REV.	DESCRIPTION	DATE	PROJ.	EXE	CHECK.	APPR.
2	ISSUED	4/4/18	JPR	GMB	TEI	TEI
1	FINAL	7/31/16	JPR	GMB	TEI	TEI
0	FOR INFORMATION	6/6/16	JPR	GMB	TEI	TEI
A	PRELIMINARY	1/29/16	GMB	GMB	PLO	PLO

Pure Fonte Ltée

NORTH ATLANTIC IRON CORPORATION

PIG IRON PRODUCTION PLANT – FEASIBILITY STUDY
CUSTOMER Nº: 1821

tenova

TECHINT

TENOVA

TECHINT ENGINEERING & CONSTRUCTION

FEASIBILITY STUDY

SECTION 6

WORK BREAKDOWN STRUCTURE – WBS

ESC.: N/A

JOB: CD-335

REVISION 2

REVISION

SECTION CONTENTS

NOTICE

This document contains the expression of the professional opinion of TENOVA and TECHINT ENGINEERING AND CONSTRUCTION ("Tenova/TEIC") as to the matters set out herein, using its professional judgment and reasonable care. It is to be read in the context of the purchase order dated December 22, 2015 (the "**Agreement**") between Tenova/TEIC and NAIC (the "**Client**"), and the methodology, procedures and techniques used, Tenova/TEIC's assumptions, and the circumstances and constrains under which its mandate was performed. This document is written solely for the purpose stated in the Agreement, and for the sole and exclusive benefit of the Client, whose remedies are limited to those set out in the Agreement. This document is meant to be read as a whole, and sections or parts thereof should thus not be read or relied upon out of context.

Tenova/TEIC have, in preparing drawings, notes, specifications, calculations and estimates, as the case may be, followed methodology and procedures, and exercised due care consistent with the intended level of accuracy, using its professional judgment and reasonable care, and is thus of the opinion that there is a high probability that actual values will be consistent with the estimate(s). However, no warranty should be implied as to the accuracy of estimates. Unless expressly stated otherwise, assumptions, data and information supplied by, or gathered from other sources (including the Client, other consultants, testing laboratories and equipment suppliers, etc.) upon which Tenova/TEIC's opinion as set out herein is based has not been verified by Tenova/TEIC's; Tenova/TEIC makes no representation as to its accuracy and disclaims all liability with respect thereto.

The concepts, drawings, descriptions, and other information contained in this proposal are considered to be proprietary and are furnished solely for the exclusive use of Tenova/TEIC for the purposes of project evaluation or award of contract, and are not to be disclosed in any form whatsoever to any third party without the expressed written consent of Tenova/TEIC.

The party receiving this document warrants to Tenova/TEIC that they shall take all reasonable precautions to insure against any breach of confidentiality and will advise their employees who might have access to such Confidential Information of the confidential nature thereof. No Confidential Information shall be disclosed to any officer, employee or agent of either party who does not have a need for such information.

All information provided by Tenova/TEIC shall be considered confidential and intellectual property of Tenova/TEIC and likewise all information provided by the Client to Tenova/TEIC shall be treated in the same respect.

To the extent permitted by law, Tenova/TEIC disclaims any liability to the Client and to third parties in respect of the publication, reference, quoting, or distribution of this report or any of its contents to and reliance thereon by any third party.

REV.	DESCRIPTION	DATE	PROJ.	EXEC.	CHECK.	APPR.
2	ISSUED	4/4/18	JPR	GMB	TEI	TEI
1	FINAL	7/31/16	JPR	GMB	TEI	TEI
0	FOR INFORMATION	6/6/16	JPR	GMB	TEI	TEI
A	PRELIMINARY	1/29/16	GMB	GMB	PLO	PLO

Pure Fonte Ltée

PURE FONTE LTÉE
PIG IRON PRODUCTION PLANT – FEASIBILITY STUDY
CUSTOMER Nº: 1821

tenova

TECHINT

TENOVA

TECHINT ENGINEERING & CONSTRUCTION

SECTION 6 – WORK BREAKDOWN STRUCTURE

CHAPTER 6.1

WBS

3786-TARG-G-MI-000-002

ESC.: N/A | JOB: CD-335

REVISION 2

REVISION

SECTION CONTENTS

0	FOR INFORMATION	06/06/16	JPR	GMB	TEI	TEI
A	PRELIMINARY	29/01/16	GMB	GMB	PLO	PLO
REV.	DESCRIPTION	DATE	PROJ.	EXEC.	CHECK.	APPR.

NORTH ATLANTIC IRON CORPORATION

PIG IRON PRODUCTION PLANT - CLASS 2 FS

CUSTOMER Nº: 1821

TECHINT ENGINEERING & CONSTRUCTION

GENERAL OF THE PLANT

WORK BREAKDOWN STRUCTURE (WBS)

3786-TARG-G-MI-000-002

ESC:	JOB:	REVISION
XXX	CD-335	0

PIG IRON PRODUCTION PLANT - CLASS 2 FS

Item	Area	Subarea	Description	Comments
			Pig Iron Production Plant	
	0		**General of the Plant**	
	0	00	General	
	0	05	Parking Area	
	0	10	Fences & Walls	
	0	15	Fire Fighting System	
	0	20	Environmental Processes	
	0	25	Main air compressor plant	
	1		**Iron Ore Pellets Receiving Area**	
	1	00	General	
	1	05	Iron Ore and Coal Pipe Conveyor from Port to Plant Storage	
	1	10	Coal Railroad (Future)	
	1	15	Train Car Tilting station and Receiving Hopper (Future)	
	1	20	Horizontal/Inclined conveyor for Coal from Hopper to Plant Storage	
	1	25	Operation Control System (Electr/Instr/Autom.)	
	1	30	Belt conveyor	
	2		**Iron Ore Pellets Dome Area**	
	2	00	General	
	2	05	Operational Control System (Electr./ Instr./ Autom.)	
	2	10	Dome	
	3		**Material Handling**	
	3	00	General	
	3	05	Operation Control System (Electr/Instr/Autom.)	
	3	10	Screening Tower	
	3	15	Screening Machine	
	3	20	Belt Conveyor to Fine Silo	
	3	25	Reversible conveyor	
	3	26	Flexible side wall conveyor - Fines	
	3	27	Fines Silo	
	3	30	Coating System	
	3	35	Belt Conveyor to Shutler Conveyor	
	3	40	Shutler Conveyor to Surge Bin	

PIG IRON PRODUCTION PLANT - CLASS 2 FS

Item	Area	Subarea	Description	Comments
	3	45	Surge BIn Weigh-belt Feeders	
	3	50	Belt Conveyor to DRI	
	3	55	Surge Bins	
	3	60	Flexowll conveyor	
	3	65	Return belt conveyor	
	3	70	Pig iron conveyor	
	3	71	Fluxes silos	
	3	72	Flux flexowell	
	3	73	Flux conveyor	
	4		**DRI Fines Briquetting Plant**	
	4	00	General	
	4	05	Control Room	
	4	10	Storage Silo Battery for Fines Iron Ore, Bentonite and Weigh-belt Feeders	
	4	15	Flexible Side Wall Conveyor for Raw Material from Silos to Mixer	
	4	20	Bentonite Truck dump station and hopper	
	4	25	Molasse Tank, Header, Pump and Piping	
	4	30	Mixer System	
	4	35	Cold Briquetting Machines System	
	4	40	Belt Conveyor for Cold Raw Material Briquettes	
	4	45	Oscillating Screen for Briquettes	
	4	50	Flexible Side Wall Conveyor forBriquettesl from Silos to RHF	
	4	55	Flexible Side Wall Conveyor for Fines from Silos	
	5		**DRI (Direct Reduction Iron) Area**	
	5	00	General	
	5	05	Operational Control System (Electr./ Instr./ Autom.)	
	5	10	DRI Stock Area	
	5	15	Reactor Charging	
	5	20	Reactor discharging	
	5	25	Reactor	
	5	30	HDRI Transport System	
	5	35	CO_2 Absortion System	
	5	40	Natural Gas Conditioning	
	5	45	Reduction Gas Circuit	
	5	50	Process Gas Heater	
	5	55	Steam System	
	5	60	Cooling Gas Circuit	
	5	65	Air Compressor Plant	
	5	70	Flare System	

PIG IRON PRODUCTION PLANT - CLASS 2 FS

Item	Area	Subarea	Description	Comments
	6		**EAF (Electric Arc Furnace) Area**	
	6	00	General	
	6	05	Control Room	
	6	10	EAF Operational Control System (Electr./ Instr./ Autom.)	
	6	15	Storage Silo Battery for DRI Weigh-belt Feeders	
	6	20	Storage Silo Battery for Lime & Dolomite Weigh-belt Feeders	
	6	25	Electrical Arc Furnace (EAF)	
	6	30	Liquid Iron Handling	
	6	35	Ladle Preparation Area	
	6	40	Furnace Shell Preparation Area	
	6	45	Electrode Preparation Area	
	6	50	Ferroalloys & Aditives Utilities	
	6	55	Tapping Car with Weighing System	
	6	60	Hot Metal Ladles	
	6	65	Slag Handling Service Plant	
	6	70	Scrap Handling	
	6	75	De-Sulfurization Station System	
	6	85	Dedusting System	
	6	90	Laboratory	
	6	95	Central Maintenance	
	7		**Continuous Pig Casting Plant**	
	7	00	General	
	7	05	Control Room	
	7	10	Operational Control System (Electr./ Instr./ Autom.)	
	7	15	Pig-Casting Machine System	
	7	20	Pig Iron Receiving Wagons (Future)	
	7	25	Final Product Stock Area	
	7	30	Final Product Handling	
	8		**Auxiliary Services Utilities**	
	8	00	General	
	8	05	CCO - Energy & Utilities Operational Control Center	
	8	10	Natural Gas Conditioning Plant	
	8	15	Natural Gas Distribution	
	8	20	Air Separation Plant	
	8	25	Water Treatment Plant - General	
	8	30	WTP - Industrial	
	8	31	WTP - Industrial Direct	
	8	32	WTP - Industrial Indirect	
	8	35	WTP - Potable	
	8	40	WTP - Firefighting	
	8	45	WTP - Demineralized Water Plant	

PIG IRON PRODUCTION PLANT - CLASS 2 FS

Item	Area	Subarea	Description	Comments
	8	50	Waste Water Treatment Plant - General	
	8	55	WWTP Domestic	
	8	60	WWTP Industrial	
	8	65	Steam Distribution	
	8	66	Air Plant	
	8	67	Oxygen	
	8	68	Nitrogen	
	8	70	Pipe Rack	
	8	80	Substation Yard - Main	
	8	85	Substation Yard - Secondaries	
	8	90	Slag Handling Service Plant	
	8	95	Primary Scrap Area	
	8	96	Diesel fuel gas station	
	8	97	Cranes & Hoists	
	8	98	Fumes treatment plant	
	8	99	Sanitary & surface water treatment	
	9		**Administration and Ancilary Facilities**	
			Administration and ancilary zone is out of scope and will not be shown on this list.	
	9	00	General	
	9	05	Main Access Area	
	9	10	Main Office / Administration Offices	
	9	15	Medical Care	
	9	20	Main Restaurant	
	9	25	Main Dressing Room	
	9	30	Recreational Areas	
	9	35	Warehouses	
	9	45	Truck Control Area	
	9	50	Road Scale	
	9	55	Radiation Detector at the Gate	
	9	60	Fuel / Gas Station	
	9	65	Air Conditioning System	
	9	85	Security / HSEC / Fire Brigade	
	9	90	Utilities	

REV.	DESCRIPTION	DATE	PROJ.	EXEC.	CHECK.	APPR.
2	ISSUED	4/4/18	POB	POB	GMB	TEI
1	FINAL	7/31/16	POB	POB	GMB	TEI
0	FOR INFORMATION	5/19/16	POB	POB	GMB	TEI
B	FOR APPROVAL	04/12/16	POB	POB	GMB	TEI
A	PRELIMINARY	2/25/16	ZAH	ZAH	GMB	PLO

Pure Fonte Ltée

PURE FONTE LTÉE

PIG IRON PRODUCTION PLANT – FEASIBILITY STUDY
CUSTOMER Nº: 1821

tenova

TECHINT

TENOVA

TECHINT ENGINEERING & CONSTRUCTION

SECTION 6 – WORK BREAKDOWN STRUCTURE

CHAPTER 6.2

PROJECT ENGENEERING EXECUTION PLAN

3786-TARG-G-PR-000-004		REVISION 2
ESC.: N/A	JOB: CD-335	REVISION

CONTENTS

FIGURES AND REFERENCES

6.2 Project Engineering Execution Plan

6.2.1 Objective

The objective of this document is to define the special Engineering Procedure valid for the Class 2 FS (Conceptual design) of the Project defined as Greenfield PIG IRON PRODUTION PLANT for the North Atlantic Iron Corporation (NAIC).

The pig iron plant will use a traditional integrated pig iron production route consisting of an Iron ore pellets Receiving Area, an Iron Ore Pellets Storage Silo, a Briquetting Plant, a DRI (Direct Reduced Iron Reactor) Area, an EAF (Electric Arc Furnace) Area and a Continuous Pig Casting Plant.

6.2.2 Project Scope

The Project includes the development of all the necessary activities for the preparation of the technical documentation involved in the Conceptual Design (Class 2 FS) of a PIG IRON PRODUCTION PLANT, developed under the direct reduction (DRI) process for the production of pig iron.

The location of the PIG IRON PRODUCTION PLANT is in PORT SAGUENAY, QUEBEC, CANADA.

The facility utilizes a DRI reactor in order to reduce the iron ore pellets into DRI which then are melted in an Electric Arc Furnace for the production of 425,000 tons per year of saleable pig iron, with the plan to have a possible expansion of the production in the future to 850,000 tons per year.

6.2.3 Project Description

Official Name of the project: CD335 - PIG IRON PRODUCTION PLANT
Project identification:
Client: NORTH ATLANTIC IRON CORPORATION (NAIC).
Client's number: 1821 Techint internal number: 3786
Implantation site: Port Saguenay, Quebec, Canada.

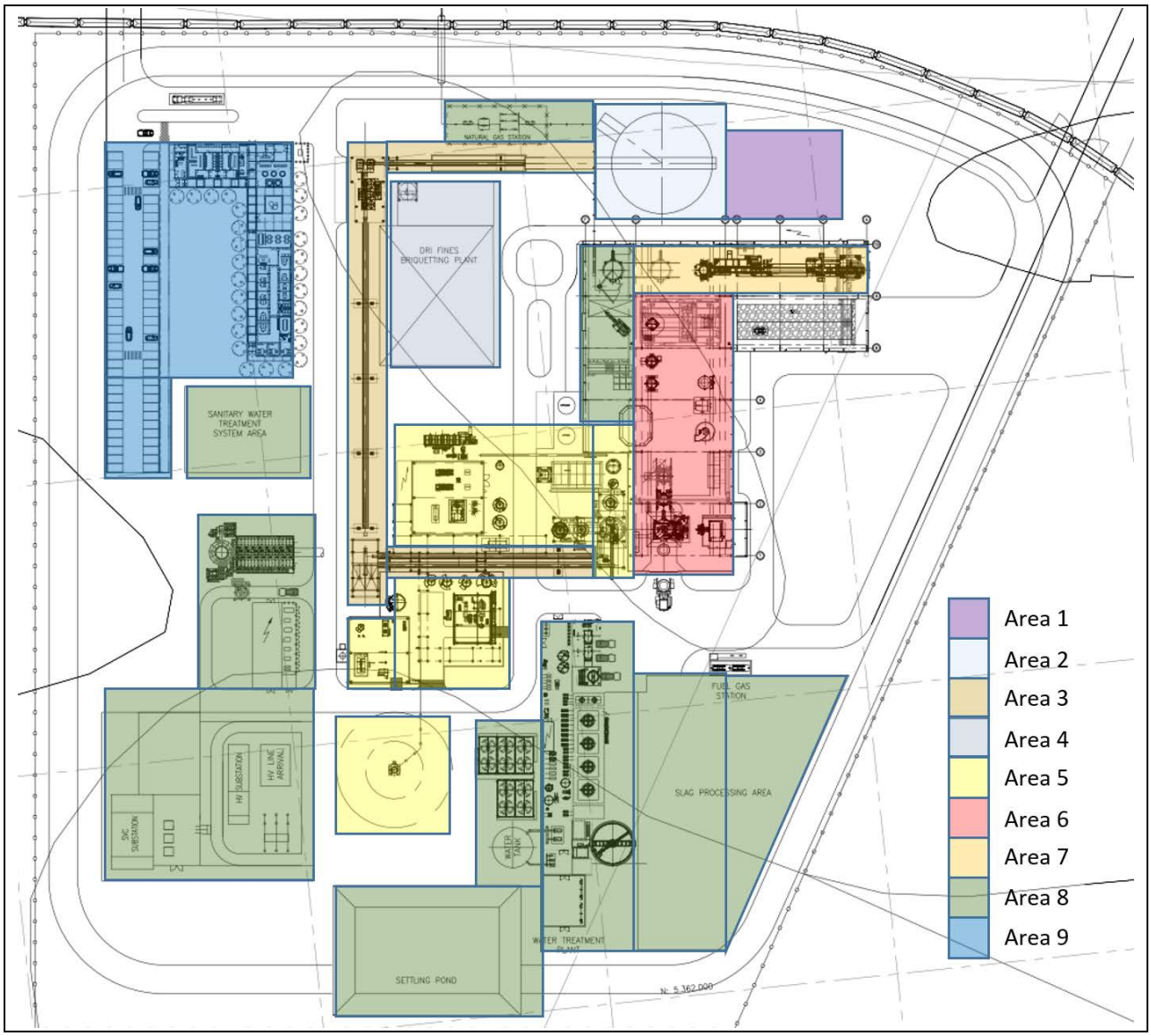

Figure 6.2-1.: Graphical identification of the project areas

Plant Description by AREAS

The Pig Iron Production Plant of North Atlantic Iron Corporation can be divided in seven main operating areas (Areas 1 to 7) and two areas for additional equipment and facilities (Areas 8 & 9).

1. Iron Ore Pellets Receiving Area

The iron pellets will travel by boat on the Saguenay River (Rivière Saguenay) and get to the dock of Port Saguenay, about 10 miles east of the town of Saguenay, QC. The ship that will transport iron ore pellets will be self-unloading bulk carriers. The carrier will deliver materials on the dock for truck transportation - option 1, used for the capex of this FS - or onto a Pipe Conveyor (CV-105-01) that will convey it for about 2.4 km (1.5 miles) to the west and deliver the iron ore pellets to the Transfer Tower (TT-105-01) located at the beginning of the Storage Area – option 2, to be evaluated for investment by APS.

2. Iron Ore Pellets Storage Area

The material will be transferred into the Silo Dome (SB-220-01) by means of a belt conveyor.

The Storage Silo will have a diameter of 36,5 m and a capacity of 35000 Tn. This silo will be a concrete thin shell dome.

The reclaiming conveyor CV-320-01 reclaims the material from the silo dome and discharge it in the handling area feeding the screens located at the screening tower ST-301-01.

3. Material Handling Area

The iron ore pellets arrive to the Screening Tower ST-301-01 and feeds the two screening equipment ST-315-01/02.

After the screening stage the iron ore pellets will be conducted to the belt conveyor CV-330-01 to the coating system, while the fines segregated by the screenings will be sent by means of the flexowell CV-326-01 to the fines silo (SL-330-01). This fines then will be sent to the briquetting plant for recuperation of all the material below 3.2 mm.

After the coating stage the iron ore pellets will be transported by the belt conveyor CV-335-01 and discharged on the reversible belt conveyor CS-340-01 that feeds the surge bin SB-355-01/ 02/ 03.

The material stacked in the surge bins will be then loaded on the DRI reactor. By means of the belt conveyor CV-350-01 the material is conducted to the flexowell CV-510-01 feeding the DRI reactor.

4. Briquetting Plant

The Briquetting plant will be Built, Own and Operated by a third party, so it is not objet of this FS as engineering and capex, but only considered into the Opex calculation. It has to be remarked that the briquetting plant will recover screened fines below 3.2 mm, dust recovered from the hoppers of the pulse-jet baghouse and dried filter cake dust proceeding from the WTP. The BP will be located so that the silo (SL-330-01) for pellets fines will be integral to the BP plant, while the rest of the material to be processed into the BP will get to it by internal truck transportation

5. DRI (Direct Reduced Iron) Reactor Area

The flexowell CV-510-01 takes the material to the upper part of the DRI reactor tower feeding the Iron Ore Pellets loading bins. This bins then feeds the Iron Ore Pellets Pressurized Bins through a system composed by valves and locks. Finally these pressured bins discharged the material into de DRI reactor. The DRI reactor feeds the EAF with Hot DRI by gravity with a chute angled about 60 degrees.

6. EAF Area

Molten metal from the EAF will be tapped about every two hours in a Hot Metal Ladle LA-630-01/02/ 03/ 04/ 05 located on a Tapping Car LC-630-01/ 02 equipped with weighing system.

Hot metal ladles will have a capacity of 120 metric tons (of Liquid Steel) and it is foreseen to have a maximum of four ladles in operation and two ladles in maintenance, for a total of five ladles.

EAF may need, depending on the chemistry and metallurgy of the briquettes, some lime, dololime and bauxite for creating the right slag for the process; these fluxes will be stored in Silos SL-620-01/ 02/ 03 inside the EAF building. Each silo will deliver weighed material to a belt transportation system that will convey these fluxes into the same chute of the hot DRI. Feeding the EAF with DRI already mixed with fluxes n the chute provides additional benefits to the process, and that is the reason why a single chute has been preferred to multiple chutes

An overhead crane OC-630-01will be needed to handle the hot metal ladles from the tilting car to the de-sulfurization station, and to the ladle reconditioning and ladle heating and waiting area, as well as to the pig casting area. A Hot Metal Ladle Heater LH-635-01 will be needed to keep hot ladles in temperature before tapping operation. One Hot Metal Ladle Dryer LD-635-01 will be installed to dry-out the new refractory of a ladle after relining in the ladle refractory area. A Ladle Refractory Station LS-635-01 equipped with a jib crane will be needed to handle bricks for relining.

A Bucket SB-670-01 will be needed in order to charge into the EAF some cold IO pellets for the first heat of each campaign, to create a pool of liquid metal needed for a smooth start of the melting process. This operation will only be needed once per EAF refractory campaign. Such campaign is expected to be lasting about four weeks.
EAF will produce about 40 tons of slag per heat, approximately 20 tph. That slag will fall into Slag Pots (eight units) SP-665-01 equipped with a Slag Pot Carrier for transport to the Slag Yard by an independent third party.
Slag processing will be a service delivered by a specialized service company, as customary in the industry. The area of Saguenay has already service companies that are rendering the same services to the aluminum industry. So this FS does not consider the slag processing as part of the engineering and capex for the project, but only the Opex for such service.

7. Continuous Pig Casting Plant

Pig Iron will be produced continuously in a one strand Pig Casting Machine (PC-715-01) with a capacity of 100 tph. The pig casting machine will discharge on the floor, where a front end loader will pick it up and move it to the nearby covered stockpile for the pig iron to cool down in a controlled environment, away from the elements, to prevent surface oxidation and degradation. The pig iron storage will be divided in different areas, where different grade of pig iron can be separated in independent stockpiles

8. Auxiliary Services Utilities

The Bag Filter (BF-685-01), or pulse-jet Bag House (BH) for the EAF off-gases and off-gasses collected from the canopy above the EAF and above the pig casting machine will be located at a defined distance from the EAF. The distance is calculated so that the off gas from the EAF (primary off gas) is initially cooled in the EAF cooled ducts and suffers a further temperature drop along the way to the baghouse. The Fumes Treatment Plant (FTP) is equipped with a Drop Out Box (DOB), the BH, and a Dust Silo (DS) equipped with a bottom funnel to load dedicated dust trucks that transport the dust to Area 4.
A Water Treatment Plant (825) is be needed for direct and indirect water cooling lines for the Area 5, 6 and 7.
An Electrical Substation (880) is be located in a position such to minimize the installation of heavy copper cables. In fact, the motors of the BH will be the users with the highest current load (at low voltage), more than the EAF transformer, which has a higher active power, but it is fed at medium voltage, so that the current amount is less than the one feeding the BH motors. The HV line arrival is assumed to be installed and paid for by the utility company, in this case HQ, that will build the electrical line from the nearby 161kV network node to the premises of NAIC. This FS considers as battery limit the arrival of the 161 kV HV line to the entrance of the substation.

The gasses storage tanks – Nitrogen Storage Tank (UT-500-03), Oxygen Storage Tank (UT-500-01) and Argon Storage Tank (UT-500-02) – are not part of this FS as engineering items and capex items, since the gasses will be delivered by an industrial gasses company that will install the tanks of the required volume and charge NAIC for the use of gas, as customary in the industry for relatively low usage plants.
The NG Receiving Station (810) is also out of the scope of this FS, because it is assumed to be installed by the utility company, Gaz Metro in this case, that will bring 10" pipe line into the premises of NAIC lot and provide a safety shut-off valve, a metering unit and a pressure reducer unit. The battery limit I assumed the flange at the end of this group of units installed and paid for by GM.
Maintenance areas, Spare Parts Storage Area are considered part of the Auxiliary Services area.

9. Administration and Ancillary Facilities
There will be areas for building and facilities, which will include Main Office Building, Main Parking Lot, Canteen, Locker Room, Entrance to the plant (Gate) with Truck Scale.

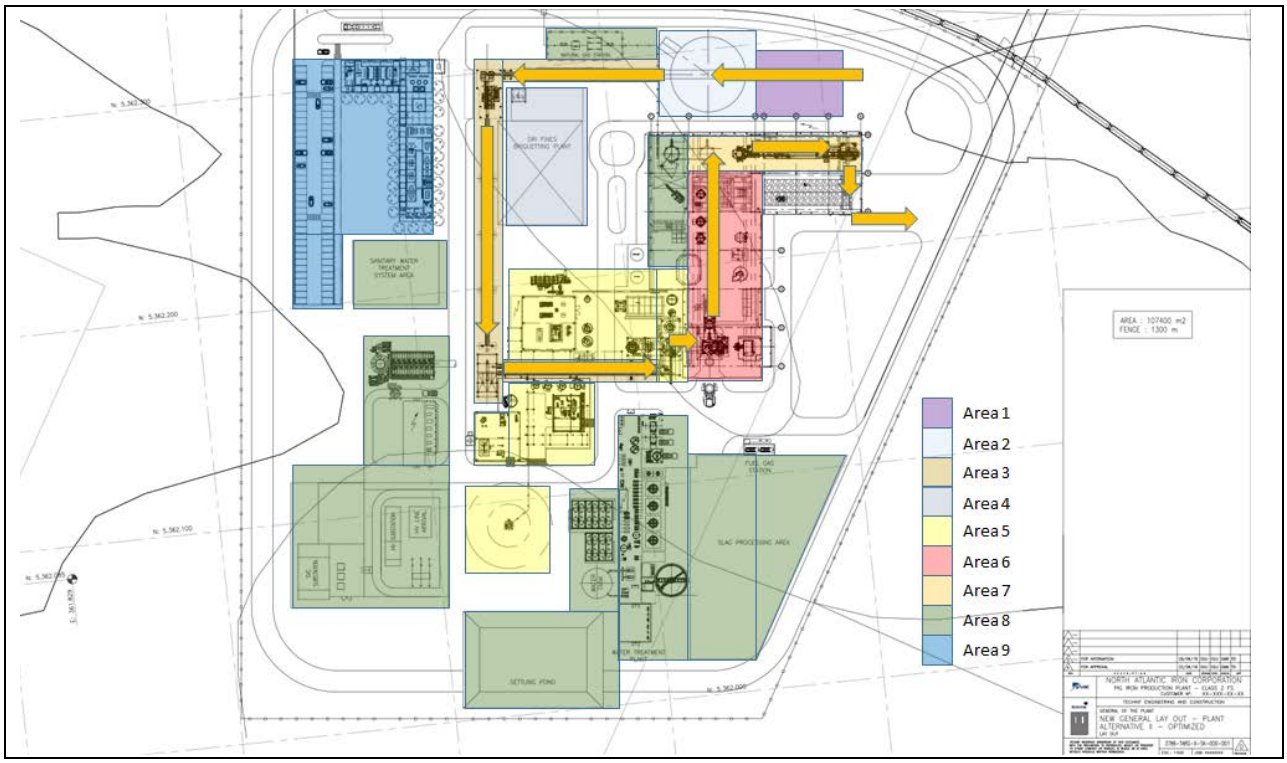

Figure 6.2-2.: process flow through the areas of the plant

6.2.4 Engineering Scope

The Conceptual Engineering Design consisted of developing the following products:

- The Pig Iron Plant basic configuration;
- Work Breakdown Structure (WBS)
- The Engineering Conceptual Design, including:
  - design criteria for all disciplines;
  - time schedule;
- Mechanical
  - Material Requisitions (including Data Sheets and Technical Specifications): Compressed Air System, Service Gas Station, Fire Fighting & Detection System.
- Layouts and equipment configuration
  - Layouts and General Arrangements
  - Areas Layouts
  - Mechanical Equipment List
- Civil
  - Foundation Layout (by area)
  - General paving layout
- Material Take Off (MTO)
- Principal Equipment Foundation and Principal Building Foundation Calculations

6.2.5 MTO criteria

6.2.5.1 Criteria for Civil MTO

The cleaning and grubbing of the site, removal of organic soil and leveling with the addition of material from an external source, will be performed by a third party.
Site is supposed to be delivered in proper conditions, meaning leveled and treated, to allow foundation works. Therefore, site preparation works are considered out of scope and will not be included in the MTO.
Massive excavations will be differentiated between soil and rock.
Trench excavations for underground services will be performed mostly in soil; trench rock excavations will be reduced to a minimum.
Massive and trench backfills will be calculated separately, and also considering the different materials used; quantities will be in cubic meters after compaction.
Geotextiles and geo-membranes will be in square meters, including required overlapping.
Sanitary sewage outside the buildings and storm water sewage will be included in this MTO, piping in meters and septic tanks and sewages in units.
Other civil installations required for underground services will be estimated, like duct banks (earthworks, concrete and filling in m3), concrete channels in lineal meters and trenches in m^3, and concrete manholes and pull boxes in units.
Other items that will be estimated are roads and parking in m^2, guardrails in linear meters, fences in linear meters and gates in units, sidewalks in m^2 and superficial finishing.

6.2.5.2 Criteria for Concrete MTO

All quantities in this MTO will be divided into the main areas of the project.
Different types of concrete structures and foundations will be measured in cubic meters.
Formwork, steel reinforcement and embedment shall be included in the price.
Anchor bolts will be estimated in kg; indication of diameter and length is out of scope.
Waterproofing and thermal insulations will be estimated in square meters.
Excavations in soil and in rock will be differentiated and measured in m^3.
Backfills will be calculated separately for the different materials used; quantities will be in m^3 after compaction.

6.2.5.3 Criteria for Piping MTO

Piping Material Take Off will be made considering length of pipes in meters, fittings and valves per unit, and supports will be considered as 10% of the pipes weight.

Note: MTO's do not include allowances or surplus, which are considered in the capex count according to the industry standards of project execution for Quebec

Piping engineering includes the definition of :

- Piping class (included in Design Criteria)
- Principal Areas Pipe Routing layout
- Material Take Off (MTO)
- Preliminary list of utility lines

6.2.5.4 Criteria for Instrumentation MTO

The Instrumentation and Control scope of supply includes all the instrumentation that is not included on the technological packages and the materials needed to install them. For technological packages that provide instrumentation, all the materials needed to install this instrumentation are also provided, wherever indicated. The Process & Safety Control System as well as the integration of the different technological packages control systems to it is also included; the Communication, CCTV and Access Control Systems are included.
Instrumentation MTO can be divided in two categories:

- Installation Material MTO: Includes all accessories for instruments installation and cabling, and electrical and mechanical materials. Cable trays and mechanical and electrical accessories will be estimated in units and conduits and tubing will be estimated in lineal meters.

- Cable MTO: Includes all cables for instruments installation, communications and optical fiber and will be estimated in lineal meters

6.2.5.5 Criteria for Electrical MTO

Electrical engineering for this FS include the following:

- Single Line Diagrams
- Main equipment preliminary short circuit calculations
- Electrical Equipment List
- Electrical Cabling and Conduits MTO
- Cable routing layout

Electrical Material Take Off will be divided in four categories:

- Installation Materials MTO: Includes all necessary accessories for the main wirings for equipment and motors. Cable trays and accessories will be estimated by unit and conduits by linear meters.

- Grounding MTO: Includes all the materials for grounding grid, equipment, structures and foundations grounding. Accessories will be estimated by unit and cables by lineal meters.

- Lighting MTO: Includes all main materials for general, vial and located lighting. Lighting fixtures and accessories will be estimated by unit.

- Cable MTO: Includes all cables for power installations (low and medium voltage), control and instrumentation (only RTD). Accessories will be estimated by unit and cables by linear meters.

6.2.5.6 Criteria for Structural MTO

Structural engineering for this FS include the following:

- MTO
- Preliminary structural design sketches

Structural MTO will be divided in the following categories:

1) Structural Steel [ton]
   a. Light (<30 kg/m) [ton]
   b. Medium (<60 kg/m) [ton]
   c. Heavy (<90 kg/m) [ton]
   d. X-Heavy (>90 kg/m) [ton]
   e. Loose Plates [ton]
2) Miscellaneous Steel [ton]
   a. Handrails [m]
   b. Caged Ladders [m]
   c. Stairs [m]
   d. Gratings [m^2]
   e. Checkered Steel Floor Plate [m^2]
3) Claddings [m^2]
   a. Single Panel (steel sheet) [m^2]
   b. Composite Roof Panel [m^2]
   c. Composite Wall Panel [m^2]

Notes: Weights are in metric tons.
All steelworks are considered to be coated to the extent of capex calculation (painted or galvanized, as per customary in the region of Quebec where NAIC will install the plant).
Steelworks shall be provided fully functional with all necessary components required for final installation, as bolting and fastening, welding consumables, seals (metallic or plastic), flashing and trims. These items are not included in MTO, but shall be considered by Steel Supplier for its quotation and provision. These items shall not be quoted separately. These items measures (weights or lengths) shall not be considered extras.
Calculation of weights: unless otherwise specified, for contracts stipulating a price per ton for fabricated structural steel that is delivered and/or erected, the quantities of

materials for payment shall be determined by the calculation of the gross weight of materials as shown in the Shop Drawings.
The weights of shop or field weld metal and protective coatings shall not be included in the calculated weight for the purposes of payment.
The weights of standard structural shapes, plates and bars shall be calculated on the basis of Shop Drawings that show the actual quantities and dimensions of material to be fabricated, as follows:

(a) The weights of all standard structural shapes shall be calculated using the nominal weight per meter and the detailed overall length.

(b) The weights of plates and bars shall be calculated using the detailed overall final configuration and dimensions.

(c) When parts are cut from standard structural shapes, leaving a non-standard section that is not useable on the same contract, still the weight shall be calculated using the nominal weight per meter and the detailed overall length.

(d) Deductions shall not be made for material that is removed for cuts, copes, clips, blocks, drilling, punching, boring, slot milling, planning or weld joint preparation.

Structural Steel includes beams, columns, trusses, bracings, runway girders, base plates, etc.

Girts and purlins are included in light structural steel.

Grating shall be galvanized serrated, 30x100 mesh, 32x5 bearing bar, 15x2 serrated cross bar.
Stairs length indicated correspond to their vertical projection. Stringers, handrails and treads are included (stair case not included).

Stair treads shall be galvanized serrated, with Checker Plate Nosing.

Claddings single steel sheet shall be trapezoidal ZINCALUME®, BWG 25 (0,51mm).
Flashings, Trims and Eaves shall be ZINCALUME®, BWG 22 (0,71mm).

All claddings and flashings shall be pre-painted.

Structural MTO is net quantity and do not include surplus (losses and margins of fabrication process, installation and rework assembly). MTO does not include bolting and welding consumables. MTO does not include flashing, trims and eaves. The extra amounts needed for construction and project execution are to be considered in the capex calculation as a percentage of the MTO, as customary for this type of FS

All joint penetration welds (connections and slices) shall be 100% radiographed.
Equivalent welded shapes are permitted, only for profiles depth more than 300 mm.

6.2.5.7 Criteria for Vessel MTO

Vessel engineering for this FS include the following:

- Silos and ducts MTO
- Material Requisition and Data Sheet for Fumes Extracting Hoods and Fire Fighting System

Vessels Material Take Off will be made considering ducts by their length, diameter and weight, and Silos by unit.

6.2.6 Project Organization

6.2.6.1 Manual of Project Procedure (MPP)

The information in current procedure, in addition to those listed below, is complemented with the following reference documents:

1) WI-ENG-G02: Execution of documentation.

6.2.6.2 Project Organizational Structure

All required activities for development of technical documentation (e.g.: lay out definitions, design criteria, etc.) have been be carried out in the Tenova offices in Pittsburgh Pa and in the Buenos Aires, Argentina offices pf TEIC.

The Capex and environmental activities have been carried out in the Montreal, Quebec offices of SNC Lavalin

The Opex calculations have been carried out in the Pittsburgh, PA offices of Tenova.

6.2.7 Project Control

The project has been monitored by Techint and Tenova Project and Engineering Managers and assisted by its departments.
Periodically, Techint and Tenova Project and Engineering Managers have organized and carried out Coordination Meetings, in order to discuss, put in common and record several topics associated with the project progress. These meetings have involved NAIC and SNC Lavalin and have discussed the following topics:

1) Management indicators
2) Design verifications and reviews
3) On hold points
4) Client comments
5) Control of preliminary input data for design

6.2.8 Language and Units

6.2.8.1 Language

English is defined as official project language. All official documentation for this FS has been developed in English. Further translation into French will have the character of information only

6.2.8.2 Units

The units of measurement system adopted are the ones as per the SI, except those cases that are widely established by practice, such as the use of US Units for the diameter and length of screws/bolts, and for the diameter of pipes, connections and ducts, among others.

6.2.9 Engineering deliverables

6.2.9.1 Deliverables execution

The standard WI-ENG-G02 governs with the following explanations.
Both initial and final drawings and technical documents in the scope of supply shall be issued in electronic files compatible with:

1) AutoCAD for 2D projects.
2) MS Office.

Document Formats are attached to this document (see below).

6.2.9.2 Deliverables issuing

The Engineering Sector that completes the execution of a document sends the original drawing to TEIC's Engineering Manager for its issuance. The label should have issuance date, submission purpose, revision state and corresponding signatures. The submission purpose should be exclusively limited to one of the following:

INTERNAL Its objective is to add several comments or points of view from the different engineering disciplines. This issuance is inside de OT. This process occurs previous to send the deliverable to the client, and it doesn't mean any progress to the official project documentation.

PRELIMINARY: When the delivery is ahead to illustrative title, for comments, etc., with the intention to complete or replace it later on. It is applied to the documentation for offers, alternative analysis, information advance, etc.

FOR APPROVAL: When Client or entities approval with supervision authority is required.

FOR INFORMATION: When a deliverable is released for information, because it has the required approvals or it does not require them. The Client may comment on any element that had not previously been subjected to its approval in any deliverable issued for information; these observations must be performed within five business days of receiving the deliverable.

FINAL ISSUE: when the deliverable has been approved and no further modification is needed. For the "Development Phase" an emission "FOR DESIGN" could be submitted in some deliverables in place of "FINAL ISSUE"

CANCELLED: When a deliverable issued for approval or for any other purpose is no longer valid (the original is stored in file, and copy is distributed to those who have received previous emissions).

6.2.9.3 Deliverables approval

APPROVED: Implies conformity with the conceptual bases and general lineaments of the document, which is released for construction, without exempt of contractor´s responsibilities.

APPROVED WITH COMMENTS: It is equal to "approved", as long as it fulfills all indicated comments. The originator shall incorporate all the comments before making copies for resubmission (Minor Comments).

REJECTED: It should contemplate all the objections thoroughly; the contractor should save them and present the document again for approval. (Major Comments).

6.2.9.4 Client's approval deadline

Once a document has been issued, NAIC has been given 5 (five) business days for comments and approval or rejection of the documents, has diligently performed these activities in the requested timeframe

6.2.9.5 Measuring physical progress by elaborate

The tool measuring physical progress of Engineering has been the Documentum software. It has been charged to this program the necessary information to monitor project progress.
The program of the Progress Report Documentum considers the different levels through which they pass the documents to their final issuance. The table below shows the percentage of progress (physical progress) set for each case.

Emission Type	Percentage of Advance
Internal	30%
Preliminary	50%
For Approval	70%
For Information	100%
For Design	100%
Final Issue	100%
Canceled	100%

Table 6.2-1.: percentage of progress for document monitoring phase

6.2.10 Project Nomenclature

The WI-ENG-G02 TEIC corporate document applies and governs this FS. A document must not be reissued with the same revision and must not re-use numbers of drawings that have been cancelled. Documentation with multiple sheets, each sheet has an independent revision state that is shown in the index. Partial issues are made up of the front sheet, index and the involved sheets.

6.2.11 Codes Standards and Regulations

The services are executed in accordance with Canada federal, state, and municipal laws and regulations. In case of any conflict, the strictest rule should prevail. In the absence of Canadian standards, international regulations shall be adopted. Alternatively, regulations and technical standards from other Canadian or foreign organizations may be adopted, after Client's approval. The Appendix II to this FS presents the list of codes and standards adopted for each discipline.

6.2.12 Cover and label

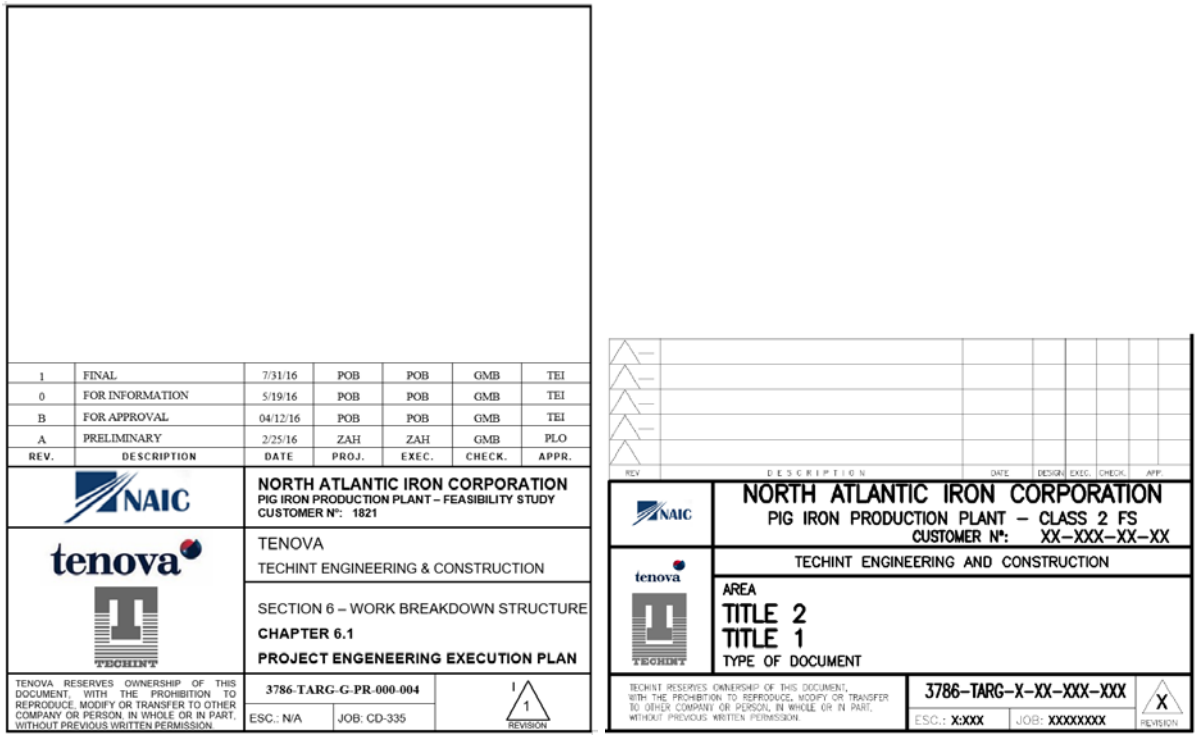

Figure 6.2-3.: templates for cover and label applied to this FS