components include a biomass fueled electric power and heat cogeneration plant, wood pellet plant, maintenance garage, material storage and handling areas, wastewater management system, water storage pond, wells, pump building, and transformer substation. The only biomass used to fuel the cogeneration plant will be woodwaste, making it a Class 1 Thermal Facility under Ontario Regulation 359/09 (O.Reg. 359/09) of the *Environmental Protection Act*. The proposed Class 1 Thermal Facility would have a nameplate capacity of up to 3.6 MW, and would displace the energy supply from existing diesel generators servicing the community via a local grid, operated by Hydro One Remote Communities Inc., as well as supply electricity for the Project. The local grid is not connected to the Provincial grid, and there are no such future plans for a transmission connection.

As the cogeneration facility and ancillary equipment is classified as a Class 1 Thermal Facility under O.Reg. 359/09, an Application for Renewable Energy Approval is being prepared under O.Reg. 359/09.

The remaining Project components that are not considered to be part of the renewable energy generation facility are subject to Environmental Compliance Approval administered by the Ministry of the Environment and Climate Change ("MOECC") and the Class Environmental Assessment for Ministry of Natural Resources ("MNR") Resource Stewardship and Facility Development Projects, hereafter referred to as the "MNR Class EA".

1.2 Report Requirements

This Project Description Report is required to satisfy the requirements listed in **Table 1**, as defined by O.Reg. 359/09 and serves as the central summary document for the Project. In addition to meeting the requirements in **Table 1**, this report was also prepared according to guidance from the Technical Guide to Renewable Energy Approvals (MOE, 2013).

Table 1 Report Requirements

Item	Requirement Met?	Reference in This Report
Set out a description of the following in respect of the renewable energy project:		
1. Any energy sources to be used to generate electricity at the renewable energy generation facility.	Yes	Section 2.3
2. The facilities, equipment or technology that will be used to convert the renewable energy source or any other energy source to electricity.	Yes	Section 3.1
3. If applicable, the class of the renewable energy generation facility.	Yes	Section 2.3
4. The activities that will be engaged in as part of the renewable energy project.	Yes	Section 3.2
5. The name plate capacity of the renewable energy generation facility.	Yes	Section 2.3
6. The ownership of the land on which the Project Location is to be situated.	Yes	Section 3.4
7. If the person proposing to engage in the project does not own the land on which the Project Location is to be situated, a description of the permissions that are required to access the land and whether they have been obtained.	Yes	Section 3.4
8. Any negative environmental effects that may result from engaging in the project.	Yes	Section 4.0
9. If the project is in respect of a Class 2 wind facility and it is determined that the Project Location is not on a property described in Column 1 of the Table to Section 19, a summary of the matters addressed in making the determination.	N/A	N/A

Item		Requirement Met?	Reference in This Report
10.	If the project is in respect of a Class 2 wind facility in respect of which Section 20 applies and it is determined that the Project Location does not meet one of the descriptions set out in subsection 20 (2) or that the Project Location is not in an area described in subsection 20 (3), a summary of the matters addressed in making the determination.	N/A	N/A
11.	An unbound, well marked, legible and reproducible map that is an appropriate size to fit on a 215 mm by 280 mm page, showing the Project Location and the land within 300 m of the Project Location.	Yes	Appendix A

2.0 General Information

2.1 Name of the Project and Applicant

The name of the Project and Applicant are provided in **Table 2**.

Table 2 Name of Project and Applicant

Name of Project	Whitesand First Nation Cogeneration and Pellet Mill Project
Name of Applicant	Sagatay Cogeneration LP, with its General Partner, Sagatay Cogeneration Ltd., and Whitesand First Nation as Agent

The Project is also referred to as the Community Sustainability Initiative (CSI).

2.2 Project Location

The Project is located on Crown land in an unorganized territory of the Thunder Bay District near Whitesand First Nation and Armstrong, Ontario; approximately 210 km north of Thunder Bay, and 2 km south of Armstrong. The Project will be located on the traditional territory of Whitesand First Nation. This Project context is shown in the key map of **Figure A1** of **Appendix A**.

The "Project Location" is defined in O. Reg. 359/09 as:

> *"a part of land and all or part of any building or structure in, on or over which a person is engaging in or proposes to engage in the project and any air space in which a person is engaging in or proposes to engage in the project".*

The Project Location also includes any temporary work areas required to construct the Project. The cogeneration plant, pellet plant, maintenance garage, wastewater management system, water storage pond, and associated equipment and temporary work areas will be contained within a boundary of approximately 35 ha as shown in **Figures A1 and A2** of **Appendix A**. For reference, a Site Plan of the Project is shown within the Project Location in **Figures A1 and A2** of **Appendix A**.

There is an existing electricity distribution connection owned and operated by Hydro One Remote Communities Inc. that will be used to connect the Project to the local grid. It is within an existing right-of-way extending from the site to the nearby existing diesel generating station. Any upgrades required to the existing electricity distribution connection will be the responsibility of Hydro One Remote Communities Inc.

Solid waste generated at the facility will be disposed of off-site at an approved disposal facility.

2.3 Energy Source, Nameplate Capacity, and Class of Facility

The only biomass used to fuel the cogeneration plant will be woodwaste, making it a Class 1 Thermal Facility under O.Reg. 359/09. It will have a nameplate capacity of up to 3.6 MW, which will be used to power the pellet plant and future local commercial development, as well as provide electricity for the entire demand of the local community. The Project is not located at a farm operation.

The average daily and annual quantities of biomass material requirements for the Site Plan are provided in **Table 3** below. Certain annual biomass quantities have been allocated by the Ministry of Northern Development, Mines and Forestry for use by this Project.

Table 3 Biomass Material Requirements

Project Component	Estimated Biomass Requirements	
	Average Daily Quantity	Average Annual Quantity
Cogeneration Plant	235 GMT* / day	82,315 GMT* / year
Pellet Plant	380 m^3 / day	139,000 m^3 / year

*Green Metric Tons at 45% moisture content, assuming downtime for maintenance.

The cogeneration plant will be equipped with a backup/emergency diesel generator, which will only be used during cogeneration plant start-up and maintenance. The electricity generated during these start-up and maintenance processes will supply less than 1% of the electricity generated by the Project on an annual basis.

There are other components of the Project that are not considered a renewable energy generation facility under O.Reg. 359/09. These components are described in Section 3.0.

2.4 Contact Information

General contact information for the Project is as follows:

Website: www.whitesandfirstnation.com
E-mail: whitesandbiomass@neeganburnside.com
Phone & Fax: 1-800-935-0832

Applicant

The Project Applicant is Sagatay Cogeneration LP, with its General Partner, Sagatay Cogeneration Ltd., and Whitesand First Nation as agent.

The principal contact for the Applicant is:

Name: Craig Toset, Project Manager
Company: Whitesand First Nation
Address: PO Box 68
Armstrong, Ontario, P0T 1A0
E-mail: ctoset@tbaytel.net
Telephone: 807-583-2177
Fax: 807-583-2170

Consultant

Neegan Burnside Ltd. was retained by Whitesand First Nation as the environmental permitting consultant. Neegan Burnside Ltd. is a majority owned Aboriginal firm providing engineering and environmental consulting services.

The principal Project consultant representing the Applicant is:

Name: Chris Shilton, Project Manager
Company: Neegan Burnside Ltd.
Address: 292 Speedvale Avenue West, Unit 20
Guelph, Ontario N1H 1C4
E-mail: chris.shilton@neeganburnside.com
Telephone: 519-823-4995
Fax: 519-836-5477

2.5 Other Approvals Required

The Project is located on Crown land on which a portion of it has been withdrawn under Section 35 of the Mining Act for prospecting, staking out, sale or lease rights, to develop a cogeneration processing facility. The land was previously used as an industrial site for a forestry operation under a Land Use Permit which was forfeited to the Crown. This area is shown in **Figure A2** of **Appendix A**. Whitesand currently holds a Land Use Permit for the full extent of the Project Location.

As shown in **Figure A2**, there is an existing electricity distribution connection that connects the site to the existing diesel generating station. Any upgrades or

modifications that may be required for the existing electricity distribution connection will be the responsibility of Hydro One Remote Communities Inc.

The Project includes certain components (i.e., the cogeneration plant, wastewater management system, and transformer substation) that are considered a renewable energy generation facility under O.Reg. 359/09, and other components (i.e., the pellet plant) that are not considered part of the renewable energy generation facility. However, each Project component is integrated into a facility that will be operated on the same site.

After consultation with MOECC and MNR, it is our understanding that other Project approvals, in addition to Renewable Energy Approval (O. Reg. 359/09) will include:

- Class Environmental Assessment for Ministry of Natural Resources ("MNR") Resource Stewardship and Facility Development Projects ("MNR Class EA"); and,
- Environmental Compliance Approval.

Furthermore, it is our understanding that while Project water taking activities are expected to exceed 50,000 L/day, a separate permit to take water will not be required, as the Project water taking activities will be permitted under O.Reg. 359/09. Further details regarding water taking are provided in the Design and Operations Report under a separate cover.

2.6 Federal Involvement

There is no federal involvement anticipated, including permitting under the 2012 Canadian Environmental Assessment Act (CEAA).

3.0 Project Information

3.1 Facility Components

The Project includes a variety of components with the overall objective to generate electricity and create premium grade wood pellets. A general description of each component of the Project is described below. Conceptual diagrams of the various processes at the facility, including the required equipment for each process, are provided in **Appendix B**.

3.1.1 Woodyard

The Project components relating to the woodyard can generally be characterized as the ancillary features that will be used to facilitate material transport, processing, conditioning, storage, and equipment operation and maintenance. The wood pellet shipping area, truck scale approach and exit ramps, and biomass storage pads will be hard surfaced (i.e., asphalt or concrete) to facilitate material handling and storage. The remaining portions of the yard will consist of gravel access roads, or will remain as existing gravel or vegetation. The site will be equipped with the appropriate fire, safety, security, communications equipment and underground utilities. Detailed diagrams of the processes and equipment in the yard are provided in **Appendix B**, and the Site Plan is shown in **Figure A1** of **Appendix A.**

Near the entrance of the site, there will be a truck scale to weigh transported materials, which will be delivered to the site in the form of hogged fuel, or chipped material. The hogged material will be used as fuel for the cogeneration plant and the chipped material will be used as feedstock for the pellet plant. The hogged and chipped materials will be stored outside in separate piles on uncovered paved storage pads.

There will be a mechanical conveyor system with diversion screens, metal detectors, and magnets to facilitate material storage and transport throughout the facility. The conveyor system will service each material storage pile, which will be used in the cogeneration and pellet plant processes. The conveyor system will be supplemented by truck dumpers, biomass storage pile stackers, a mobile bucket loader, storage bins, a wood hog and screen in an approximately 40 m^2 (430 ft^2) enclosure, a hogged fuel storage bin and stoker in an approximately 215 m^2 (2,315 ft^2) enclosure, and a chip sizer in an approximately 37 m^2 (400 ft^2) enclosure. There will also be medium voltage Motor Control Centers (MCCs) as required by equipment at critical points along the mechanical conveyor system. The MCCs are anticipated to be installed in ocean shipping containers or similar enclosures ranging from approximately 15 m^2 to 30 m^2 (160 ft^2 to 320 ft^2).

The yard will host a biomass belt dryer, having a footprint of approximately 385 m^2 (4,144 ft^2). The biomass belt dryer will be used to dry biomass from approximately 45-50% moisture content to approximately 10% moisture content for use as feedstock in the wood pellet manufacturing process.

The yard will also host a maintenance garage, diesel fuel storage and filling station, and waste oil building, having footprints of approximately 225 m^2 (2,422 ft^2), 160 m^2 (1,720 ft^2), and 16 m^2 (172 ft^2) respectively. The garage will have proper storage facilities for any oils, lubricants, or hazardous chemicals to be used and stored in the building. The diesel fuel storage and filling station will include above ground tanks on a hard surface, and will comply with the requirements of O.Reg. 217/01 and the Ontario Liquid Fuels Handling Code. Waste oil from site operations will be stored in metal barrels in the small metal waste storage building, complete with a containment sump, and stored until there is adequate material to warrant a pick-up and disposal at an approved facility.

For all Project buildings, any hazardous material will be securely stored in appropriate, labeled containers, with Material Safety Data Sheets in each building where the hazardous material will be used or stored.

3.1.2 Biomass Cogeneration Plant

The biomass cogeneration plant is considered a Class 1 Thermal Facility under O.Reg. 359/09. It will have a nominal capacity of up to 3.6 MW, which will be used to power the pellet plant, as well as provide electricity for the entire demand of the local community. Biomass quantities required for the cogeneration plant are estimated to be 82,315 Green Metric Tonnes (GMT) per year, or 235 GMT per day, assuming a biomass moisture content of 45%.

There are a number of technologies available to generate electricity from biomass. The Project is proceeding on the basis of using the steam Rankine cycle. This process is a closed thermal cycle, where the biomass fuel combustion process and the power generation cycle are physically separated. This process isolates and protects the power generator from potential contamination in the biomass fuel combustion process.

The steam Rankine cycle can generally be described in the following three steps:

1. biomass is combusted in a boiler to produce steam;
2. steam is used to drive a steam turbine, connected to an electrical generator, creating electricity; and,
3. steam is condensed and pumped for re-use in the boiler to repeat the cycle.

The cogeneration component of the plant comes from the steam turbine exhaust, where the steam at a lower pressure and temperature is used in the pellet plant biomass dryer system, and for heat in the on-site buildings.

The total footprint of the cogeneration plant, including the heat source building, turbine building, cooling tower, ash collection/storage system, and ancillary equipment is expected to be approximately 1,330 m^2 (14,315 ft^2).

Preliminary detailed diagrams of the proposed processes and equipment at the cogeneration facility are provided in **Appendix B**. Generally, the equipment required for the congregation plant includes:

- a biomass dryer;
- water treatment systems and storage tanks for process and domestic water supply;
- a biomass dryer, furnace and boiler to generate steam;
- a steam turbine;
- an oil tank and lubrication system;
- an electrical generator;
- a condenser and cooling tower;
- water, wastewater, and steam distribution piping;
- a steam/glycol heating system (to heat site buildings);
- a fire suppression system;
- a heating and ventilation system, including exhaust stacks;
- pumps and fans;
- a baghouse and exhaust stack;
- an emission monitoring system;
- an ash collection and storage system;
- wastewater management infrastructure (refer to Section 3.1.5);
- a mechanical material handling system;
- partitioned rooms (i.e., offices, lunch room, mechanical/electrical room); and,
- fuel tanks and a backup / emergency generator.

3.1.3 Pellet Plant

While the Pellet Plant is not considered part of the renewable energy generation facility, it has been included in the reports for O.Reg. 359/09 for completeness to evaluate the cumulative effect of the Project.

The pellet plant will utilize heat and electricity from the cogeneration plant to create approximately 8 metric tons per hour or 60,000 metric tons per year of residential and/or

industrial grade fuel pellets. Biomass quantities required for the pellet plant are estimated to be 139,000 m^3/yr, or 380 m^3/day.

Dried biomass from the belt dryer in the woodyard will be used as feedstock for the pellet plant. The dried biomass will first be transferred to a covered dry biomass storage bin / silo adjacent the pellet plant. It will then be transferred to the hammer mill via the mechanical conveyor system and feed bucket elevator. In the hammer mill, the biomass will be ground into a fine material, and then transferred to a ripening bin with moisture metering equipment. The pellet mill will then use process steam from the cogeneration plant to compress the ground material under high temperature and pressure conditions into wood pellets. The wood pellets are then cooled, screened, and stored in a pellet storage bin/silo adjacent the pellet plant prior to packaging on site for shipping.

The total footprint of the pellet plant, including its ancillary equipment and storage bins / silos is expected to be approximately 1310 m^2 (14,100 ft^2).

Preliminary detailed diagrams of the processes and equipment at the pellet plant are provided in **Appendix B.** Generally, the equipment required for the pellet plant includes:

- a mechanical material handling system, including feed bucket elevators;
- dry biomass and pellet storage bins/silos;
- hammer mills;
- a pellet ripening bin;
- moisture metering equipment;
- pellet mills;
- a pellet cooler;
- dust control bag houses;
- wastewater management infrastructure (refer to Section 3.1.5);
- partitioned rooms (i.e., control room, offices, lunch room, mechanical/electrical room);
- a pellet packaging and bag stacking system; and,
- covered and secured propane bottle storage racking on the paved pellet shipping area adjacent the pellet plant.

3.1.4 Water Supply and Storage

Facility process water and potable domestic water is expected to be supplied via existing on-site wells. Water supply for firefighting is expected to be supplied via an on-site storage pond with a liner. It is anticipated that the pond would be required to hold a volume of approximately 1,136,000 L under the volume of inaccessible frozen water during the winter, and would have a footprint of approximately 3,650 m^2 (39,288 ft^2). A

pump building would be required adjacent the pond and would have a footprint of approximately 150 m^2 (1,615 ft^2).

If feasible, water supply for firefighting may alternatively be supplied via storage tanks within the heated portions of on-site buildings.

Preliminary detailed diagrams of the processes and equipment relating to water supply and storage are provided in **Appendix B.** Generally, the equipment required for the water supply and storage system includes:

- wells (primary and back-up);
- pumps;
- an underground water distribution system;
- a potable water treatment and storage system;
- monitoring equipment;
- storage tanks for firefighting water supply (if feasible); and,
- a pond with a liner and pump building for firefighting water supply (if required).

3.1.5 Wastewater Management

An on-site wastewater management system has been designed to manage wastewater generated by the Project. There will be separate wastewater treatment tanks for various Project wastewater streams (i.e., process wastewater, wash-up wastewater, domestic sewage) with a common subsurface effluent disposal bed. There will also be a portable toilet in the woodyard, which will be serviced and maintained by a qualified service provider.

The general components of the wastewater management system will include:

- gravity pipes and forcemains connecting the on-site buildings to the effluent disposal bed;
- pump chambers to service the forcemains;
- an oil/grit separator for wash-up wastewater from the maintenance garage;
- subsurface wastewater tanks under the cogeneration plant and pellet plant buildings;
- a septic tank in the woodyard;
- a bed dosing tank;
- a subsurface effluent disposal bed; and,
- monitoring equipment and alarms.

3.1.6 Transformer Substation

A main transformer substation will be constructed near the entrance of the site to step up the voltage of the electricity produced by the cogeneration plant from 5 kV to 25 kV. This is required to match the voltage of the electricity distribution line operated by Hydro One Remote Communities. The substation will include protection, control, monitoring, and communications equipment (including line reactor and load bank) to protect on-site equipment and ensure that the electricity being distributed to Hydro One Remote Communities is compliant with the specified operating conditions. It will also include security and safety equipment, including proper electrical grounding and a fence. The footprint of the transformer substation is expected to be approximately 465 m^2 (5,005 ft^2).

In addition to the main transformer substation, there will also be three outdoor pad-mounted transformers servicing the cogeneration and pellet plants. These transformers would step down the voltage used by the buildings from 5 kV to 600 V for distribution to the plant loads. Additional transformers will be installed in Project buildings as required to service equipment operating at 120 V, 208 V and 240 V.

There is an existing electricity distribution connection owned and operated by Hydro One Remote Communities Inc. that will be used to connect the Project to the local grid. It is within an existing right-of-way extending from the site to the nearby existing diesel generating station. The Project connection point is anticipated to be at a hydro pole near the Project's main transformer substation or at the entrance of the site. The hydro pole will be equipped with a gang operated fused disconnect switch in accordance with the Canadian Electrical Code and Hydro One. Furthermore, it is anticipated that Hydro One will monitor the quality of electricity generated by the cogeneration plant, and will remote trip the cogeneration plant in the event that it is operating outside of its specified parameters. The existing Hydro One diesel generators would then be used as an emergency backup source of power for the community until the problem is resolved at the cogeneration plant. Any upgrades required to the existing electricity distribution connection will be the responsibility of Hydro One Remote Communities Inc.

3.2 Project Activities

3.2.1 Project Schedule

The anticipated Project schedule is presented in **Table 4** below.

Table 4 Project Schedule

Project Activity	Anticipated Schedule
Issue First Draft Project Description Report	June 2013
REA Technical Studies	2013 through 2014

Public Information Centre #1	September 25, 2013
Issue Draft REA Reports to the Local Service Board	December 2013
Issue Draft REA Reports to the Public	January 2014
Public Information Centre #2	April 2, 2014
REA Submission / Approval	October 2014 / January 2015
Start of Construction	April 2015
Project Operation	2016 - 2041
Decommissioning / Refurbishment	2042

3.2.2 Operating Schedule

The Project operating schedule is presented in **Table 5** below.

Table 5 Operating Schedule

Project Component	Seasonal & Weekly Operation	Daily Operation
Cogeneration Plant	All year, 7 days/week	24 hours/day
Pellet Plant	All year, 7 days/week	24 hours/day
Woodyard	All year, 7 days/week	24 hours/day

3.2.3 Project Activities

Once permitting is complete, Project activities can be organized into three phases as follows:

- Construction
- Operation and Maintenance
- Decommissioning

Project activities during each of the phases above are outlined in **Table 6** below.

A more detailed description of project activities during each phase is provided in the Construction Plan Report, Design and Operations Report, and Decommissioning Plan Report, all under separate covers.

Table 6 Project Activities by Phase

Phase	Project Activities
Construction	Woodyard: • survey for layout and delineation of work areas; • installation of erosion and sediment controls and site safety measures for construction; • delivery of construction and Project equipment to site; • site preparation, clearing and grubbing; • general earthworks (site grading); • excavation and installation of underground utilities; • construction of the maintenance garage, biomass belt dryer, waste oil building, including foundations, and containment sump for the waste oil building; • construction of the mechanical conveyor system, including foundations and enclosures for its associated equipment; • construction of the diesel fuel storage and filling station; • fine-grading and installation of site drainage features; • construction of gravel access roads, truck scale, and select areas of asphalt and/or concrete paving; • installation of final safety, security, and fire protection equipment, including entrance gates, and safety fencing as required around the substation and water storage pond; and, • restoration of all temporarily disturbed areas upon completion of Project construction.
	Cogeneration Plant: • excavation and installation of the utilities under the cogeneration plant with protected leads extending outside the building footprint; • construction of the cogeneration plant building, including cooling tower, baghouse/exhaust stack, ash collection/storage system, and foundations; • installation of equipment for use in cogeneration plant; • connection with the yard mechanical conveyor system; and, • installation of pad-mounted transformers, backup generator, and associated electrical equipment.

Phase	Project Activities
	Pellet Plant: • excavation and installation of the utilities under the pellet plant with protected leads extending outside the building footprint; • construction of the Pellet Plant building and ancillary equipment, including foundations; • installation of equipment for use in pellet plant; • connection with the yard mechanical conveyor system; and, • installation of the pad-mounted transformer and associated electrical equipment.
	Water Supply and Storage: • connection of wells to on-site buildings and site fire protection equipment via an underground water distribution system; • installation of storage tanks in building(s) for fire protection demand (if feasible); and, • excavation and construction of a pond with liner for fire protection demand (if required).
	Wastewater Management: • install oil/grit separator for maintenance garage wash-up wastewater; • install gravity pipes and/or forcemains with pumps to connect on-site buildings to the underground effluent disposal bed; • excavate and place underground tankage; • excavate disposal bed area and install perforated pipe and stone for effluent distribution; and, • install and connect system controls and alarms as required.
	Substation: • excavate and install electrical grounding and granular foundation; • install electrical equipment at the substation; • install secondary containment system around the main transformer; and, • install safety, security, and communications equipment.

Phase	Project Activities
Operation and Maintenance	Woodyard: • material transport via trucks to on-site weighing, sorting, storing, and shipping from site; • maintenance of gravel access roads, paved areas, vegetated areas, and site drainage features as required; • operation of mobile equipment, truck dumpers, and pile stackers for material sorting and storage; • material screening, processing, and transport via a mechanical conveyor system and ancillary equipment; • biomass drying via the on-site belt dryer; • filling, handling, and storage of waste oil barrels in the waste oil building, including periodic collection and disposal by a qualified service provider at an approved off-site facility; • periodic servicing (ie. pumping, removal, and cleanout as required) of the wastewater tanks and portable toilet by a qualified service provider; and, • mobile equipment maintenance and fuel filling at the maintenance garage and diesel fuel storage/filling station, including proper use, storage, and disposal of oils, lubricants, fuels and any other hazardous material.
	Cogeneration Plant: • treatment of supply water; • material transport via a mechanical conveyor system; • combustion of biomass; • creation of steam through use of a boiler; • electricity generation from a steam turbine and generator; • cooling and condensing re-usable process steam; • operation of a steam/glycol heating system; • drying of biomass; • operation of pumps, fans and exhaust venting; • monitoring of air emissions for compliance with regulated limits; • collection and storage of solid waste (ash) prior to transportation to an approved disposal facility; and, • operation of emergency backup generator during cogeneration plant maintenance or downtime.

Phase	Project Activities
	Pellet Plant: • material transport and storage via a mechanical conveyor system and ancillary equipment; • pulverizing biomass through the use of a hammer mill; • creating wood pellets using process steam and a pellet mill; and, • packaging wood pellets for shipping.
	Water Supply and Storage: • water pumping in accordance with REA approval (greater than 50,000 L/day); • water quality testing as required; and, • well and pump testing and maintenance as required.
	Wastewater Management: • monitor system controls and alarms as required; and, • remove accumulated sludge and scum from tanks as required.
	Transformer Substation: • operation and monitoring of electrical equipment; • electrical equipment maintenance and transformer oil replacement; and, • automatic process shut down when facility is operating outside its specified parameters.
Decommissioning	Woodyard: • dismantling of the mechanical conveyor system and ancillary equipment, biomass belt dryer, truck scale, truck dumpers, security equipment, fencing, gates, and signs; • sale of above materials for salvage value or otherwise removal and recycle or disposal at an approved off-site facility; • removal and disposal at an approved facility of the diesel fuel storage and filling station in accordance with the applicable laws regarding fuel transport; • removal and disposal at an approved facility of the paved concrete and asphalt areas under the biomass storage pads and around the buildings; • removal of the gravel site roads if required in consultation with MNR; and, • restoration of affected land to its original state as required.

Phase	Project Activities
	Site Buildings: • dismantling and sorting of all equipment within and associated with the cogeneration plant, pellet plant, maintenance garage, fire pump building, and conveyor equipment enclosures; • sale of above materials for salvage value or otherwise removal and disposal at an approved off-site facility; • removal of metal waste oil barrels by an approved hauler for disposal and recycling; • upon removal of all interior equipment and clean-up of any waste, demolish site buildings in accordance with applicable laws; and, • removal and recycle or disposal of the demolished building debris at an approved facility.
	Water Supply and Storage: • removal of the pond liner and filling-in the pond or leaving in-place as required by MNR; and, • decommissioning of wells in accordance with O.Reg. 903.
	Wastewater Management: • pumping-out any remaining waste from the wastewater tanks and oil/grit separator on-site and removal off-site at an approved facility by a licensed hauler; • removal of pump stations and sale for salvage value or disposal off-site at an approved facility; • filling of the underground tanks with suitable fill material, or demolition in-place in accordance with applicable regulations and in consultation with MNR; and, • upon completion of pumping, demolition, and filling in accordance with applicable regulations and guidelines; abandonment of wastewater management system and conveyance pipes in-place, in consultation with MNR.

Phase	Project Activities
	Transformer Substation: • after disconnection, all the oil in the transformers will be safely removed by pumping the oil into an industry approved disposal container by an approved hauler to an approved waste management facility. The container will be sealed to prevent spills during transportation. The empty transformers will be removed and transported off-site by truck. The transformers will be recycled, if possible, or will be disposed of at an approved facility; • dismantling and sorting of all equipment at the transformer substation; • removal of underground infrastructure (i.e., power and grounding cables); • sale of above materials for salvage value or otherwise removal and disposal at an approved off-site facility; • removal of material within the main transformer's secondary containment area off-site at an approved facility, and replacement with a suitable fill material in consultation with MNR; and, • removal of surface gravel if required in consultation with MNR.

3.3 Map of Project Location

An unbound map of the Project Location is provided as **Figure A2** of **Appendix A**. For specific details and definition of the Project Location, refer to Section 2.2.

3.4 Land Ownership

As noted in Section 2.5, the Project is located on Crown Land on which a portion of it has been withdrawn under Section 35 of the Mining Act for prospecting, staking out, sale or lease rights, to develop a cogeneration processing facility. This area is shown in **Figure A2** of **Appendix A.** A portion of the Project Location was previously used as an industrial site for a forestry operation under a Land Use Permit which was forfeited to the Crown. Whitesand currently holds a Land Use Permit that includes the full extent of the Project Location for the development of an Industrial Site (Sawmill/Cogeneration Plant). Based on consultation with MNR, it is anticipated that the Crown Land bound by the Project Location will be either be leased long-term or sold to Sagatay Economic Development LP by a disposition from MNR upon Project approval. In either case, Sagatay Cogeneration LP will have the required access and permission to construct, install, operate, and decommission the Project through an agreement with Sagatay Economic Development LP.

4.0 Potential Negative Environmental Effects

Potential negative effects associated with the Project are identified in **Table 7** and **Table 8** below. These effects were identified through various investigations as part of the Renewable Energy Approval process. In **Tables 7** and **8**, each potential negative effect is identified and assessed for performance objectives, mitigation strategies, monitoring, and contingency measures.

Further details that inform these tables are provided in the comprehensive set of reports that have been prepared in support of an Application for Renewable Energy Approval for the Project, including the following:

- Stage 1 Archaeological Assessment
- Natural Heritage Assessment
  - Records Review
  - Site Investigation
  - Evaluation of Significance
  - Environmental Impact Study
- Water Assessment Report
  - Records Review
  - Site Investigation
- Surface Water Assessment Report
- Effluent Management Plan Report
- Construction Plan Report
- Design and Operations Report
  - Cultural Heritage Self-Assessment
  - Hydrogeological Assessment
- Emission Summary and Dispersion Modelling Report
- Noise Study Report
- Decommissioning Plan Report

A key component of the REA process is the establishment of common setbacks for all renewable energy facilities in the Province. The Project was designed to meet the setbacks outlined in O. Reg. 359/09 to the extent possible. Within the regulation there are some setbacks for which studies that identify potential negative environmental effects and mitigation measures can be conducted in lieu of meeting the setback requirements. In some instances in the proposed design, Project components may be proposed within the defined setbacks. In these instances, additional assessment studies have been conducted in the Natural Heritage Assessment under a separate cover, the results of which are provided in **Table 8**.

Table 7 Potential Effects, Mitigation, Monitoring, and Contingency Measures-Summary

Environmental Component	Potential Effects	Performance Objective	Mitigation Strategy	Proposed Monitoring and Contingency Measures
Archaeological and Cultural Heritage	• Disturbance to archaeological and cultural heritage resources during construction and operation	• Minimize disturbance to archaeological and cultural heritage features.	• A Stage 1 Archaeological Assessment Report has been completed, and concluded that extensive modification of the ground surface has severely degraded any cultural heritage potential, leading to the recommendation that the Study Area does not require further archaeological assessment. • The Ministry of Tourism, Culture and Sport has reviewed the above referenced report and is satisfied that the fieldwork and reporting are consistent with the Ministry's 2011 Standards and Guidelines for Consultant Archaeologists and the terms and conditions for archaeological licenses. • A Cultural Heritage Self-Assessment was undertaken to evaluate the potential for cultural heritage resources at or abutting the Project Location. The assessment concluded there is low potential for cultural heritage resources.	• Should any unknown/unexpected artifacts or human remains be encountered during construction, the construction contractor will stop work and the Ministry of Tourism, Culture and Sport will be notified for direction prior to proceeding.
Woodlands and Natural Vegetation	• Fragmentation; • Introduction of invasive species; • Vegetation loss/change during construction; and, • Removal of biomass from surrounding forests for use in the various facility processes	• Minimize disturbance to forest communities to the extent possible.	• Field studies took place in the summer of 2013 to confirm the presence, significance, sensitivity and abundance of woodlands and natural vegetation, including: – Vegetation Inventories; – Ecological Land Classification; and, – Species at Risk surveys as required. • No Significant Woodlands, rare vegetation communities or at risk flora were identified. • Forests regenerating from previous harvesting activities are present. The following mitigation will be used to minimize disturbance to surrounding forests: – The Project Location site boundaries will be surveyed and marked to limit vegetation clearing and encroachment beyond the Project Location; – No clearing, grading, stockpiling of materials, temporary work areas, etc., will be permitted beyond the Project Location; – Silt fencing will be installed to limit soil movement beyond the boundaries of the Project Location; – Erosion and sediment control measures will be regularly inspected to ensure they are functioning and are maintained as required; – If erosion and sediment control measures are not functioning properly, alternative measures will be implemented and prioritized above other construction activities; and, – Only approved and permitted biomass will be stored on site and used in the cogeneration plant and pellet plant.	• During construction, an Environmental Inspector will regularly monitor operations to ensure that activities do not extend beyond the Project Location; • If accidental encroachment occurs, the offending material or equipment will be immediately removed and restoration of the area conducted as needed; and, • Deliveries of biomass will be regularly inspected and will not be accepted without the proper documentation to ensure it is approved biomass from a permitted source. Non-permitted biomass will not be accepted for storage or use at the facility.

Environmental Component	Potential Effects	Performance Objective	Mitigation Strategy	Proposed Monitoring and Contingency Measures
Wetlands	• Fragmentation; • Introduction of invasive species; • Vegetation loss/change; • Possible loss of, or disturbance to, Provincially Significant Wetlands, non-Provincially Significant Wetlands and unevaluated wetlands; and, • Impacts to the hydrological regime due to changes in surface water runoff and groundwater drawdown.	• None Required.	• Field studies took place in the summer of 2013. No wetlands were identified within 120 m of the Project Location.	• None Required.
Life Science and Earth Science Areas of Natural and Scientific Interest (“ANSIs”)	• These features are not present within 120 m of the Project Location. No effects are anticipated.	• None Required.	• The Project has been sited in an area with no ANSIs at or within 120 m of the Project Location.	• None Required.
Terrestrial Wildlife and Wildlife Habitat	• Disruption to terrestrial species and their breeding, feeding and migration habitats, including: – birds; – bats; – mammals; – amphibians; – reptiles; – insects; and, – species at risk.	• Minimize habitat loss to the extent possible and limit direct loss to the confines of the Project Location.	• Field studies took place in 2013 and 2014 to confirm the presence, significance, sensitivity and abundance of wildlife and wildlife habitat, in accordance with the Natural Heritage Assessment Guide for Renewable Energy Projects (MNR, 2012). The only significant feature identified at or within 120 m of the Project Location was Category 3 woodland caribou habitat. • Limit disturbance to Category 3 woodland caribou habitat as follows: – Minimize the footprint of the facility and land clearing requirements to the extent possible; – Minimize construction impacts as noted above under “Woodlands and Natural Vegetation” and below under “Surface Water”, “Air, Odour, Dust”, and “Noise”; and, – Review potential impacts with the MNR to confirm permitting requirements and additional mitigation, if required under the ESA, 2007.	• None, unless required by MNR for Category 3 woodland caribou habitat under the ESA, 2007.

Environmental Component	Potential Effects	Performance Objective	Mitigation Strategy	Proposed Monitoring and Contingency Measures
			• Mitigate impacts to migratory bird species by implementing the following: – Tree and vegetation clearing will not occur during the breeding season (May 16 to August 8); – Noise levels will be maintained at or below the approved limits set out by MOECC in the REA and ECA approvals; and, – Measures to limit accidental encroachment into habitats beyond the Project Location and to minimize sedimentation and erosion effects on habitats are described under "Woodlands and Natural Vegetation", above.	
Provincial Parks, Conservation Reserves or Valleylands	• These features are not present within 120 m of the Project Location. No effects are anticipated.	• None Required.	• The Project has been sited in an area with no provincial parks, conservation reserves, or valleylands at or within 120 m of the Project Location.	• None Required.
Surface Water	• Erosion and sedimentation during all Project phases could affect water quality at the water bodies in the vicinity of the Project Location; • Water quality impacts due to potential fuel and oil spills; • Water quality impacts due to leachate or movement of biomass into nearby water bodies; and, • Water quality impacts associated with the subsurface disposal wastewater management system.	• Prevent erosion and sedimentation impacts on water bodies; • Prevent occurrence of spills; • Minimize biomass leachate production and prevent migration into water bodies; and, • Minimize potential impacts on water bodies associated with wastewater management system subsurface disposal.	• Field studies took place in the summer of 2013 to evaluate water bodies in the vicinity of the Project. The Project Location was sited such that there are no water bodies at or within 120 m of the Project Location, and no Lake Trout Lakes within 300 m of the Project Location. • Mitigation measures will be implemented to minimize potential impacts associated with erosion and sedimentation as follows: – An erosion and sediment control plan will be designed and implemented prior to any other construction activities; – Erosion and sediment control measures would be inspected regularly and repaired/maintained as required; – Materials removed or stockpiled would be contained in a manner to ensure sediment does not enter any water body; – The porous soils and deep water table at the Project Location are conducive to infiltration. The Project has been designed with more than 90% of the site area having gravel or vegetated surfaces, promoting infiltration at source, thereby reducing runoff and associated erosion and sediment impacts; and, – A vegetated filter strip and/or bio-swale will be constructed at the downstream side of the Project for additional infiltration, reduced runoff, and reduced erosion and sediment transport. • Mitigation measures will be implemented to prevent the occurrence of spills as follows: – A secondary containment system will be constructed in the transformer substation around the main site transformer and will be inspected regularly; – All other oil filled transformers will be installed above a containment catch basin; – The diesel fuel storage and filling station will include above ground tanks on a	• A three year post-construction monitoring program is proposed at ponds 1, 4, and 5, as shown on Figure A4 of the Site Plan in Appendix A of the Design and Operations Report. The monitoring program would include: – Taking water samples at ponds 1, 4, and 5, for chemical analysis to determine pollutant levels in each pond; – The first round of testing would occur prior to construction to establish background conditions. These background conditions will be evaluated to set performance objectives in consultation with MOECC; – Subsequent samples will be taken twice a year (during Spring after snow melt, and Summer), for three years; and – If testing remains within the performance objectives for three years of Project operation, testing will discontinue. Otherwise, MOECC will be consulted to implement further mitigation, contingency, and testing procedures. • Wastewater flow monitoring and reporting in accordance with MOECC requirements. • Minor site re-grading and dense vegetation planting as required to disperse channelized flows.

Environmental Component	Potential Effects	Performance Objective	Mitigation Strategy	Proposed Monitoring and Contingency Measures
			hard surface, and will comply with the requirements of O.Reg. 217/01 and the Ontario Liquid Fuels Handling Code; – A waste oil building will be constructed with a containment sump for storage of waste oil in metal barrels; – Site personnel will be trained in the proper handling, use, and storage of hazardous materials; • Biomass will be stored on paved storage areas with drainage directed away from the piles, consistent with environmental best practices listed in the "Biomass Storage Environmental Practices Guide" (OFIA, 2008); • The paved biomass storage areas are located over 290 m from the nearest water body; and, • The wastewater management system has been designed in accordance with the effluent limits established in consultation with MOECC.	• Covered storage of biomass if monitoring discovers non-conformance due to biomass leachate impacts. • The Ontario Ministry of the Environment document "Spills Reporting – A Guide to Reporting Spills and Discharges", dated May 2007 and as amended from time to time, will be followed for spill reporting protocols, including calling the MOECC Spills Action Centre.
Groundwater	• Groundwater taking for use by the Project (expected to require more than 50,000 L/d); • Potential to encounter non-documented shallow dug wells; • Water quality impacts due to leachate from biomass to groundwater; • Impacts to groundwater quality from on-site subsurface wastewater treatment; • Water quality impacts due to potential fuel and oil spills; and, • Water quality impacts from damaged underground utilities (i.e., glycol heat	• No adverse impact on existing wells in the vicinity of the Project; • Minimize biomass leachate production and potential impact on groundwater; • Minimize potential impacts on groundwater associated with wastewater management system subsurface disposal; • Prevent occurrence of spills; and • Minimize potential for underground utility damage and associated	• A hydrogeological assessment has been completed, and concluded that the groundwater can supply 5.7 L/s from the well identified as TW2-13, and the water taking would not adversely impact the existing wells in the surrounding area, including those in Armstrong, Ontario. The hydrogeological assessment is included in Appendix D of the Design and Operations Report. • Due to the porous nature of the surficial soils and deep water table at the Project Location, no shallow dug wells are anticipated. Furthermore, none were encountered during natural heritage field studies or during the on-site hydrogeological assessment. • Biomass will be stored on paved storage areas with drainage directed away from the piles, consistent with environmental best practices listed in the "Biomass Storage Environmental Practices Guide" (OFIA, 2008). • The paved biomass storage areas are located over 290 m from the nearest water body. • The wastewater management system has been designed in accordance with the effluent limits established in consultation with MOECC. • Mitigation measures will be implemented to prevent spills as noted above under "Surface Water". • All underground electrical cables, backfill, and grounding will be installed according to the Electrical Safety Code and the authorities having jurisdiction. • Gravity pipes or forcemains for the wastewater conveyance system will be installed in accordance with all relevant Ontario Provincial Standard Specifications (OPSS), including OPSS 410 and OPSS 412 as appropriate. • If technically feasible, propylene glycol (a low toxicity, organic compound) will be used for the glycol heating system.	• As part of the three year post-construction monitoring program outlined above under "Surface Water", water samples will also be taken from the Project's production well and analyzed for compliance with performance objectives set in consultation with MOECC. • Ponds 1, 4, and 5 are believed to be groundwater fed. As such, the post-construction surface water monitoring program outlined above is expected to provide insight on groundwater quality conditions. Furthermore, the cogeneration plant will be equipped with a water treatment system that will be able to detect water quality coming from the production well on site. Any abnormal incoming water quality characteristics will prompt notice to potentially affected groundwater users, and further investigations, such that the cause of the unexpected results is determined and corrective actions are taken. • Wastewater flow monitoring and reporting in accordance with MOECC requirements. • Covered storage of biomass if monitoring discovers non-conformance due to biomass leachate impacts. • Monitoring of glycol heating system fluid levels to confirm no leaks have occurred.

Environmental Component	Potential Effects	Performance Objective	Mitigation Strategy	Proposed Monitoring and Contingency Measures
	transfer system or wastewater conveyance system).	impacts on the environment.		• The Ontario Ministry of the Environment document "Spills Reporting – A Guide to Reporting Spills and Discharges", dated May 2007 and as amended from time to time, will be followed for spill reporting protocols, including calling the MOECC Spills Action Centre.
Aquatic Species and Aquatic Habitat	• Potential impacts to aquatic habitat due to erosion and sedimentation, spills, and leachate migration to water bodies; and, • Water bodies may also be affected by groundwater taking.	• Minimize impacts on potential aquatic species at water bodies in the vicinity of the Project.	• Field studies took place in the summer of 2013 to evaluate water bodies in the vicinity of the Project. The Project Location was sited such that there are no water bodies at or within 120 m of the Project Location, and no Lake Trout Lakes within 300 m of the Project Location; • No fish were observed from shoreline observations at the five closest water bodies to the Project Location; and, • Refer to mitigation measures above under "Surface Water" and "Groundwater" for measures to protect potential aquatic species and aquatic habitat in the vicinity of the Project.	• Refer to the monitoring and contingency measures above under "Surface Water" and "Groundwater", which will be implemented in part to protect potential aquatic species and aquatic habitat in the vicinity of the Project.
Air, Odour, Dust	• Dust and air emissions from Project equipment; • Increases in air-borne dust and particulate matter; • Increased emissions from equipment during construction and decommissioning; • Positive effects of reducing air emissions by replacing the need for the existing diesel generating station; and, • Odour impacts from biomass storage piles.	• Comply with the applicable air emissions regulations during Project operation; • Minimize dust and air emissions during construction and decommissioning; and, • Minimize odour from biomass storage piles.	• An Emission Summary and Dispersion Modelling (ESDM) report has been prepared under a separate cover in accordance with O.Reg. 419/05. The report indicates air emissions compliance with the applicable regulatory requirements during Project operation. • The construction and decommissioning contractors would implement good site practices with regard to air/odour/dust, which may include: – Multi-passenger vehicles would be utilized to the extent practical; – Company and contractor personnel would avoid idling of vehicles when not necessary for construction activities; – Equipment and vehicles would be maintained in good working order with functioning mufflers and emission control systems as appropriate; and, – Dust suppression (e.g., water) of source areas. • A Best Management Plan will be in place during operation to control dust/particulate emissions from unpaved roads and biomass storage piles. • Low emissions and low temperature wood drying technology will be used for drying of biomass during Project operation. • Ash waste will be collected and stored inside the cogeneration plant building. • Biomass and waste ash delivery trucks carrying friable material will be loaded and/or covered such that emissions are minimized during transport. • Biomass will be stored on paved storage areas with drainage directed away from the piles, consistent with environmental best practices listed in the "Biomass Storage Environmental Practices Guide" (OFIA, 2008). Proper drainage at the biomass storage piles will promote drying of material and reduced odour effects.	• The cogeneration plant will be equipped with a Continuous Emission Monitoring system to ensure the cogeneration plant is operating within existing Ministry established air emissions limits for biomass combustion facilities; and, • A Communications Plan will be developed and implemented during all phases of the Project, including a complaint response protocol as outlined in Section 6.3 of the Design and Operations Report. Corrective actions will be taken to address the complaint as appropriate.

Environmental Component	Potential Effects	Performance Objective	Mitigation Strategy	Proposed Monitoring and Contingency Measures
Noise	• Noise emissions from the operation of construction machinery and transport of materials to and from the facility; • Noise emissions from the operation of equipment at the facility; and, • Noise effects associated with decommissioning and dismantling activities.	• Minimize noise emissions during construction and decommissioning • Comply with REA and ECA noise emission requirements during Project operation.	• Industry best practices will be implemented to minimize noise impacts during construction and decommissioning. For example, construction equipment will be repaired and maintained in good working order, and all engines associated with construction equipment would be equipped with mufflers. To the greatest extent possible, activities that could create excessive noise would be restricted to daytime construction hours, and construction/decommissioning activities would adhere to local noise regulations that may be in effect. • The facility has been designed to mitigate noise impacts by locating equipment with significant noise emissions in buildings as required. Building doors will be kept closed during operation as required to achieve predicted noise levels. • A Noise Study Report has been prepared to assess noise impacts during Project operation, and indicates compliance with regulatory requirements at the nearest points of reception. • Regular facility maintenance will take place throughout the operational phase of the Project to ensure that all equipment is functioning properly, reducing noise associated with malfunctioning equipment.	• A Communications Plan will be developed and implemented during all phases of the Project, including a complaint response protocol as outlined in Section 6.3 of the Design and Operations Report. Corrective actions will be taken to address the complaint as appropriate.
Petroleum, Oil and Gas Resources	• Possible impacts on existing or historic petroleum, oil and gas wells.	• None required.	• A review of the MNR's oil, gas and petroleum library indicated there are no current or historical petroleum wells or facilities within 75 m of the Project Location.	• None required.
Provincial and Local Infrastructure	• Temporary pressure on local services and inconvenience to local residents during construction and decommissioning; • Traffic delays on local and provincial roads as a result of construction-related traffic (i.e., movement of heavy equipment and facility components); • Damage to roads as a result of the movement of heavy equipment and facility components;	• Minimize traffic; and, • Restore any damage to roads/ infrastructure.	• The construction and decommissioning contractors will comply with Book 7 (Temporary Conditions) of the Ontario Traffic Manual to ensure all equipment deliveries and construction-related traffic is controlled in a safe manner that minimizes traffic disruptions. • The Project Location is situated over 300 m from Highway 527, minimizing traffic impacts associated with construction activities or work areas on or near public roads. • During Project operation, transport trucks will frequent the site on a daily basis for the delivery of biomass and shipment of wood pellets. The woodyard will have adequate space for multiple trucks on site at the same time, ensuring no backups will occur onto Highway 527. Based on existing traffic volume and the population of Armstrong, Ontario, no significant traffic delays are expected during the operational phase of the Project. • Oversize/overweight trip permits will be obtained from MTO as required. • A Road Condition Survey will be conducted if required by MTO or the local services and roads boards. Any damage to local or provincial infrastructure as a result of construction or decommissioning activities will be repaired promptly as required. • Consultation will take place with the MTO and local service board if there is a need	• Any upgrades and/or subsequent rehabilitation and maintenance/repair will be negotiated with the appropriate authorities. • A Communications Plan will be developed and implemented during all phases of the Project, including a complaint response protocol as outlined in Section 6.3 of the Design and Operations Report. Corrective actions will be taken to address the complaint as appropriate.

Environmental Component	Potential Effects	Performance Objective	Mitigation Strategy	Proposed Monitoring and Contingency Measures
	and, • Potential traffic delays during Project operation as a result of deliveries of biomass.		to upgrade or widen any roads in order to allow for the delivery of equipment or biomass.	
Waste	• Construction and decommissioning waste will be generated and will require disposal; and, • The cogeneration plant will generate wood ash waste, which will require disposal.	• Meet MOECC and operator requirements for disposal of waste at an approved landfill/disposal facility.	• During construction and decommissioning, the Contractor would implement a site-specific waste collection and disposal management plan. • Non-hazardous wood ash waste generated by the cogeneration plant will be regularly disposed of off-site at an approved landfill/disposal facility. No landfilling will occur on-site.	• Testing of waste material as required to confirm acceptability for disposal.
Public Health and Safety	• Safety concerns related to the operation of heavy equipment during construction; • Accidents, spills or malfunctions associated with Project components, including heavy equipment, furnace, boiler system, pressurizing equipment, and electrical systems; • Fire and/or explosion at the facility or within material stockpiles, with the potential to spread to surrounding forests; and, • Water quality impacts	• Protect site personnel and the public; • Prevent occurrence of spills; • Prevent occurrence of fires and explosions; and, • No adverse impacts to wells in the vicinity of the Project.	• All Project work during construction, operation, maintenance, and decommissioning will comply with the Ontario Occupational Health and Safety Act. • A Health and Safety Plan will be developed and implemented during each phase of the Project, including the minimum emergency response elements described in Section 6.1 of the Design and Operations Report, and a staff training program including the minimum elements described in Section 5.2 of the Design and Operations Report. • The site will be equipped with security equipment, signage, and entrance slide gates. Fencing and signage will be installed around the transformer substation and fire water supply pond. • There will be a pre-start safety review of the Project prior to operation in accordance with regulatory requirements. This review will ensure that all equipment has been installed as designed, commissioned appropriately, and that safety procedures and a training program are in place as noted above. • Mitigation measures will be implemented to prevent spills as noted above under “Surface Water”. • The entire facility, including biomass storage areas, will be fully equipped for fire detection and protection as described in Section 4.1.6.4 of the Design and Operations Report. • Biomass will be stored on paved storage areas with drainage directed away from the piles, consistent with environmental best practices listed in the “Biomass Storage Environmental Practices Guide” (OFIA, 2008). • The wastewater management system has been designed in accordance with the	• The facility will be monitored by staff on site 24 hours / day, throughout the year. Any event encountered that could impact public health and safety will trigger the emergency response protocols outlined in the Health and Safety Plan. • Refer to the monitoring and contingency measures above under “Surface Water” and “Groundwater”, which will be implemented in part to protect public health.

Environmental Component	Potential Effects	Performance Objective	Mitigation Strategy	Proposed Monitoring and Contingency Measures
	on wells in the vicinity of the Project.		effluent limits established in consultation with MOECC.	
Provincial Land Use Plans	• The Project is not protected under the Greenbelt Plan, Lake Simcoe Protection Plan, Niagara Escarpment Plan or Oak Ridges Moraine Conservation Plan. No impacts under provincial land use plans or policies are anticipated.	• None Required.	• No mitigation measures are required.	• None Required.

Table 8 Potential Effects, Mitigation, Monitoring, and Contingency Measures – Natural Heritage Assessment Environmental Impact Study

Potential Impacts and Mitigation					**Environmental Effects Monitoring Plan**					
Project Activity	**Potential Effects (D=Direct) (I=Indirect) Potential effect on the size, diversity, health, connectivity, functionality and resilience of the natural feature.**	**Mitigation Strategy**	**Residual Effect (magnitude/frequency/ duration)**	**Performance Objective**	**Methodology**	**Monitoring Locations**	**Frequency and Duration of Sample Collection**	**Technical and Statistical Value of Date**	**Reporting Requirements**	**Monitoring Plan and Contingency Measures**
Habitat of Threatened and Endangered Species: Category 3 Woodland Caribou Habitat										
All Construction, Operation and Decommissioning Activities	• Loss of approximately 35 ha of Category 3 habitat (D)	• Minimize the footprint of the facility and land clearing requirements to the extent possible. • Minimize construction effects (noise, dust, erosion/sedimentation). • Review potential impacts with the MNR to confirm permitting requirements and additional mitigation, if required under the ESA, 2007.	• Limited geographic extent based on entire range of Category 3 habitat. • Low magnitude based on relatively low importance of Category 3 habitat. • Duration of effect will last for the entire life of the facility. • No residual effect to the species anticipated.	• Minimize loss of Category 3 habitat to the extent possible.	• No Environmental Effect Monitoring needed unless specified as part of ESA, 2007 requirements.					
Habitat for Migratory Breeding Birds										
Tree and vegetation clearing for construction	• Loss of approximately 35 ha of breeding habitat (D). • Potential for greater loss if clearing, encroachment	• Tree and vegetation clearing will not occur during the breeding bird season (May 16 to August 8). • The site boundaries will be surveyed and marked to limit encroachment within	• Loss will be experienced for the life of the project; however, magnitude considered to be low based on large extent of	• Minimize habitat loss to the extent possible and limit direct loss to the confines of the Project Location.	• N/A	• N/A	• N/A	• N/A	• N/A	• N/A

Potential Impacts and Mitigation					Environmental Effects Monitoring Plan					
Project Activity	**Potential Effects (D=Direct) (I=Indirect) Potential effect on the size, diversity, health, connectivity, functionality and resilience of the natural feature.**	**Mitigation Strategy**	**Residual Effect (magnitude/frequency/ duration)**	**Performance Objective**	**Methodology**	**Monitoring Locations**	**Frequency and Duration of Sample Collection**	**Technical and Statistical Value of Date**	**Reporting Requirements**	**Monitoring Plan and Contingency Measures**
	of equipment or stockpiles inadvertently extends beyond the Project Location boundary (D).	Project Location. • No clearing, grading, stockpiling of materials, temporary work areas, etc. will be permitted beyond the Project Location. • During construction, an Environmental Inspector will regularly monitor operations to ensure that activities do not extend beyond the Project Location. • If accidental encroachment occurs the offending material or equipment will be immediately removed and restoration of the area conducted as needed.	suitable habitat present in the surrounding area.							
Land clearing, construction and decommissioning activities	• Movement of exposed sediment into the features (I). • Sedimentation could have a minor effect on the size of woodland and	• Silt fencing will be installed to limit soil movement beyond the boundaries of the Project Location. • Erosion and sediment control measures will be regularly inspected to	• Limited duration, frequency, geographic extent. • No residual effect anticipated.	• No vegetation loss or disturbance associated with sediment and erosion beyond the Project Location.	• N/A	• N/A	• N/A	• N/A	• N/A	• N/A

Potential Impacts and Mitigation					Environmental Effects Monitoring Plan					
Project Activity	**Potential Effects (D=Direct) (I=Indirect) Potential effect on the size, diversity, health, connectivity, functionality and resilience of the natural feature.**	**Mitigation Strategy**	**Residual Effect (magnitude/frequency/ duration)**	**Performance Objective**	**Methodology**	**Monitoring Locations**	**Frequency and Duration of Sample Collection**	**Technical and Statistical Value of Date**	**Reporting Requirements**	**Monitoring Plan and Contingency Measures**
	on its function (I).	ensure they are functioning and are maintained as required. • If erosion and sediment control measures are not functioning properly, alternative measures will be implemented and prioritized above other construction activities.								
Construction activities and Facility Operations	• Noise disturbance during construction and operations could cause bird species to avoid suitable nesting areas adjacent to the project (I). • No effect anticipated at the species level.	• Noise levels will be maintained at or below the approved limits set out by MOECC in the REA and ECA approvals.	• Loss will be experienced for the life of the project; however, magnitude considered to be low based on large extent of suitable habitat present in the surrounding area.	• Minimize disturbance effects to maintain breeding habitat in the area.	• N/A	• N/A	• N/A	• N/A	• N/A	• N/A

5.0 Conclusion

The Whitesand First Nation Cogeneration and Pellet Mill Project can be constructed, operated, maintained, and decommissioned without causing significant negative environmental effects. This will be achieved through proper implementation of the mitigation, monitoring, and contingency measures outlined in this report. Further details regarding the rationale and determination of these measures are provided in the comprehensive reports prepared in support of an Application for Renewable Energy Approval of the Project.

Neegan Burnside Ltd. has prepared this Project Description Report for Whitesand First Nation in accordance with O.Reg. 359/09. This report has been prepared by Burnside for the sole benefit of Whitesand First Nation, and may not be re-produced by any third party without the express written consent of Whitesand First Nation.

Respectfully submitted,

Neegan Burnside Ltd.

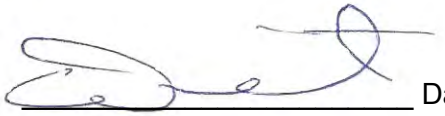
Written by:

Signature  Date October, 2014
Chris Shilton, P.Eng., LEED ®AP
Project Manager
Neegan Burnside Ltd.

Reviewed by:

Signature  Date October, 2014
Lyle Parsons, BES
Senior Advisor
Neegan Burnside Ltd.

Approved By:

Signature  Date October, 2014
Craig Toset
Project Manager
Whitesand First Nation

6.0 References

Neegan Burnside Ltd., October 2014. *Design and Operations Report.*

Neegan Burnside Ltd., October 2014. *Effluent Management Plan Report.*

Neegan Burnside Ltd., October 2014. *Emission Summary and Dispersion Modelling Report.*

Neegan Burnside Ltd., August 2014. *Natural Heritage Assessment.*

Neegan Burnside Ltd., October 2014. *Surface Water Assessment Report.*

Neegan Burnside Ltd., October 2014. *Water Assessment Report.*

Ontario Legislative Assembly, 2012. *Renewable Energy Approvals Under Part V.0.1 of the Environmental Protection Act*. Ontario Regulation 359/09.

Ontario Ministry of the Environment, 2013. *Technical Guide to Renewable Energy Approvals.*

WSP Canada Inc., June 18, 2014. *Design Basis Memorandum Great North Bio Energy Inc. Whitesand First Nation Biomass Energy Project, Revision 4*.

Appendix A

Project Location

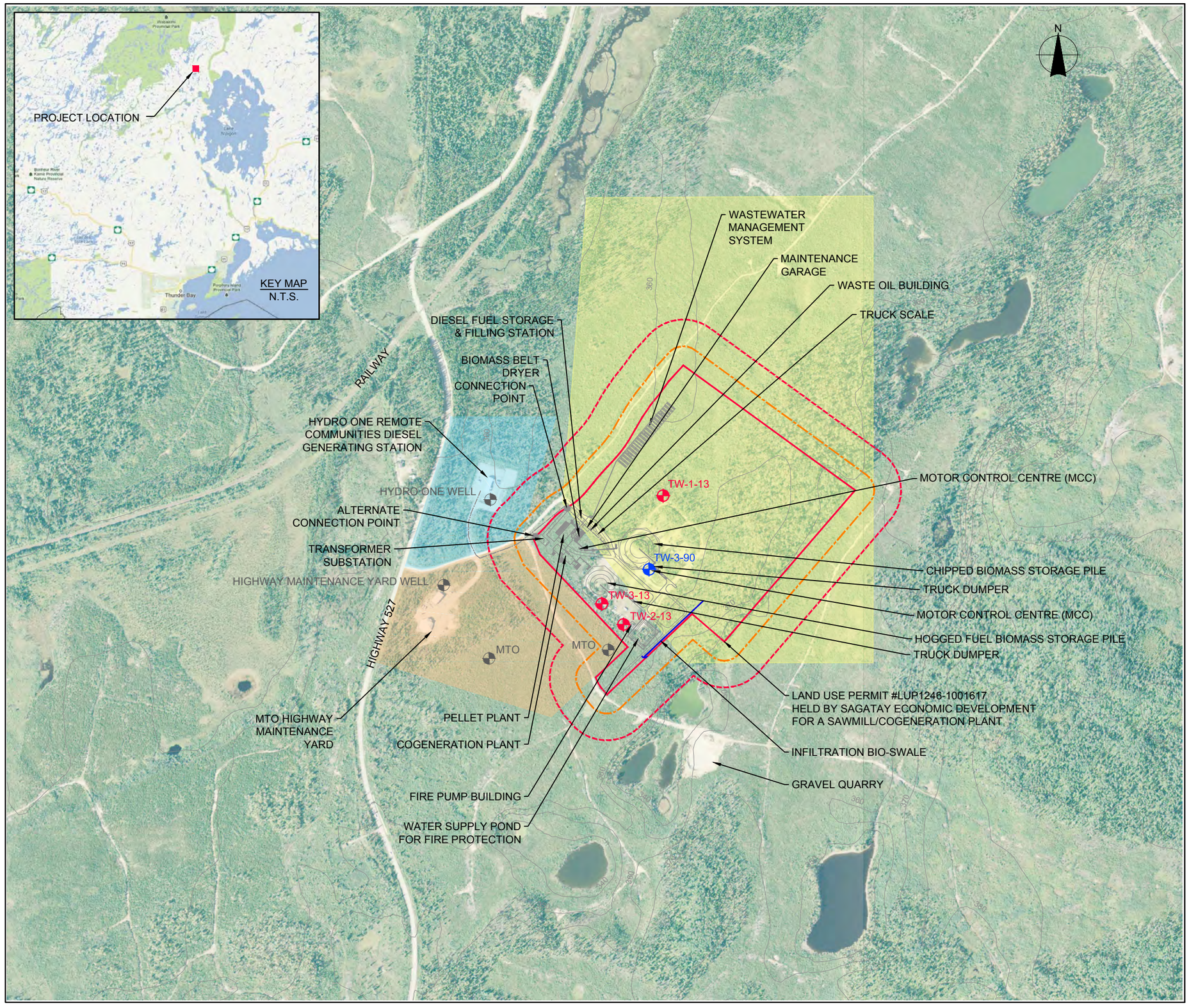


FIGURE A1

WHITESAND FIRST NATION
COGENERATION & PELLET MILL PROJECT
CLASS 1 THERMAL FACILITY UNDER ONTARIO REGULATION 359/09

STUDY AREA

LEGEND

- PROJECT LOCATION
- STUDY AREA 50m SETBACK
- STUDY AREA 120m SETBACK
- MONITORING WELL LOCATION *By Others, 1990*
- MONITORING WELL LOCATION *By Neegan Burnside, 2013*
- PRIVATE WELL LOCATION *By Others*
- AREA WITHDRAWN PER SECTION 35 OF THE MINING ACT (ORDER No. W-TB-122/11)
- CROWN LAND DISPOSITION CL10395
- PART 1, REFERENCE PLAN No. P-8060-55 ON HIGHWAY No. 527
- EXISTING ELECTRICITY DISTRIBUTION LINE
- CONNECTION POINT
- 350 EXISTING 10m CONTOURS INTERVAL (m asl)

Air Photo Source:
Background 2008 forest resource inventory air photo reproduced with the permission of Ministry of Natural Resources, © Queen's Printer for Ontario

0 200 400 600 800
Metres

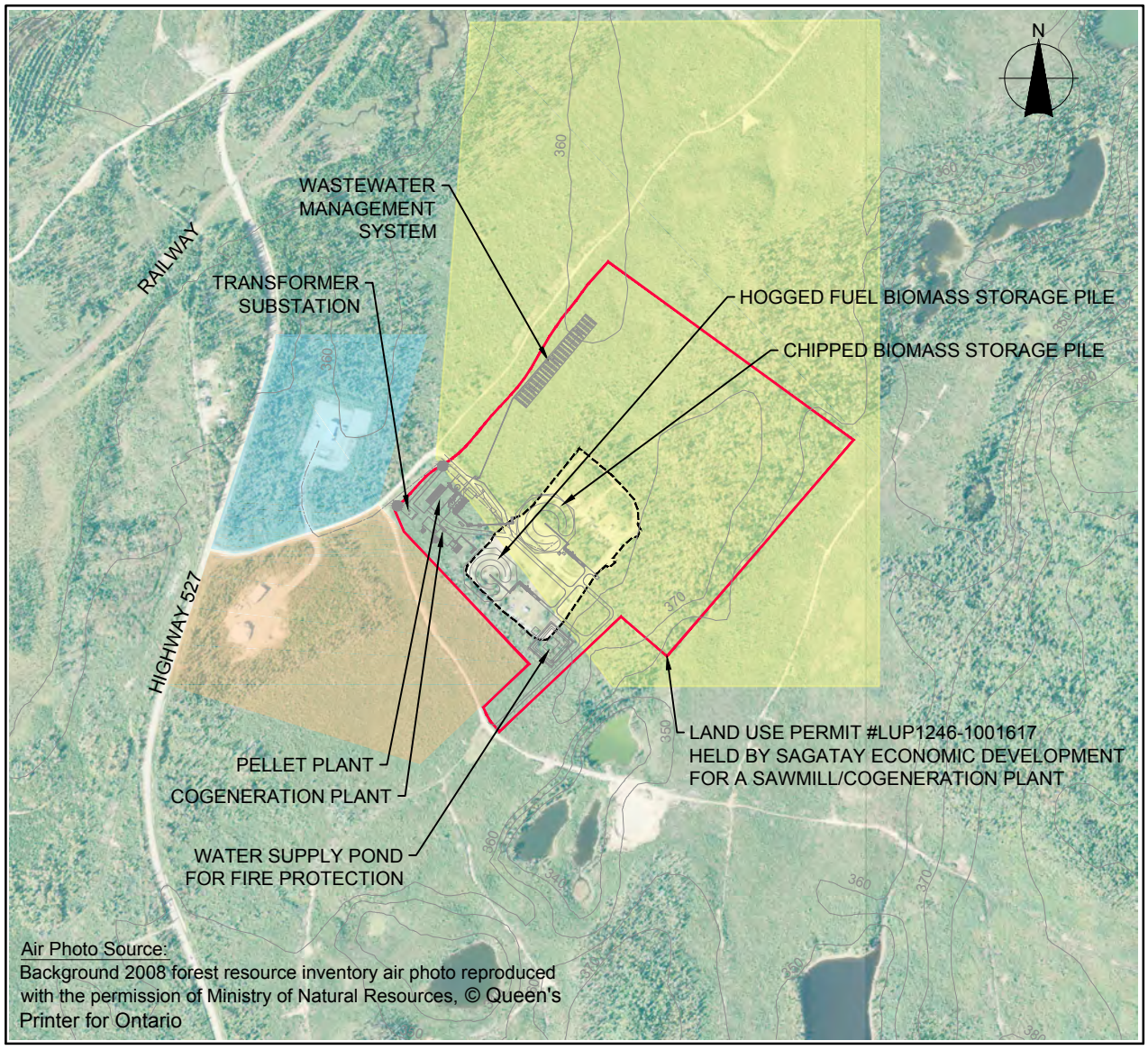
1:10,000
August 2014
Project Number: 300030895

Projection: UTM Zone 16
Datum: NAD83

Prepared by: C. Sheppard
Verified by: C. Shilton

NEEGAN BURNSIDE

030895 PELLET MILL DRAWING SET.DWG
LAYOUT: PROJECT DESCRIPTION SA
PRINTED: August 26, 2014, 10:29 AM



LEGEND

- PROJECT LOCATION
- LAND PREVIOUSLY USED BY FOREST COMPANY
- AREA WITHDRAWN PER SECTION 35 OF THE MINING ACT (ORDER No. W-TB-122/11)
- CROWN LAND DISPOSITION CL10395
- PART 1, REFERENCE PLAN No. P-8060-55 ON HIGHWAY No. 527
- 350 EXISTING 10m CONTOURS INTERVAL (m asl)
- EXISTING ELECTRICITY DISTRIBUTION LINE
- CONNECTION POINT

FIGURE A2

WHITESAND FIRST NATION

COGENERATION & PELLET MILL PROJECT

CLASS 1 THERMAL FACILITY UNDER ONTARIO REGUALTION 359/09

PROJECT LOCATION

0 250 500 750 1,000

Metres

1:12,500
August 2014
Project Number: 300030895

Projection: UTM Zone 16
Datum: NAD83

Prepared by: C. Sheppard

Verified by: C. Shilton

NEEGAN BURNSIDE

030895 PELLET MILL DRAWING SET.DWG

LAYOUT: PROJECT DESCRIPTION PL

PRINTED: August 26, 2014, 10:01 AM

Equipment and Process Diagrams

Appendix B

SCALE IN AND OUT
BY OTHERS (MNR)

TD-02
CHIP TRUCK DUMPER
TRUCK UNLOADING
2-3 TRUCKS /HR
25-35 TONNE LOADS

CHIP HANDLING SYSTEM

5 HP
30 HP VFD
RECT.
BELT MAGNET
5 HP
GBC-01
15 HP
25-75 MTPH
TO CHIP STORAGE
8001
BELT SCALE
REQUIRED?
HPU
E 1500W
75 HP
5 HP

TD-01
HOG FUEL TRUCK DUMPER
TRUCK UNLOADING
1-3 TRUCKS /HR
25-35 TONNE LOADS

HOG FUEL HANDLING SYSTEM

5 HP
30 HP VFD
RECT.
BELT MAGNET MD
5 HP
GBC-05
7.5 HP
7.5 HP
25-75 MTPH
OVERS
+75mm
DS-01
ACCEPTS
-75mm
BARK HOG 10-15 MTPH
CONTINUOUS
125 HP
125 HP
HG-01
3 HP
20 HP
GCC-02
BELT SCALE
REQUIRED?
HPU
E 1500W
M HP
M HP
75
5

GBC-06
10 HP
15 HP
HOG FUEL STORAGE PILE
NOMINAL 475,000 CUBIC FT.
4,300 METRIC TONNES @
20LBS/FT³
ST-01
RADIAL STACKING
CONVEYOR
100' - 270°
5 HP
REV
HOG FUEL RECLAIM
5 HP
10 HP VFD
RC-01
GBC-07
BELT SCALE
5 HP
GBC-08
5 HP
15 GMTPH 3" MINUS
TO BIOMASS GREEN
FUEL BIN
8003.1

OPERATING PARAMETERS

FEED STOCK:
ASPEN 74%
WHITE BIRCH 26%
TOTAL 113,000 m³ PER YEAR
CHIPS ARE TO BE SUPPLIED TO PULP MILL SPEC.

BIOMASS BULK DENSITY ASSUMPTIONS
FOR STORAGE : 20 LBS/FT³
FOR CONVEYOR HP : 25 LBS/FT³
FOR CONVEYOR SIZING : 20 LBS/FT³

PELLET PLANT PRODUCTION:
DESIGN: 8 TONNES PER HOUR
PLANT 7,497 HRS/YEAR AND WOODYARD 3,927 HRS/YEAR

HOG FUEL REQUIREMENTS
81,000 GREEN METRIC TONNES PER YEAR, @ 45% MOISTURE CONTENT. FUEL SIZE (NOMINAL) INDUSTRY STANDARD OF 3" MINUS (76mm) - 90% ACCEPTS, BUT NOT MORE THAN 20%< 3mm.
NOMINAL 230 METRIC TONNES PER DAY
10 TRUCK REQUIRED PER DAY BASED ON 25 TONNES/TRUCK.

PRELIMINARY / CONCEPTUAL

REFERENCES

DWG. NO.	DESCRIPTION

REVISIONS

REV.	YYYY/MM/DD	DESCRIPTION	DRAFTER	DESIGNER	PROJ.MGR
J	2014/03/11	SYSTEM REVISED TO PURCHASED CHIPS AND BARK ONLY.	RMP		
H	2013/11/05	REVISED TRUCK DUMPER NOTES , ADDED BELT SPEED & CHIPPER RPM	TJH		
G	2013/09/18	REVISED TO INDICATE GTPH	TJH		
F	2013/08/19	REVISED TO MATCH SITE LAYOUT PLAN	TJH	TKK	DRW
E	2013/06/24	GENERAL REVISION	DTP	CPB	DRW
D	2013/06/05	WAS 2-3 TRUCKS/HR	DTP	CPB	DRW
C	2013/05/30	FOR REVIEW	JJR	DRW	DRW
B	2012/04/12	REVISED CHIP FLOW RATE	DCH	DRW	DRW
A	2012/03/26	FOR REVIEW	DCH	DRW	DRW

ISSUE STATUS
FOR REVIEW

SCALE N.T.S.

	INITIALS	YYYY/MM/DD
DESIGNED BY:	DRW	2012/02/10
DESIGN CHK'D. BY:	DRW	
DRAWN BY:	MJE	2012/02/24
DRAWING CHK'D. BY:		
PROJECT MANAGER	DRW	

KEYWORD

GNBE Great North Bio Energy

GENIVAR
740 SOUTH SYNDICATE AVENUE
THUNDER BAY, ONTARIO P7E 1E9
TEL: 807 625-6700
FAX: 807 623-4491
www.GENIVAR.com

GENIVAR REF. NO.
121-12538-01

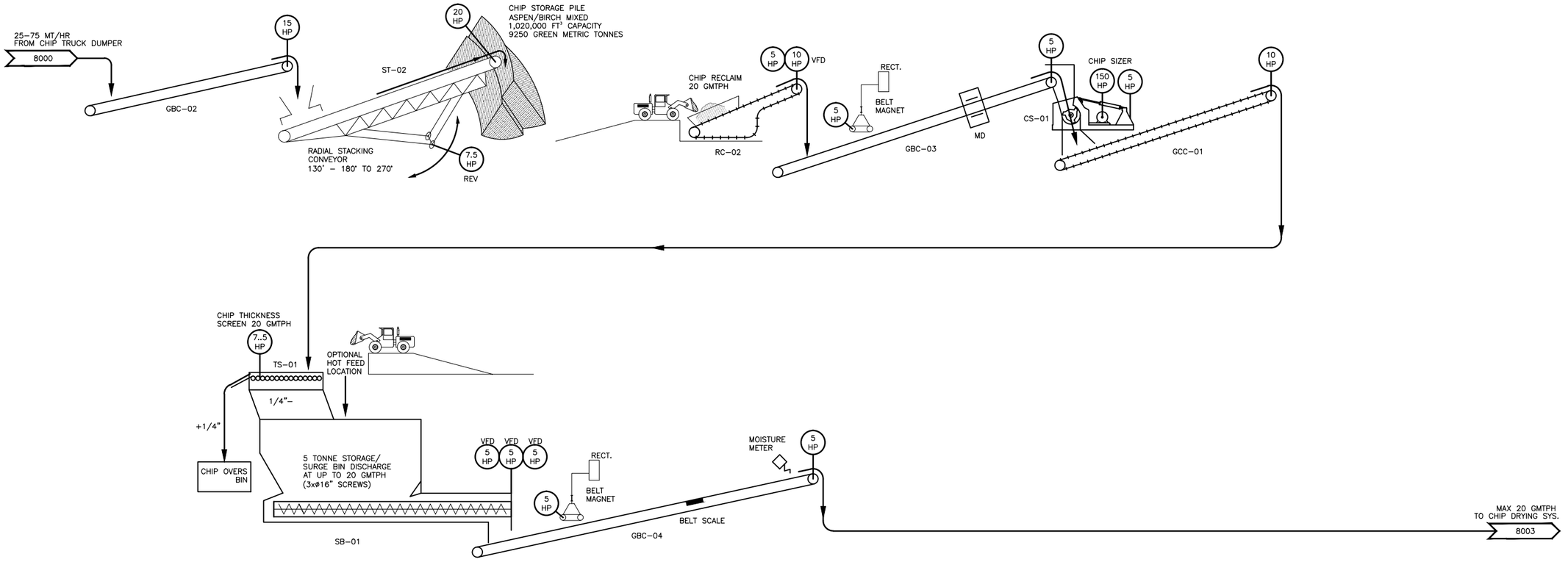
PROJECT
GREAT NORTH BIO ENERGY - WHITESAND F.N.

PROJECT NO.

TITLE
FLOW DIAGRAM
PRIMARY WOOD YARD
WHITESAND F.N. - COGEN/PELLET PLANT

CLIENT DWG. NO.
8000
J

FILE NAME: 121-12538-01 PID'S
LAST EDITED: 3/21/2014 11:33 AM



PRELIMINARY / CONCEPTUAL

DWG. NO.	DESCRIPTION

REFERENCES

REV.	YYYY/MM/DD	DESCRIPTION	DRAFTER	DESIGNER	PROJ.MGR
J	2014/03/11	SYSTEM REVISED TO PURCHASED CHIPS ONLY	RMP		
H	2013/11/04	REVISED SCREEN	TJH		
G	2013/09/18	REVISED TO 3/8" CHIPS AND GTPH, ADD CONVEYOR	TJH		
F	2013/08/19	REVISED TO MATCH SITE LAYOUT	TJH	TKK	DRW
E	2013/06/24	GENERAL REVISION, WAS DWG 8002	DTP	CPB	DRW
D	2013/06/05	WAS 15 MTPH	DTP	CPB	DRW
C	2013/05/30	FOR REVIEW	JJR	DRW	DRW
B	2012/04/12	REVISED FLOW RATE	DCH	DRW	DRW
A	2012/03/26	FOR REVIEW	DCH	DRW	DRW

REVISIONS

ISSUE STATUS

FOR REVIEW

SCALE N.T.S.

	INITIALS	YYYY/MM/DD
DESIGNED BY:	DRW	2012/02/10
DESIGN CHK'D. BY:	DRW	
DRAWN BY:	MJE	2012/02/24
DRAWING CHK'D. BY:		
PROJECT MANAGER	DRW	

KEYWORD

GNBE Great North Bio Energy

GENIVAR
740 SOUTH SYNDICATE AVENUE
THUNDER BAY, ONTARIO P7E 1E9
www.GENIVAR.com
TEL: 807 625-6700
FAX: 807 623-4491

GENIVAR REF. NO. 121-12538-01

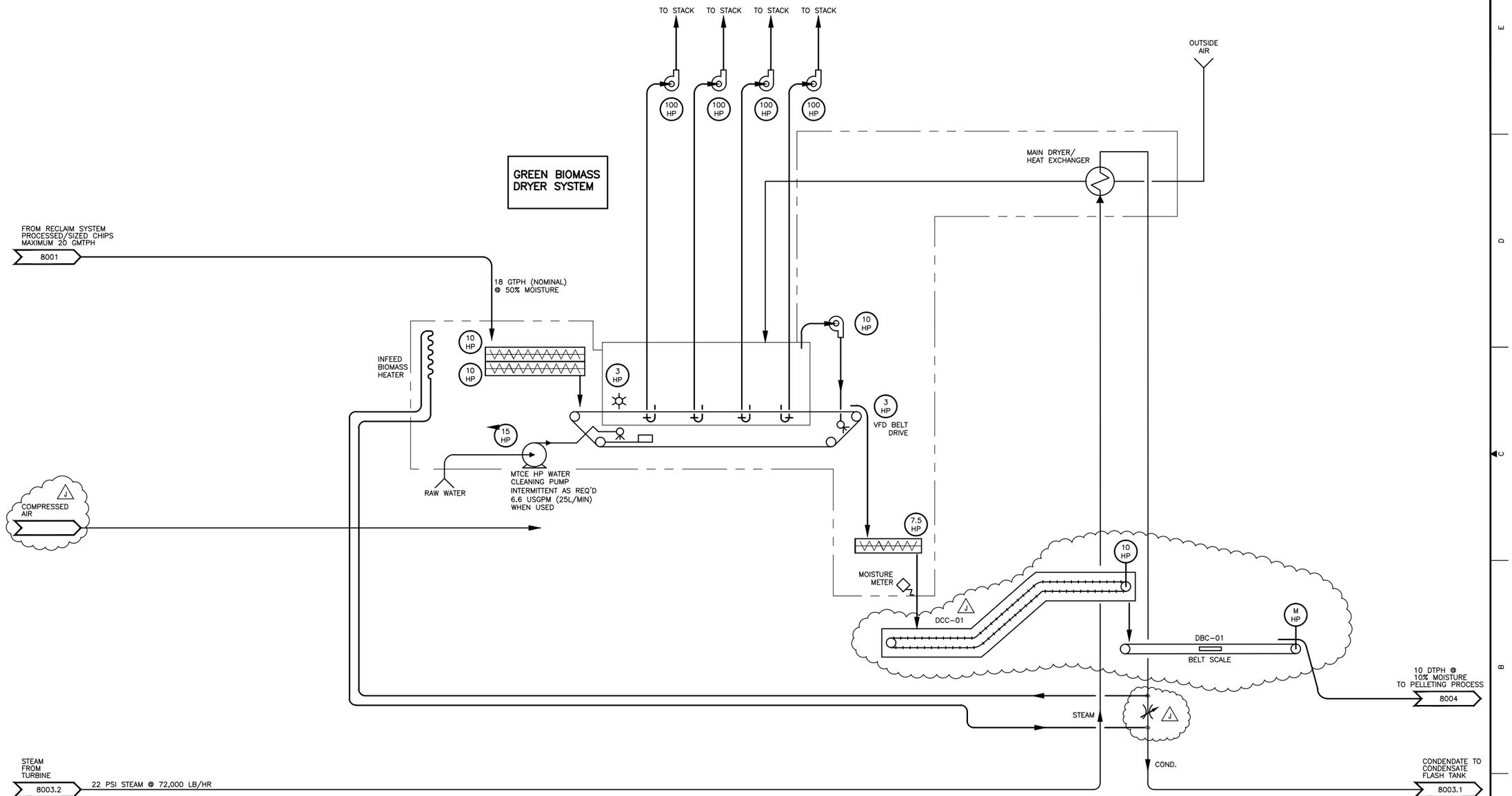
PROJECT: GREAT NORTH BIO ENERGY – WHITESAND F.N.

PROJECT NO.

TITLE: FLOW DIAGRAM
PROCESSING WOOD YARD
WHITESAND F.N. – COGEN/PELLET PLANT

CLIENT DWG. NO. 8001 J

FILE NAME: 121-12538-01 PID'S
LAST EDITED: 3/21/2014 11:33 AM



PRELIMINARY / CONCEPTUAL

DWG. NO.	DESCRIPTION	REV.	YYYY/MM/DD	DESCRIPTION	DRAFTER	DESIGNER	PROJ.MGR
		J	2013/11/08	REVISED CONVEYORS	TJH/SVT	TKK	DRW
		I	2013/09/26	REVISED TO INDICATE GTPH & DTPH	TJH	TKK	DRW
		H	2013/08/19	WAS COND. TO BOILER	DTP	TKK	DRW
		G	2013/08/06	GENERAL REVISIONS	JJR	CPB	DRW
		F	2013/07/17	DWG NO WAS 8003 NOW IS 8003.1	DTP	CPB	DRW
		E	2013/06/24	GENERAL REVISION, DWG NO WAS 8004	DTP	CPB	DRW
		D	2012/06/05	ADD HEAT EXCHANGER AND PROCESS	DTP	CPB	DRW
		C	2013/05/30	FOR REVIEW	JJR	DRW	DRW
013/08/16		B	2012/03/28	REVISED STEAM & CONDENSATE FLOW	DCH	DRW	DRW
		A	2012/03/26	FOR REVIEW	DCH	DRW	DRW

REFERENCES

REVISIONS

ISSUE STATUS

FOR REVIEW

SCALE N.T.S.

	INITIALS	YYYY/MM/DD
DESIGNED BY:	RW	2012/02/10
DESIGN CHK'D. BY:	DRW	
DRAWN BY:	MJE	2012/02/24
DRAWING CHK'D. BY:		
PROJECT MANAGER	DRW	

KEYWORD

GNBE Great North Bio Energy

GENIVAR

740 SOUTH SYNDICATE AVENUE THUNDER BAY, ONTARIO P7E 1E9 www.GENIVAR.com TEL: 807 625-6700 FAX: 807 623-4491

GENIVAR REF. NO. 121-12538-01

PROJECT: GREAT NORTH BIO ENERGY – WHITESAND F.N.

PROJECT NO.

TITLE: FLOW DIAGRAM
GREEN BIOMASS BELT DRYER
WHITESAND F.N. – COGEN/PELLET PLANT

CLIENT DWG. NO. 8003 J

FILE NAME: 121-12538-01 PID'S
LAST EDITED: 3/21/2014 11:33 AM

BIOMASS STEAM BOILER CO-GEN BLDG

3.6MW STEAM CYCLE W/ BIOMASS DRYER WORKING AS AN AIR COOLED CONDENSER (ACC)42,000 LBS/HR OF PROCESS HEATING STEAM W/ BALANCE CONDENSED IN SURFACE CONDENSER/COOLING TOWER

PARTICULATE DISCHARGE SPECIFICATION MAX 50mg / STD CU.M.

BAG HOUSE FILTER

CEMS SYSTEM

GAS SAMPLE PORTS

INST. AIR (DRY)

MIN. 40' ABOVE GRADE

5 HP

BOILER ID FAN 300 HP VFD

1 HP

FLY ASH CONES

HURST FUEL DRYER

HURST BOILER 20,000–65,000 PPH

BLOW DOWN VENT

MIN CAPACITY 2 M TONS

SUPER SAC 1 TON PELLET BAG UNLOADER

PELLET FLEX SCREW

PELLET STORAGE BIN

TBD HP

ASH BIN

BACK–UP PELLET PLANT HEATING BOILER HEAT LOAD=0.700 MBTH

MIN 12 SUPER SAC PELLET BAGS IN STORAGE

VFD

DUPLEX PRIMARY LOOP CIRC PUMPS

30 HP

PLANT BUILDINGS GLYCOL HEATING SYSTEM HEAT LOAD=0.700 MBTH

BOILER MUA ZONE 1

BOILER HEAT ZONE 2

HEAT SINK ZONE 3

STEAM 22 PSIG 8003.2

COND. TRAP

STEAM TO TURBINE 8003.2

BLOW DOWN SEPARATOR TANK

BLOW DOWN NORMAL 2.5 USGPM MAX 3.5 USGPM

405PSIg 800°F

DEAERATOR SYSTEM/ WATER TANK

S.C. HOTWELL RETURN 8003.2

PUMP

COND. FLASH TANK

8003

COND. RETURN FROM DRYER

RE INJECTION FAN 3 HP

DRAINS

DRAIN

TREATED WATER

DUPLEX PUMP X2

PREHEATER

40 HP VFD

BOILER TREATMENT FEEDWATER SYSTEM

NORMAL 15 USGPM MAX 20 USGPM

RO WATER 8013

BOILER WATER CHEMICAL

15 GMTPH 3" MINUS FROM HOG FUEL RECLAIM

8000

8–12 GTPH

GES SCREEN

OVERS

3"x3" SCREEN ACCEPTS

FUEL STORAGE FABRIC ENCLOSURE

GES LEVELING CHAIN CONVEYOR

GES FUEL STOKER 12 HOURS 150+ G TONS

HPU

3–11 GTPH

FUEL TRANSFER CONV.

7.5 HP x4

1.5 HP

MANUAL FLAME START UP

UNDERFIRE/ PRIMARY FAN

OVERFIRE/ SECONDARY FAN

100 HP VFD

DESUPERHEATER WATER 8003.2

BOILER BLOWDOWN 8013

BOILER DRAINS 8013

RAW WATER 8013

MAKE–UP

ASH TRANSFER CONV.

WET ASH COLLECTING CONV.

2–152

INST AIR SYSTEM

100 PSI

BLDG AIR SYSTEM

AIR RECEIVER

REGEN AIR DRYER

GRAY WATER PLANT DRAIN SYSTEM

TO DISPOSAL SYSTEM

PLANT AIR SYSTEM

50 HP COMPRESSOR #1

50 HP COMPRESSOR #2

ROLL UP DOOR

HEATER

BUNKER

ASH STORAGE BIN/TRUCK LOADING

500 LBS/HR DRY ASH

3PH 575V POWER

500 KW STANDBY DIESEL GENERATOR

ASH LOADING BAY FLOOR SUMP 8013

PRELIMINARY / CONCEPTUAL

DWG. NO.	DESCRIPTION
	REFERENCES

REV.	YYYY/MM/DD	DESCRIPTION	DRAFTER	DESIGNER	PROJ.MGR
I	2014/03/12	ADDED NOTES, GENERAL REVISIONS	TJH		
H	2013/09/24	REVISED TO INDICATE GTPH	TJH	TKK	DRW
G	2013/08/21	ADD DRAINS, FLOW, OFFSHEET DIRECTION	DTP	TKK	DRW
F	2013/08/19	ADD SUPER SAC UNLOADER SYS, HURST FUEL DRYER	DTP	TKK	DRW
E	2013/06/24	GENERAL REV, DWG NO WAS 8004.1, WAS 405 PSIG/770°F, ADD PUMPS	DTP	CPB	DRW
D	2013/06/05	ISSUED FOR REVIEW	DTP	CPB	DRW
C	2013/05/30	FOR REVIEW	JJR	DRW	DRW
B	2012/03/28	FOR REVIEW	DCH	DRW	DRW
A	2012/03/26	FOR REVIEW	DCH	DRW	DRW
		REVISIONS			

ISSUE STATUS

FOR REVIEW

SCALE N.T.S.

	INITIALS	YYYY/MM/DD
DESIGNED BY:	DRW/TKK	2012/03/15
DESIGN CHK'D. BY:	DRW	TKK
DRAWN BY:	DCH/DTP	2012/03/14
DRAWING CHK'D. BY:	TKK	
PROJECT MANAGER	DRW	
KEYWORD		

GNBE Great North Bio Energy

GENIVAR

740 SOUTH SYNDICATE AVENUE THUNDER BAY, ONTARIO P7E 1E9 www.GENIVAR.com TEL: 807 625-6700 FAX: 807 623-4491

GENIVAR REF. NO. 121–12538–01

PROJECT: GREAT NORTH BIO ENERGY – WHITESAND F.N.

PROJECT NO.

TITLE: FLOW DIAGRAM BIOMASS FURNACE & STEAM BOILER SYSTEM WHITESAND F.N. – COGEN/PELLET PLANT

CLIENT DWG. NO. 8003.1 1

FILE NAME: 121–12538–01 PID'S
LAST EDITED: 3/21/2014 11:33 AM

STEAM FROM BIOMASS BOILER
8003.1
STEAM
– 65,000 LBS/HR
– 405 PSIG
– 800° F
DESUPERHEATER WATER
8003.1
TO ATMOSPHERE
WATER
TURBINE TRIP STEAM DUMP VALVE
STEAM ORIFICE TYPE FLOW METER
PLANT AIR
PLANT AIR
ELECTRICAL METERING 0.2%
E–STOP VALVE
TEMPERATURE AND VIBRATION MONITORING SYSTEM
CONTROL CABINET AUTO SYNCHRONIZING
EXTRACTION GOVERNOR
THROTTLE VALVE
STATOR RTDS 100 OHM
PRV
HOGGER AIR EJECTOR
TO ATMOSPHERE
SILENCER
125 PSIG
6"ø
1ST STAGE AIR EJECTOR
TURBO–TECH EXTRACTION CONDENSING TYPE TURBINE 3,600 KW XXXX RPM
CPLG
GEAR BOX XXXX
GENERATOR DESIGN OUTPUT 3,600 KW 0.8 PF 4 POLE 1800 RPM
4160V 3PH 60 CYCLE
GENERATOR COOLING WATER
COOLING WATER OUT
EXTRACTION
22 PSIG
EXHAUST 1.25 PSIA
SPACE HEATER 120/240 VAC 10
XXXXX LBS
SKID WET XXXXX LBS
2ND STAGE AIR EJECTOR
TO ATMOSPHERE
SILENCER
TO ATMOSPHERE
COOLING WATER IN
OIL TANK
ELECTRIC HEATER
LUBRICATION SYSTEM
5 HP
5 HP
WET (DRY) 500 LBS
TURBINE BUILDING
TO ATMOSPHERE
SILENCER
SURFACE CONDENSOR WT. 15,916 LBS
22 PSI STEAM TO TO GLYCOL HEATER
8003.1
TO GREEN BIOMASS DRYER
8003
STEAM 22 PSIG DRYER 54,400 LBS/HR
LP FEED WATER HEATER
TO DEARATOR
8003.1
PUMP
7.5 HP
TRAP
EVAPORATION XX USGPM
MAKE–UP WATER XX USGPM
8013
DRIFT XXX USGPM
CROSSFLOW COOLING TOWER
2X
2 CELL XXXX USGPM WT. (DRY) XXXXX LBS
SUMP
25 HP
25 HP
125 HP
XX USGPM
COOLING TOWER BLOWDOWN
8003.1
VFD PUMP

PRELIMINARY / CONCEPTUAL

DWG. NO.	DESCRIPTION	REV.	YYYY/MM/DD	DESCRIPTION	DRAFTER	DESIGNER	PROJ.MGR
		I		GENERAL REVISION	TJH		
		H	2013/09/24	ADD COOL'G TOWER BLOWDOWN	TJH	TKK	DRW
		G	2013/08/19	REVISED TO MATCH SITE PLAN	TJH/DTP	TKK	DRW
		F	2013/07/17	COMPLETED CIRCUITS FOR GLYCOL HTG SYSTEM AND COOL'G TOWER	DTP	TKK	DRW
		E	2013/06/24	GENERAL REVISION, DWG NO WAS 8004.2	DTP	CPB	DRW
		D	2013/06/05	ISSUED FOR REVIEW	DTP	CPB	DRW
		C	2013/05/30	FOR REVIEW	JJR	DRW	DRW
		A	2012/03/27	FOR REVIEW	DCH	DRW	DRW

REFERENCES | REVISIONS

ISSUE STATUS
FOR REVIEW

SCALE N.T.S.

	INITIALS	YYYY/MM/DD
DESIGNED BY:	DRW	2012/03/15
DESIGN CHK'D. BY:	DRW	
DRAWN BY:	DCH	2012/03/14
DRAWING CHK'D. BY:		
PROJECT MANAGER	DRW	

KEYWORD

GNBE Great North Bio Energy

GENIVAR
740 SOUTH SYNDICATE AVENUE
THUNDER BAY, ONTARIO P7E 1E9
TEL: 807 625-6700
www.GENIVAR.com
FAX: 807 623-4491

GENIVAR REF. NO. 121–12538–01

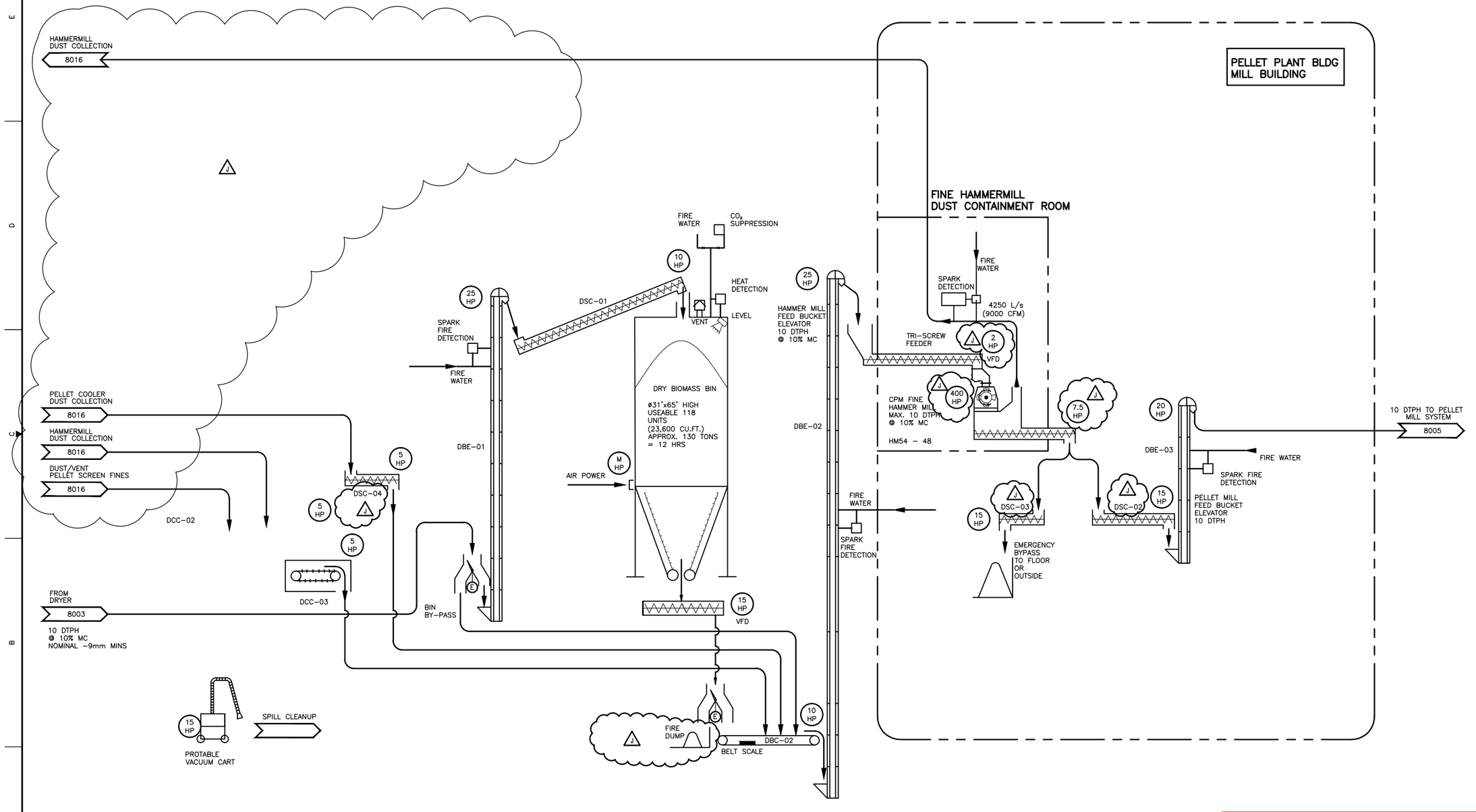
PROJECT
GREAT NORTH BIO ENERGY – WHITESAND F.N.

PROJECT NO.

TITLE
FLOW DIAGRAM
4.3 MW STEAM TURBINE SYSTEM
WHITESAND F.N. – COGEN/PELLET PLANT

CLIENT DWG. NO. 8003.2 I

FILE NAME: 121–12538–01 PID'S
LAST EDITED: 3/21/2014 11:33 AM



PRELIMINARY / CONCEPTUAL

DWG. NO.	DESCRIPTION	REV.	YYYY/MM/DD	DESCRIPTION	DRAFTER	DESIGNER	PROJ.MGR
REFERENCES		REVISIONS					
		J	2014/03/12	REMOVED DUST COLLECTION EQUIPMENT SEE DWG. 121-12538-01-8016	TJH	TKK	TKK
		H	2013/11/08	REVISED CONVEYORS	TJH/SVT	TKK	DRW
		G	2013/09/24	REVISED TO INDICATE DTPH	TJH	TKK	DRW
		F	2013/08/19	REVISED TO MATCH SITE PLAN LAYOUT	TJH/DTP	TKK	DRW
		E	2013/06/24	GENERAL REVISION, DWG NO WAS 8005	DTP	CPB	DRW
		D	2013/06/05	WAS FINE DUMP	DTP	CPB	DRW
		C	2013/05/30	FOR REVIEW	JJR	DRW	DRW
		B	2012/03/28	FOR REVIEW	DCH	DRW	DRW
		A	2012/03/26	FOR REVIEW	DCH	DRW	DRW

ISSUE STATUS
FOR REVIEW

SCALE
N.T.S.

	INITIALS	YYYY/MM/DD
DESIGNED BY:	DRW	2012/02/10
DESIGN CHK'D. BY:	DRW	
DRAWN BY:	MJE	2012/02/24
DRAWING CHK'D. BY:		
PROJECT MANAGER	DRW	
KEYWORD		

GNBE Great North Bio Energy
GENIVAR
740 SOUTH SYNDICATE AVENUE
THUNDER BAY, ONTARIO P7E 1E9
TEL: 807 625-6700
FAX: 807 623-4491
www.GENIVAR.com

GENIVAR REF. NO.
121-12538-01

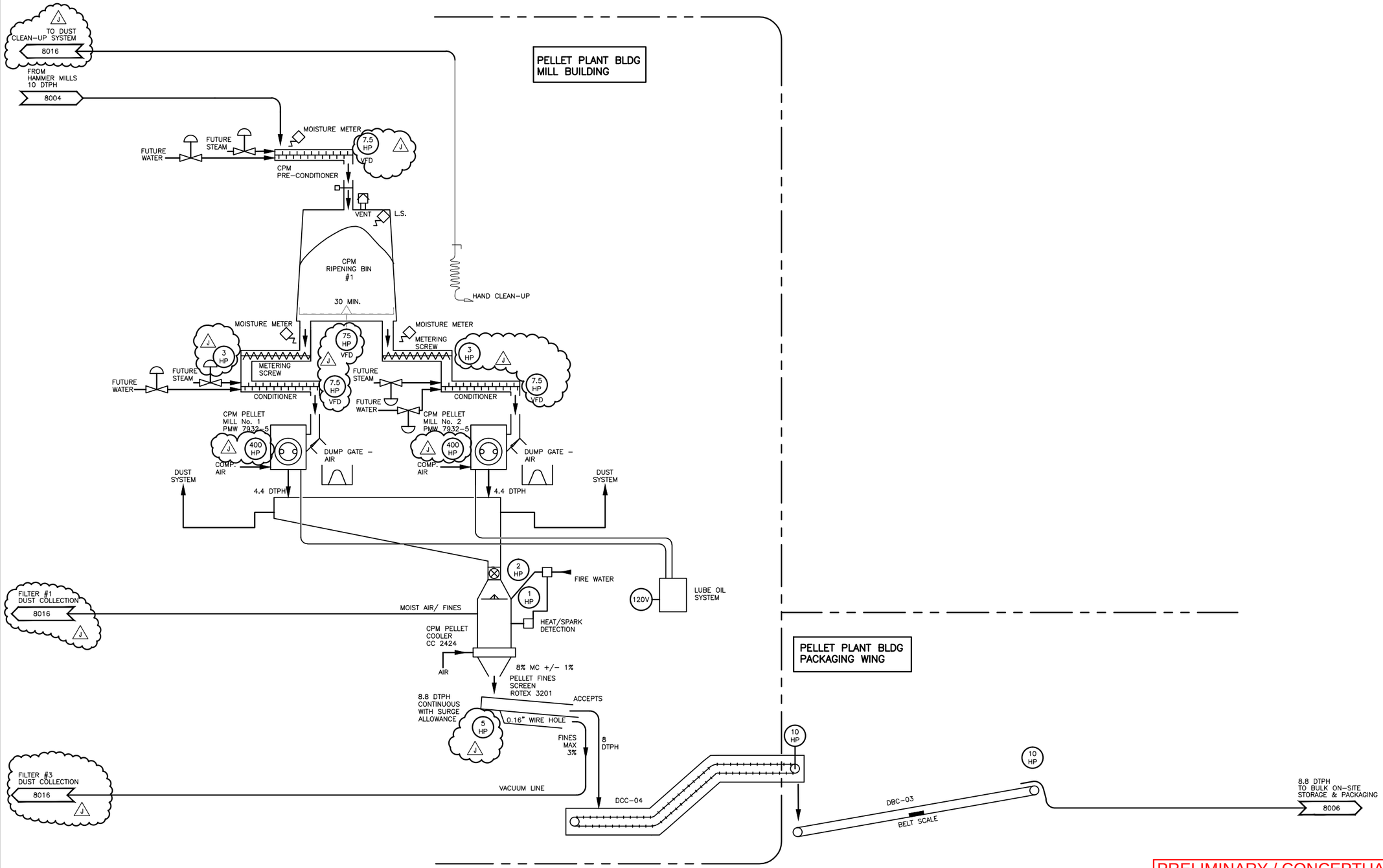
PROJECT
GREAT NORTH BIO ENERGY - WHITESAND F.N.

PROJECT NO.

TITLE
FLOW DIAGRAM
FINE HAMMER MILL
WHITESAND F.N. - COGEN/PELLET PLANT

CLIENT DWG. NO.
8004
J

FILE NAME: 121-12538-01 PID'S
LAST EDITED: 3/21/2014 11:33 AM



PRELIMINARY / CONCEPTUAL

DWG. NO.	DESCRIPTION	REV.	YYYY/MM/DD	DESCRIPTION	DRAFTER	DESIGNER	PROJ.MGR
		J	2014/03/12	REVISED PROCESS FOLW DRAWING NUMBER, WAS 2004	RMP	TKK	TKK
		H	2013/11/08	REVISED CONVEYORS	TJH/SvT	TKK	DRW
		G	2013/09/24	REVISED TO INDICATE DTPH	TJH	TKK	DRW
		F	2013/08/16	REVISED TO MATCH SITE PLAN LAYOUT	TJH/DTP	TKK	DRW
		E	2013/06/24	GENERAL REVISION, DWG NO WAS 8006	DTP	CPB	DRW
		D	2013/06/05	ISSUED FOR REVIEW	DTP	DRW	DRW
		C	2013/05/30	FOR REVIEW	JJR	DRW	DRW
		B	2012/03/28	FOR REVIEW	DCH	DRW	DRW
		A	2012/03/26	FOR REVIEW	DCH	DRW	DRW

REFERENCES | REVISIONS

ISSUE STATUS: **FOR REVIEW**

SCALE: N.T.S.

	INITIALS	YYYY/MM/DD
DESIGNED BY:	DRW	2012/02/10
DESIGN CHK'D. BY:	DRW	
DRAWN BY:	MJE	2012/02/24
DRAWING CHK'D. BY:		
PROJECT MANAGER	DRW	
KEYWORD		

GNBE Great North Bio Energy

GENIVAR
740 SOUTH SYNDICATE AVENUE
THUNDER BAY, ONTARIO P7E 1E9
TEL: 807 625-6700
FAX: 807 623-4491
www.GENIVAR.com

GENIVAR REF. NO. 121-12538-01

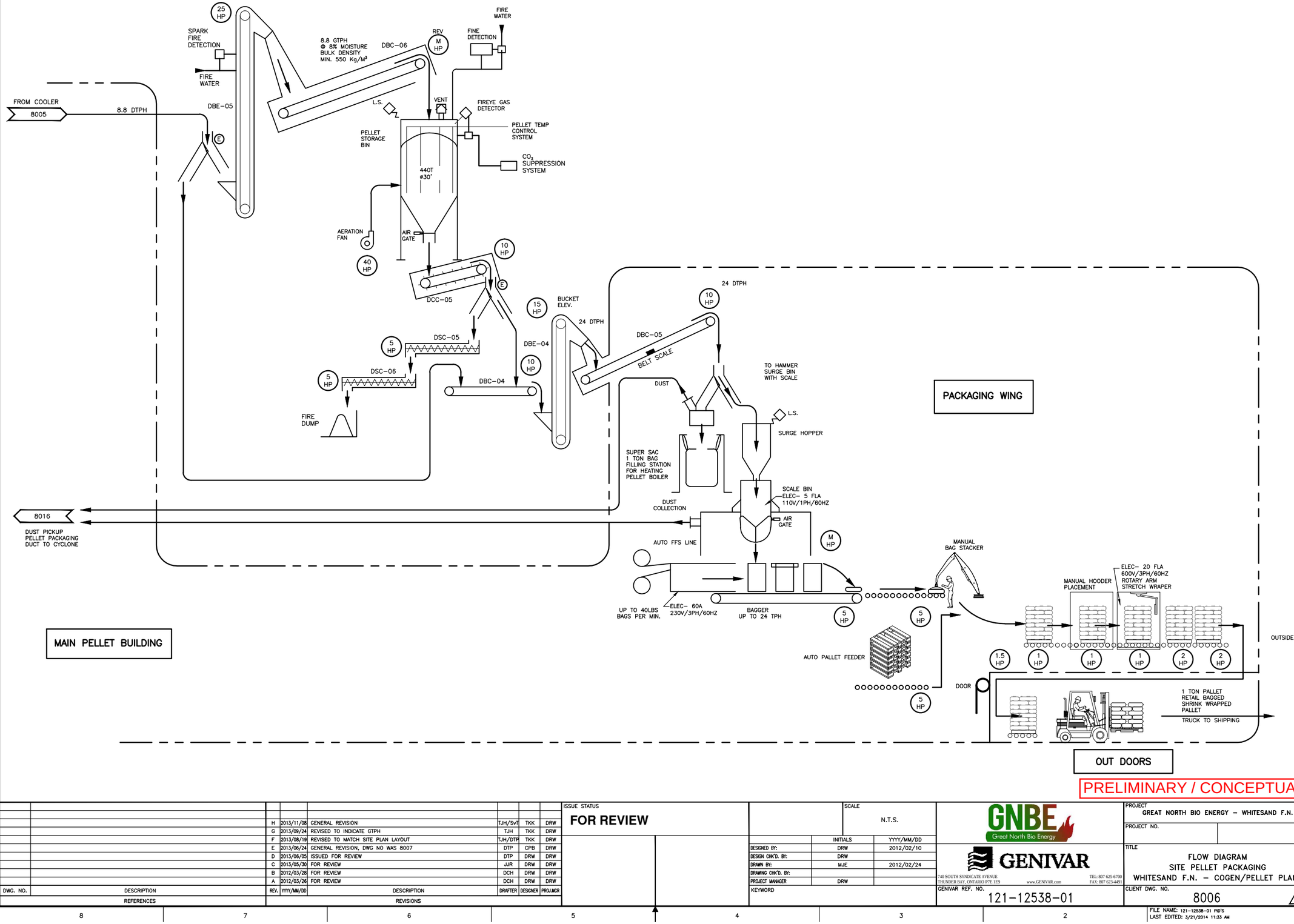
PROJECT: GREAT NORTH BIO ENERGY - WHITESAND F.N.

PROJECT NO.

TITLE: FLOW DIAGRAM PELLETING WHITESAND F.N. - COGEN/PELLET PLANT

CLIENT DWG. NO. 8005 J

FILE NAME: 121-12538-01 PID'S
LAST EDITED: 3/21/2014 11:33 AM



PRELIMINARY / CONCEPTUAL

DWG. NO.	DESCRIPTION	REV.	YYYY/MM/DD	DESCRIPTION	DRAFTER	DESIGNER	PROJ.MGR
REFERENCES		REVISIONS					
		H	2013/11/08	GENERAL REVISION	TJH/SvT	TKK	DRW
		G	2013/09/24	REVISED TO INDICATE GTPH	TJH	TKK	DRW
		F	2013/08/19	REVISED TO MATCH SITE PLAN LAYOUT	TJH/DTP	TKK	DRW
		E	2013/06/24	GENERAL REVISION, DWG NO WAS 8007	DTP	CPB	DRW
		D	2013/06/05	ISSUED FOR REVIEW	DTP	DRW	DRW
		C	2013/05/30	FOR REVIEW	JJR	DRW	DRW
		B	2012/03/28	FOR REVIEW	DCH	DRW	DRW
		A	2012/03/26	FOR REVIEW	DCH	DRW	DRW

ISSUE STATUS
FOR REVIEW

SCALE N.T.S.

	INITIALS	YYYY/MM/DD
DESIGNED BY:	DRW	2012/02/10
DESIGN CHK'D. BY:	DRW	
DRAWN BY:	MJE	2012/02/24
DRAWING CHK'D. BY:		
PROJECT MANAGER	DRW	

KEYWORD

GNBE Great North Bio Energy

GENIVAR
740 SOUTH SYNDICATE AVENUE THUNDER BAY, ONTARIO P7E 1E9 www.GENIVAR.com TEL: 807 625-6700 FAX: 807 623-4491

GENIVAR REF. NO. 121–12538–01

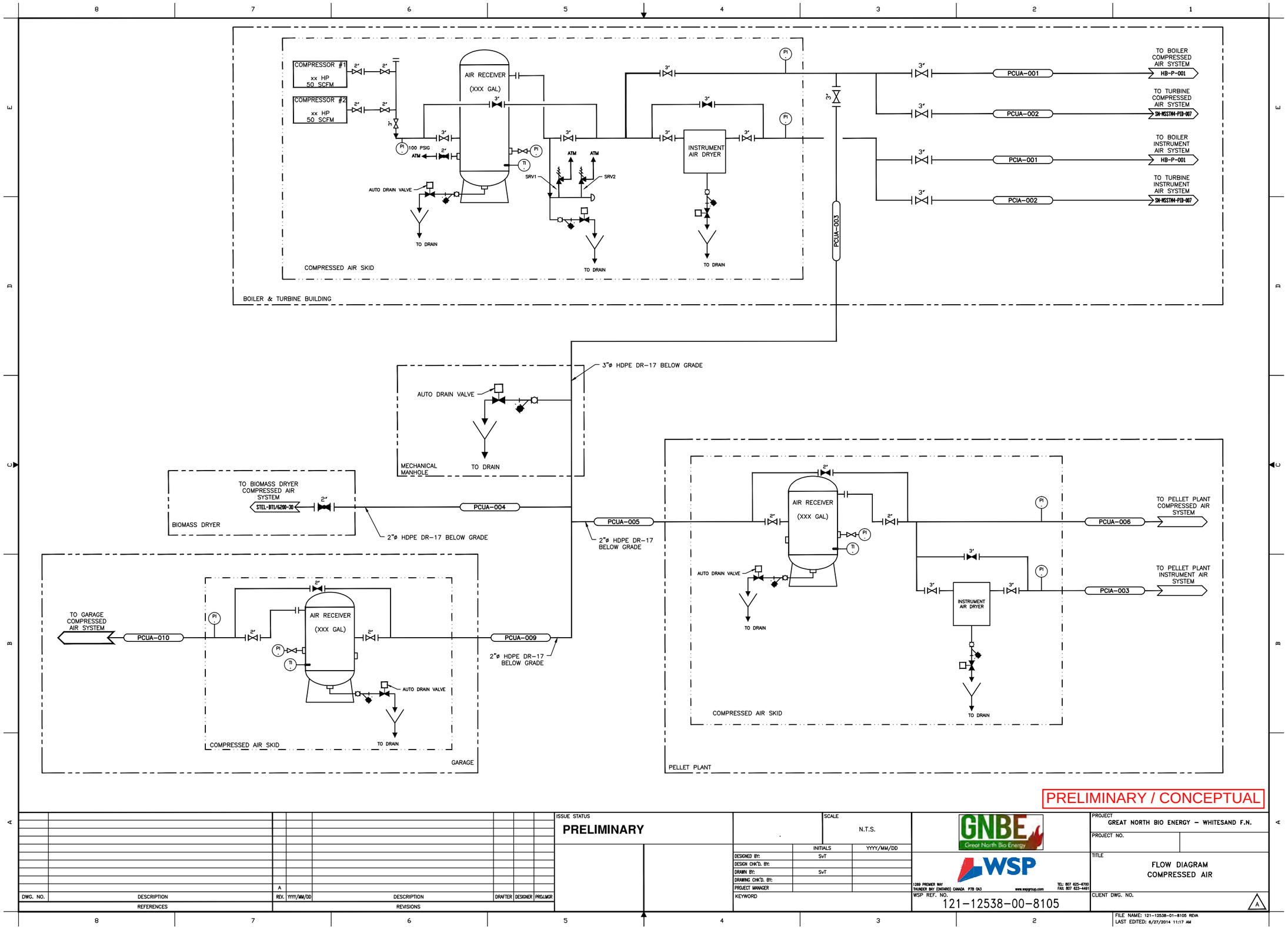
PROJECT
GREAT NORTH BIO ENERGY – WHITESAND F.N.

PROJECT NO.

TITLE
FLOW DIAGRAM
SITE PELLET PACKAGING
WHITESAND F.N. – COGEN/PELLET PLANT

CLIENT DWG. NO. 8006 H

FILE NAME: 121–12538–01 PID'S
LAST EDITED: 3/21/2014 11:33 AM



PRELIMINARY / CONCEPTUAL

DWG. NO.	DESCRIPTION	REV.	YYYY/MM/DD	DESCRIPTION	DRAFTER	DESIGNER	PROJMGR
REFERENCES		A		REVISIONS			

ISSUE STATUS
PRELIMINARY

SCALE
N.T.S.

	INITIALS	YYYY/MM/DD
DESIGNED BY:	SvT	
DESIGN CHK'D. BY:		
DRAWN BY:	SvT	
DRAWING CHK'D. BY:		
PROJECT MANAGER		
KEYWORD		

GNBE Great North Bio Energy

WSP
1289 PREMIER WAY
THUNDER BAY (ONTARIO) CANADA P7B 0A3
TEL: 807 625-4700
FAX: 807 623-4491
www.wspgroup.com

WSP REF. NO.
121-12538-00-8105

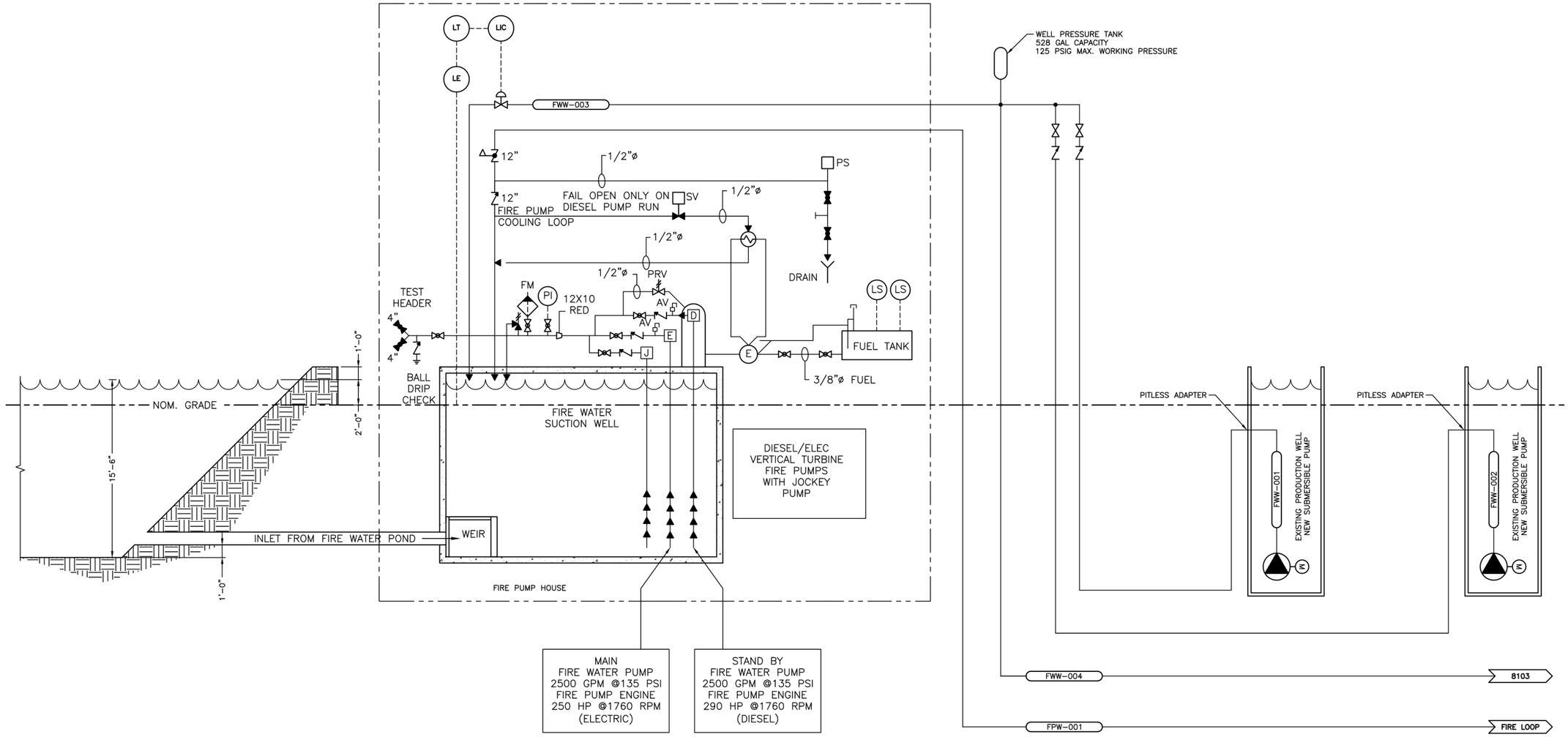
PROJECT
GREAT NORTH BIO ENERGY – WHITESAND F.N.

PROJECT NO.

TITLE
FLOW DIAGRAM
COMPRESSED AIR

CLIENT DWG. NO.
A

FILE NAME: 121-12538-01-8105 REVA
LAST EDITED: 6/27/2014 11:17 AM



PRELIMINARY / CONCEPTUAL

DWG. NO.	DESCRIPTION	REV.	YYYY/MM/DD	DESCRIPTION	DRAFTER	DESIGNER	PROJ.MGR
REFERENCES		A		PRELIMINARY FOR PRICING			
		REVISIONS					

ISSUE STATUS
PRELIMINARY FOR PRICING

SCALE N.T.S.

	INITIALS	YYYY/MM/DD
DESIGNED BY:		
DESIGN CHK'D. BY:		
DRAWN BY:		
DRAWING CHK'D. BY:		
PROJECT MANAGER		

KEYWORD

GNBE Great North Bio Energy

WSP
1269 PREMIER WAY
THUNDER BAY (ONTARIO) CANADA P7B 0A3
TEL: 807 625-4700
FAX: 807 623-4481
www.wspgroup.com

WSP REF. NO. 121-12538-01

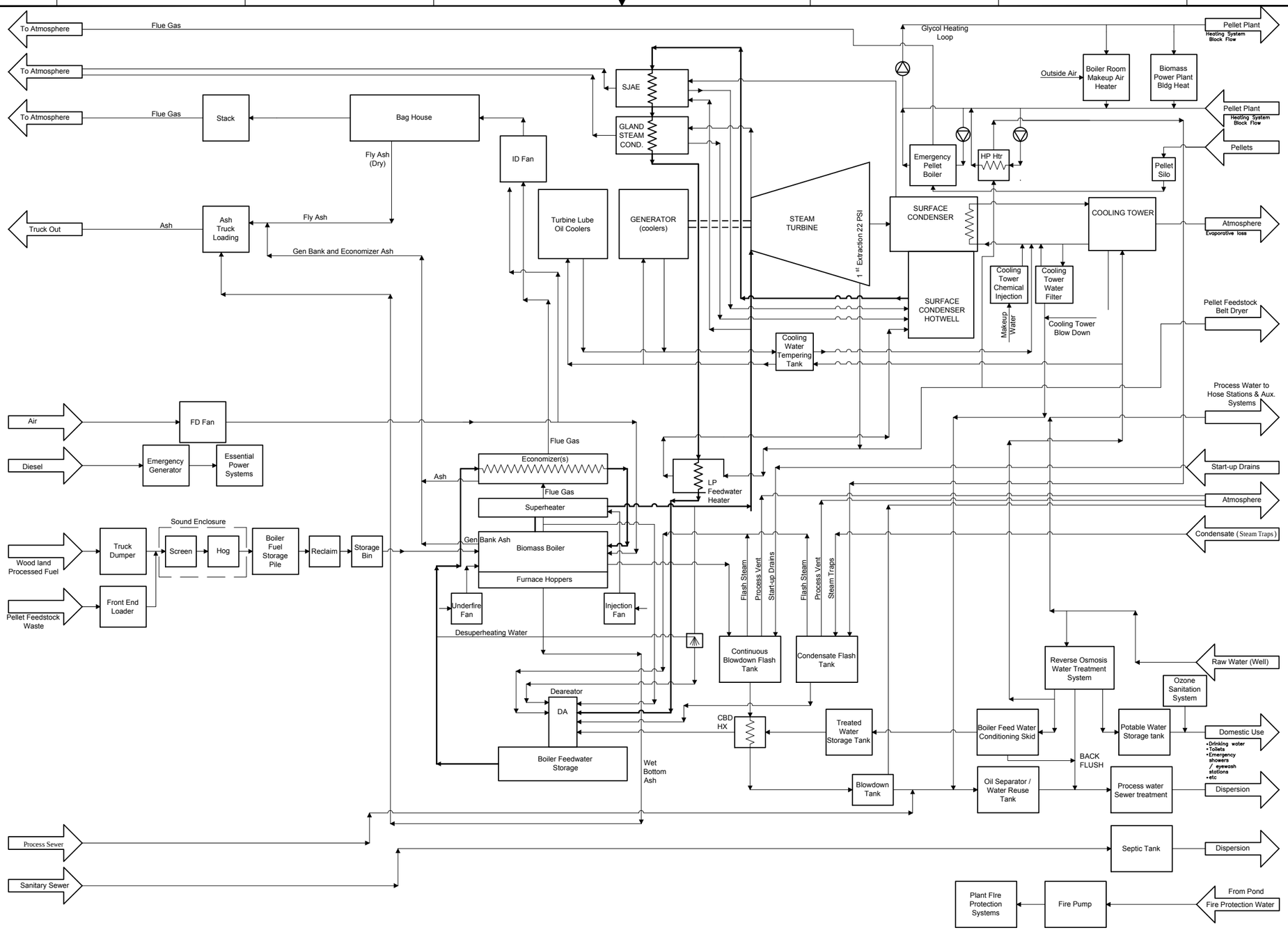
PROJECT
GREAT NORTH BIO ENERGY – WHITESAND F.N.

PROJECT NO.

TITLE
P & ID
FRESH WATER PIPING
WHITESAND F.N. – COGEN/PELLET PLANT

CLIENT DWG. NO. 8106 A

FILE NAME: 121-12538-01-8106 REVA
LAST EDITED: 7/11/2014 10:03 AM



PRELIMINARY / CONCEPTUAL

DWG. NO.	DESCRIPTION	REV.	YYYY/MM/DD	DESCRIPTION	DRAFTER	DESIGNER	PROJMGR
REFERENCES		B	2014/06/10	REVISED	TJH	TKK	
		A	2013/08/12	FOR REVIEW	DTP	TKK	
		REVISIONS					

ISSUE STATUS
FOR REVIEW

SCALE
N.T.S.

	INITIALS	YYYY/MM/DD
DESIGNED BY:	TKK	2013/07/23
DESIGN CHK'D. BY:	CPB	2013-08-26
DRAWN BY:	DTP	2013/07/23
DRAWING CHK'D. BY:	TKK	2013-08-27
PROJECT MANAGER	DRW	2013-08-28
KEYWORD		

GNBE Great North Bio Energy

WSP
1260 PREMIER WAY
THUNDER BAY (ONTARIO) CANADA P7B 0A3
TEL: 807-625-6700
FAX: 807-625-6495
www.wspgroup.com

WSP REF. NO.
121-12538-01-8010

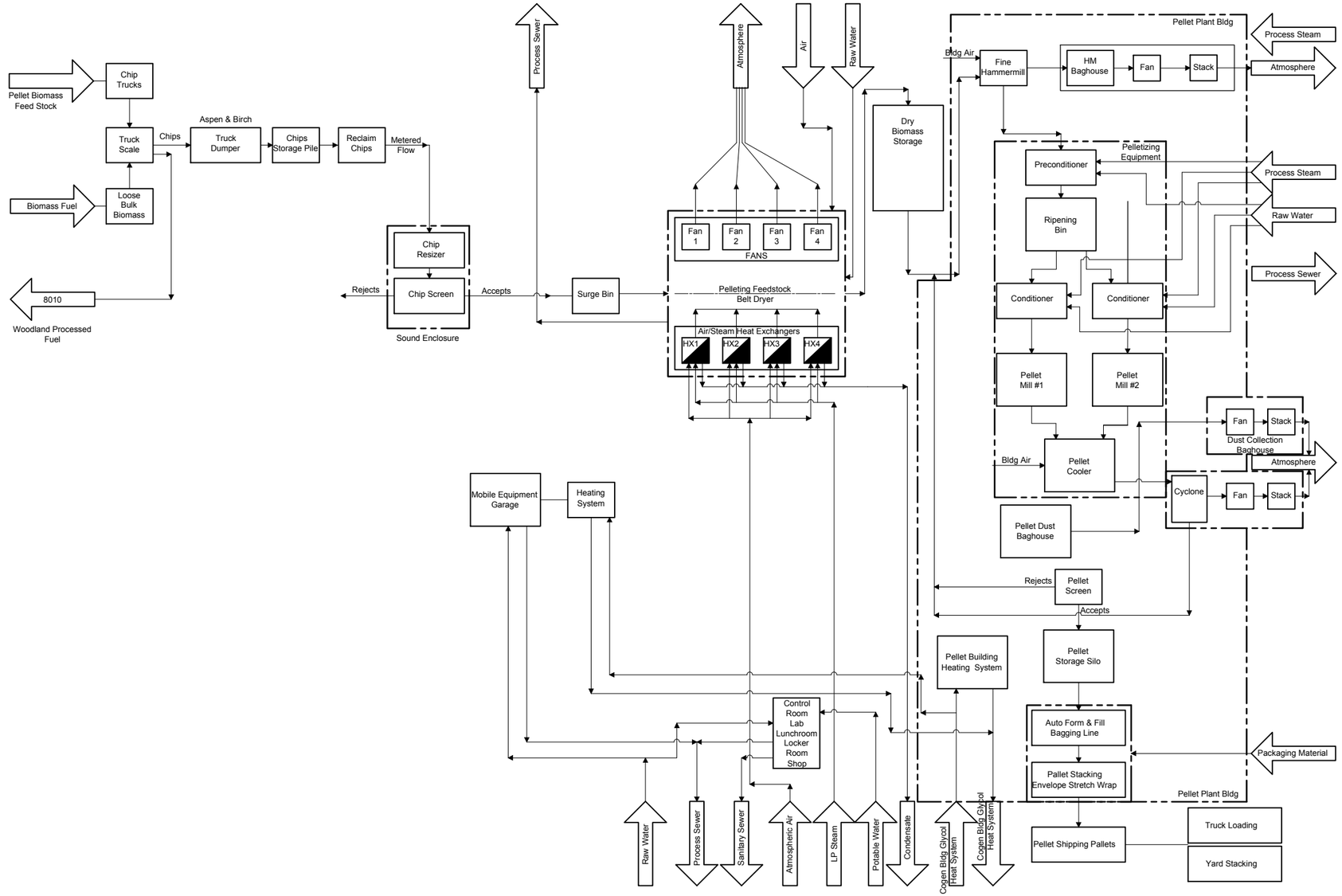
PROJECT
GREAT NORTH BIO ENERGY – WHITESAND F.N.

PROJECT NO.
121-12538-01

TITLE
PLANT PROCESS
BLOCK DIAGRAM
WHITESAND F.N. – COGEN/PELLET PLANT

CLIENT DWG. NO.
B

FILE NAME: 121-12538-01-8010 REVA
LAST EDITED: 8/7/2014 3:57 PM



PRELIMINARY / CONCEPTUAL

DWG. NO.	DESCRIPTION	REV.	YYYY/MM/DD	DESCRIPTION	DRAFTER	DESIGNER	PROJ.MGR
REFERENCES		B	2014/06/10	REVISED	TJH	TKK	
		A	2013/08/13	FOR REVIEW	DTP	DRW	
		REVISIONS					

ISSUE STATUS: **FOR REVIEW**

SCALE: N.T.S.

	INITIALS	YYYY/MM/DD
DESIGNED BY:	DRW	2013/07/12
DESIGN CHK'D. BY:	TKK	2013-08-19
DRAWN BY:	DTP	2013/08/13
DRAWING CHK'D. BY:	TKK	2013-08-28
PROJECT MANAGER	DRW	2013-08-29
KEYWORD		

GNBE Great North Bio Energy

WSP
1200 PREMIER WAY THUNDER BAY (ONTARIO) CANADA P7B 0A3 www.wspgroup.com TEL: 807 625-6700 FAX: 807 623-4491

WSP REF. NO. 121-12538-01-8011

PROJECT: GREAT NORTH BIO ENERGY – WHITESAND F.N.

PROJECT NO.: 121-12538-01

TITLE: PELLET PLANT PROCESS BLOCK DIAGRAM WHITESAND F.N. – COGEN/PELLET PLANT

CLIENT DWG. NO.: B

FILE NAME: 121-12538-01-8011 REVA
LAST EDITED: 8/7/2014 4:34 PM

Neegan Burnside Ltd.