



**TOGETHER**  
*for a sustainable future*

## OCCASION

This publication has been made available to the public on the occasion of the 50<sup>th</sup> anniversary of the United Nations Industrial Development Organisation.



**TOGETHER**  
*for a sustainable future*

## DISCLAIMER

This document has been produced without formal United Nations editing. The designations employed and the presentation of the material in this document do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations Industrial Development Organization (UNIDO) concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries, or its economic system or degree of development. Designations such as “developed”, “industrialized” and “developing” are intended for statistical convenience and do not necessarily express a judgment about the stage reached by a particular country or area in the development process. Mention of firm names or commercial products does not constitute an endorsement by UNIDO.

## FAIR USE POLICY

Any part of this publication may be quoted and referenced for educational and research purposes without additional permission from UNIDO. However, those who make use of quoting and referencing this publication are requested to follow the Fair Use Policy of giving due credit to UNIDO.

## CONTACT

Please contact [publications@unido.org](mailto:publications@unido.org) for further information concerning UNIDO publications.

For more information about UNIDO, please visit us at [www.unido.org](http://www.unido.org)

RESTRICTED

19025

DP/ID/SER.B/688  
6 June 1991  
ORIGINAL: ENGLISH

1394  
1991  
1991

ASSISTANCE TO GUYANA MANUFACTURE'S ASSOCIATION LTD.

SI/GUY/90/801

GUYANA

Terminal Report \*

Prepared for the Government of Guyana  
by the United Nations Industrial Development Organization,  
acting as executing agency for the United Nations Development Programme

Based on the work of Paul Hayes  
Wood Processing Industries Consultant

Backstopping officer: R.M. Hallett  
Industrial Management and Rehabilitation Branch

United Nations Industrial Development Organization  
Vienna

---

\* This document has not been edited.

V.91-25329

TABLE OF CONTENTS

	Page
1. INTRODUCTION	1
2. EXISTING STATUS OF THE FIDU	4
3. STATUS OF THE GUYANESE WOOD PRODUCTS INDUSTRY	13
4. THE DEVELOPMENT AND BASIS OF THE PROPOSED SERVICES	21
5. RECOMMENDATIONS	30
6. SUMMARY	36
<b>ANNEXES</b>	
1. JOB DESCRIPTION	38
2. EQUIPMENT/MACHINERY STATUS REPORT	41
2.1 TOOL SHARPENING CENTRE - CURRENT EQUIPMENT STATUS REPORT	44
2.2 LABORATORY EQUIPMENT STATUS REPORT	48
2.3 EQUIPMENT LIST FOR WOOD RESEARCH AND UTILIZATION LABORATORY	50
3. EXPLANATION NOTES ON "APPRAISAL OF CURRENT FIDU STAFF"	53
4. EXPLANATORY NOTES ON OPERATION CAPACITY AND MANNING CALCULATIONS	60
4.1 ESTIMATED PRODUCTION CAPACITIES	61
4.2 MANNING LEVELS DIRECT LABOUR - MANNING REQUIREMENTS	62
5. ESTIMATED PRODUCTION COSTS AND PROFITS PROJECTIONS EXPLANATION ON BASES OF COST CALCULATIONS	64
5.1 ESTIMATED PRODUCTION COSTS	65
5.2 TENTATIVE ANNUAL PROFITS PROJECTION	68
6. "WOOD PRODUCTS CENTRAL SERVICES" - REHABILITATION SCHEDULE/COSTS	70
7. FIDU PROPOSED ORGANIZATION CHART	72
8. FIDU PROPOSED SALARY STRUCTURE AND BENEFITS GUYANESE DOLLARS PER MONTH	73

9.	PROPOSAL TO POTENTIAL PRIVATE SECTOR INVESTORS IN "WOOD PRODUCTS CENTRAL SERVICES LIMITED"	74
10.	DRAFT MEMORANDUM AND ARTICLES OF ASSOCIATION	82
11.	DRAFT AGREEMENT BETWEEN THE GOVERNMENT OF THE COOPERATIVE REPUBLIC OF GUYANA AND THE GUYANA MANUFACTURERS ASSOCIATION LTD. ON THE FORMATION OF A NEW COMPANY: "WOOD PRODUCTS CENTRAL SERVICES LTD."	99
12.	EXISTING AND PROPOSED SITE LAYOUTS	102
13.	QUOTES AND CORRESPONDENCE	105
	13.1 QUOTES FOR CENTRALIZED BOILER	107
	13.2 ESTIMATE FOR REPAIRS AND NEW WORKS	129
	13.3 SURVEY AND VALUATION REPORTS	132

## 1. INTRODUCTION

1.1 The Consultant P.R. Hayes arrived in Guyana on 9th September, 1990 to undertake his duties under the UNDP/UNIDO Project SI/GUY/90/801 - Assistance to Guyana Manufacturers Association (Forestry and Wood Products Group). His duties and job description can be found in Annex 1.

1.2 On 10th September, 1990 the Consultant attended a meeting with Mr Lance Carberry, Head of the Natural Resources Planning Unit of the Guyana Natural Resources Agency (G.N.R.A.), the Government implementing Agency. Mr. Carberry outlined the G.N.R.A.'s desire to see an autonomous, profit-making concern comprising of government and private sector interests established at the existing Forest Industries Development Unit (F.I.D.U.). Mr. Carberry further highlighted the Government's concerns over avoiding a large private company dominance of the new concern, which would be detrimental to the interests of the smaller manufacturers. The need to ensure that the private sector give the correct degree of attention to the non-profit making activities of the new unit i.e. research, training and library/data facilities was also stressed.

1.3 A further meeting with Mr. Winston King, Chairman of the G.N.R.A. took place on 11th September, 1990 where the Government's concern over large company dominance was re-iterated. Mr King stressed the importance of setting up a constructive dialogue between the government and the private sector via the Guyana Manufacturers Association Limited (G.M.A.) and the assistance that the Consultant could render in bringing this about. It was agreed that the Consultant would meet with Mr. Carberry on a fortnightly basis to discuss the progress of the Project.

1.4 At the initial progress meeting held on 17th September, 1990 the question of the current occupation of part of the F.I.D.U. Compound by Demerara Woods Limited (D.W.L.) was raised by the Consultant and it was agreed that the existing status of D.W.L.'s occupation would be investigated.

1.5 At a subsequent meeting held on 22nd October, 1990 Mr. Carberry informed the Consultant that it appeared that D.W.L. had applied for a lease on the F.I.D.U.

Compound area although it was not known how extensive this claim was.

1.6 A copy of the proposed portfolio of a company interested in purchasing D.W.L. which is due to be divested, was obtained by the GNRA. This document clearly showed the intention of the Company to occupy the complete FIDU site and gave extensive investment proposals for the rehabilitation of the wharf and the removal of all buildings to provide a large timber storage area.

1.7 To clarify the situation, a representation was made to Mr. L. Rutherford the Deputy Commissioner of the Department of Lands and Surveys which comes under the Ministry of Agriculture. He confirmed that D.W.L. had applied for a "lease to purchase" on the complete site and that his Department was currently undertaking a Survey in respect of this claim. Mr. Rutherford stated that, given a submission by the G.N.R.A./U.N.D.P. highlighting the intended use and potential of the revitalised F.I.D.U., he was sure that the question of tenure would be decided in favour of the F.I.D.U.

1.8 As no further progress was made on the matter a meeting with Mr. W. King was requested by the U.N.D.P. Resident Representative Mr. J.L. Larrabure. At the meeting held on 16th November, 1990 Mr King explained that he held discussions with the Minister of Agriculture, Mr. P.L. McKenzie on the question of the D.W.L. claim and that the Minister would be investigating the matter from the point of view of a possible shared facility of the F.I.D.U. Site. Objections to a shared facility were raised by Mr. Eardley Crowell of the G.N.R.A. and the Consultant on the grounds that the volume of timber and traffic within the Compound would seriously hinder an efficient work flow of the proposed F.I.D.U. production activities.

1.9 The Consultant was called to a meeting with Mr. L. Rutherford of the Lands and Surveys Office on 22nd November, 1990. Mr Blair a representative of D.W.L. was also present and he stated that the operations that D.W.L. would undertake on the F.I.D.U. site purely involved local, retail timber sales. The Consultant stated that this intention seemed out of proportion to the degree of investment in the site proposed by at least one of the potential purchasers of D.W.L. The question of a shared facility was brought up by Mr. Rutherford and

the Consultant explained the difficulties this provided in formulating an efficient working plan for the F.I.D.U. Mr Rutherford however made several proposals of possible alternative sites although adjacent and outside the existing F.I.D.U. Compound and he stated that he would be discussing these alternatives with the Minister that afternoon.

1.10 At the time of writing no clear indication as to the future tenure of the F.I.D.U. site had been given and this matter remains the single most important subject affecting the successful outcome of this project. Unless full and uninterrupted tenure to the F.I.D.U. site can be obtained by the new managing company further U.N.D.P. investment aid cannot be justified and this must be included as a pre-requisite in the proposed Project Document.

1.11 The consultant's initial attempts to encourage local manufacturers to participate in the project met with good individual response. Companies that were contacted included:

Aziz Bacchus & Company  
 Fries Furniture  
 Guyana Wood Products Limited  
 Precision Woodworking Limited  
 Modern Industries Limited  
 Nagasar Sawh Limited  
 Shiva Furniture Limited  
 Tropical Woods Limited  
 Mohan Persaud Furniture Limited

In addition, regular contact with the Guyana Manufacturers Association Limited was made through their officials Mr. A. Kim Kisson, Mr. N. Ragnauth and Ms. E. Brijmohan.

1.12 Problems existed with attendance by the members of the G.M.A. Forestry and Wood Products Group at meetings called to discuss joint action in support of the project. The first meeting called for 28th September, 1990 was abandoned as only one member turned up. A further meeting was called on 4th October, 1990 at the office of Precision Woodworking Limited when five member companies attended. At this meeting the requirements of the industry in terms of training and

centralised services was discussed at length. The members also indicated their objections to dominance by any one party either a large manufacturing company or government interests. It was agreed that each member of the Forestry and Wood Product Group would be invited to forward a written submission detailing their proposal on the type of services to be provided and the management organisation and control of the unit. From these submissions a joint proposal from the G.M.A. would be drawn up and used as the basis of negotiations with the G.N.R.A. Submissions were subsequently received from four member companies.

1.13 On the basis of these submissions the Consultant drew up a draft proposal which was presented to the G.M.A. at a meeting held on 19th November, 1990. Further meetings to discuss the draft were held on 25th November, 1990 with the G.M.A. officials and on 29th November, 1990 with the G.M.A.'s Forestry and Wood Products Group members. From these meetings the final draft proposal was developed and this can be found in Annex 9.

1.14 This report details the current status of the F.I.D.U. makes recommendations on the various centralised services designed to assist the local wood products to improve their export rehabilitation programme along with an implementation schedule and a training programme covering both craft and management subjects within the syllabus. The calculations of production capacity and projected costs and profits can be found in Annexes 5 and 6. This report also contains an analysis of the capabilities of the existing F.I.D.U. Staff and makes recommendations as to their retraining.

## 2. EXISTING STATUS OF THE F.I.D.U.

### 2.1 Land and Buildings

2.1.1 There is a considerable problem with flooding and poor general drainage particularly in:

- (1) The vicinity of the Wells Kiln with water entering the kiln during periods of heavy rain. This is due to poor contouring of the surrounding concrete floor which slopes towards the entrance of the kiln from the front of the Sizing Shop and the bad state of the shop roofing with numerous holes in the corrugated sheeting.



(ii) The Impregnation Plant with the Hickson impregnation chamber under constant flood conditions. The area has been pumped out and the concrete sump under the chamber appears to be sound indicating that the flooding is not caused by underground seepage but surface water entering the plant under the entrance door.

(iii) Both the existing Joinery Shop and the two boiler rooms which are lower than the surrounding land levels and subject to flooding during rainy periods .

(iv) The outer boundary areas which are naturally boggy and would require draining and hard coring/concreting to render the land usable.

2.1.2 The numerous drainage channels used are congested with weeds and refuse and do not facilitate efficient drainage during rainy periods - an additional cause of flooding.

2.1.3 Attempts to obtain the services of an expert Drainage Engineer have, to date, proved unsuccessful. Such assistance remains essential so as to determine if the cause of flooding is related to a water-table problem in which case the solution could well be difficult and costly.

2.1.4 The existing buildings are all of wood construction and predominantly roofed in corrugated steel. Such buildings require regular maintenance as degradation, particularly in tropical climates, can be extensive with a relatively short (2/3 years) period. Unfortunately the buildings show evidence of degradation through rotted timbers and numerous rust holes. Besides the aggravating flood problem described in 2.1.1, several of the buildings are unsafe with severely rotted upright columns and support beams/cross members in danger of collapse.

2.1.5 The general condition of the concrete flooring in the Sizing and Moulding Shops is good and requires minimal re-screeding to provide a sound surface for the transport of palletised components. Additional concreting will be necessary in the Sizing shop to raise the level of the floor as described in 2.1.1. The Joinery Shop floor is showing signs of surface damage and requires re-screeding and again the level requires raising to avoid flooding.

2.1.6 The very low standards of housekeeping with wood waste left to rot on the Joinery Shop floor has added to the general deterioration of the floors and timber structure.

## 2.2 Kilns

2.2.1 With the exception of the Plumtre Solar Kiln, none of the Kilns are in working order, and the Plumtre Solar Kiln is only partially effective as the original ultra-violet resistant polyethylene film (Melamex, I.C.I.) has been removed due to damage and replaced with standard polyethylene which has far less heat retention properties.

2.2.2 All remaining kilns are powered via steam boilers and all of the existing three boilers are out of action. The problems associated with the boilers include:

- (i) Disrepair of the main Yorkshire steel boiler with the burner disconnected to the steam chamber through breakdown of the joining walls. This boiler was previously oil burning but was converted to wood waste with a cork-screw feed mechanism to transfer wood waste to the burners from an adjacent silo fed from the dust extraction system. This feed system failed and the connecting feed pipe to the burner was cut. The boiler reverted to manual log feed direct to the burner. The system is of a three pass

design and the burner is not of the type to suit this system as it is inefficient in burning and produces too much smoke particles which clog the transfer tubes resulting in constant stoppages for cleaning and poor steam generation. Work would be required to replace the outer steel shell as this has rusted, as have the end cross frames. The smoke flue is of the wrong diameter and produces insufficient draught to remove particles. another factor that would produce constant clogging of the tube passage.

(ii) The existing oil-fired boiler requires conversion to a wood waste facility as oil prices make it uneconomic to use: it has in fact never been used. Unfortunately the design of the boiler in terms of chamber and tube dimensions make it totally impractical to convert to wood waste burning.

(iii) There is a partially built boiler adjacent to the oil-fired boiler which is designed to fire coal or charcoal rather than wood waste. The burner chamber is too small for the volume of wood dust/shavings that would be required to generate the relevant heat for steam generation. The choice would therefore be to either replace the burner with one suitable for wood waste or fire the boiler on charcoal. Either way the boiler could generate sufficient steam to heat the Irvington Moore 40,000 F.B.M. Kiln but there would be little residual capacity for future expansion of kilning facilities.

2.2.3 Given the rehabilitation of the two boilers as described above there would still remain a problem with maintenance in that the boilers would require to be shut down for cleaning for at least 20 minutes per 8 hour shift and kilning is of course a

continuous process up to 5 weeks long. The effect of constant drops in temperature inside the three kilns, particularly the Wells High Pressure Kiln, could have a damaging effect on the timber in terms of degrade. To ensure a constant heat output steam storage chambers could be installed though at some cost.

- 2.2.4 As stated in 2.1 the Wells Kiln is subject to flooding, an obviously unsatisfactory situation. Given that this problem can be overcome through recontouring of the floor, roof repairs and additional drainage relief channels, the kiln would appear to be in reasonable working order. Minor repairs to the door support rails are required and with minor internal cleaning the kiln is serviceable.
- 2.2.5 The Irvington-Moore 40,000 F.B.M. low temperature kiln requires a motor to run the fans and the replacement of missing fuses, switches and other electrical controls. The kiln is currently used by Demerara Woods Limited to store timber and to facilitate access the front set of doors have been removed and require refitting. Minor engineering work is required to ensure that the kiln is fully sealed.
- 2.2.6 The Osmose 20,000 F.B.M. low temperature kiln is only partially complete and requires the manufacture of doors and the fitting of roof ventilation hoods. The motor that runs the fans is again missing.
- 2.3 Machinery and Equipment
- 2.3.1 The inventory and condition of the existing machinery and equipment can be found in Annex 2.
- 2.3.2 All of the machines are of the older design and date from around 1955 to 1965. Spares and tooling however are still available.

- 2.3.3 It can be seen from the list in Annex 2. that several of the machines are unserviceable. These machines have been classified as such on the basis of the cost of repair compared to the cost of new and the estimated life of the machine after repair.
- 2.3.4 Although the Wadkin 6 head moulder is in service the quality of mouldings are poor due to inferior home made knives and profile blades and inconsistent, wavering feed due to poor pressure on the feed rollers. The lack of spare heads and the absence of in-situ grinding facilities makes the periods of down time for change overs and resetting excessive. The combination of all these factors results in considerably reduced feed rates and an estimated machine efficiency/utilisation of around 40% of capacity.
- 2.3.5 The partially rebuilt Robinson moulder has several essential parts missing including the motor support frames which have apparently been lost. The machine was inherited from Demerara Woods Limited who had also failed to get the machine into service. The machine has not been used since it was imported into the country around twenty years ago. it is approximately thirty-five years old. The cost of rehabilitating the machine is prohibitive.
- 2.3.6 The absence of belt covers, guards and fences and the wiring of machines directly to the mains, due to missing switches and starters, provide serious safety hazards.

#### 2.4 Wood Preservation Plant

- 2.4.1 The door to the impregnation chamber had been blown off in a previous accident (the operators had failed to secure all door bolts) and had been damaged. The repairs which involved rewelding of the hinge bolt had been carried out incorrectly with the result that the door studs do not line up with the recesses and locking of the door is impossible. The hinges must be cut and re-welded correctly.

2.4.2 Due to the constant flood conditions that exist around the impregnation chamber, water has entered the chamber which has resulted in a degree of surface scale on the interior walls of the chamber. A general cleaning and de-scaling operation will be required before the plant can be used.

2.4.3 The pump which transfers the chemical solution from the storage tanks to the chamber has been removed and its whereabouts are unknown. A replacement pump will need to be purchased.

2.4.4 The general condition of the storage tanks, transfer pipes etc. is good and require only minimal cleaning.

#### 2.5 Tool Servicing Centre

2.5.1 The unit being the recipient of recent U.N.I.D.O./U.N.D.P. assistance (DP/GUY/86/005 - G.A. Woods) is in excellent operative order, housed in a clean and secure building with a good range of well maintained machinery.

2.5.2 In spite of this, the effectiveness of the unit as a service to local wood products manufacturers and saw-mills is minimal. This is due to :

- (i) Failure to adopt the recommendations of the assigned U.N.I.D.O. Consultant Mr. G.A. Woods as contained in his technical report.
- (ii) Excessive turn-around time of tooling delivered by customers and a general lack of urgency in dealing with customers needs.
- (iii) The absence of a stand-by generator facility with the unit machinery only operating an average 20 hours per week on present mains electric supply availability.
- (iv) No telephone facilities to maintain good communications with customers.

- (v) Poor advertising of the service to local manufacturers and saw-millers and a general lack of industry knowledge on tool maintenance and change frequencies.

2.6 Activities of the F.I.D.U./Personnel

- 2.6.1 Activity was generally noted to be low level during periods when there was main electrical power and non-existent during blackouts.
- 2.6.2 Despite the numerous problems associated with flooding through blocked drainage channels, flooding in the impregnation shop, the dilapidated state of the buildings and extremely poor house-keeping in the Joinery shop, no attempts were made to utilise the blackout periods to carry out basic maintenance/rehabilitation work. The operators either sat around the compound doing nothing while there was a blackout or went home.
- 2.6.3 Attempts to obtain assistance to carry out drainage work in the Impregnation shop met with the comments that "they were not employed to do this type of work" and that outside assistance should be sought.
- 2.6.4 The Consultants estimated overall plant/labour efficiency was around 20% with the moulding area perhaps reaching 35% on the manufacture of tongue and groove and parquet flooring.
- 2.6.5 There was evidence of alcohol consumption on the premises during working hours. One operator interviewed during the Consultants investigation was obviously intoxicated, being unable to stand up or talk coherently.
- 2.6.6 The management of the unit did not operate any form of labour controls or even direct supervision of the labour force. They made few positive contributions to ideas on improving the situation at the F.I.D.U. making mainly negative comments on what could not be

achieved at the unit. blaming the majority of their woes on a lack of financial support from Government Agencies (G.N.R.A./Forestry Commission).

- 2.6.7 The Consultants view on the ability potential and re-training requirements of the existing F.I.D.U. personnel can be found in Annex 3.

2.7 Laboratory

- 2.7.1 The general environmental controls such as ventilation, temperature, humidity etc. are very poor and totally unsuited to any form of controlled experimentation.
- 2.7.2 The general condition of the building in terms of walls, ceiling and floors is very poor and requires major restructuring to upgrade the area for laboratory use.
- 2.7.3 There are no suitable work benches, lighting, power points or any relevant services to provide even minimal facilities.
- 2.7.4 The area is dirty with sacks of chemical compounds (for the impregnation plant) stored on the floor many of which have split, with the contents lying around the floor.
- 2.7.5 In the opinion of Dr. James Anofa little, if any of the existing test equipment remaining, can be salvaged.
- 2.7.6 The offices on the first floor level above the laboratory are in reasonable condition and are currently being used by a Canadian aid agency. The offices would be required for technical services under a revitalized F.I.D.U.



### 3. STATUS OF THE GUYANESE WOOD PRODUCTS INDUSTRY

#### 3.1 The Market and Guyanese Wood Products Capabilities

3.1.1 The Guyanese domestic market is currently in a period of severe recession. The situation therefore whereby a vibrant domestic market can generate funding and impetus for expansion to foreign markets does not exist and the export markets even to the immediate (Caribbean/South American) markets are showing little growth despite the considerable potential.

3.1.2 If the Guyanese wood products industry is to survive, exports would appear to be the only salvation. The existing restrictions to export growth are well documented being:

- (i) Low investment in modern machinery and equipment which restricts volume output.
- (ii) Lack of management and craft skills.
- (iii) Poor quality standards.
- (iv) Poor design capabilities.
- (v) Lack of marketing knowledge.
- (vi) Poor industry co-operation.

3.1.3 Local manufacturers may well point to other fiscal matters such as consumption tax, import duties, lack of hard currency etc. as being equally responsible for poor export performance. Whereas these problems most certainly affect export performance negatively, the fact remains that relatively low raw material costs and very low labour costs are sufficient to counteract these problems given improved manufacturing performance.

#### 3.2 Volume Production

3.2.1 The items of capital equipment that are not commonly found within the Guyanese wood products industry which are commonly found in countries with a volume export capability include:

- (i) Kilns - the capacity of steam heated facilities to produce seasoned timber from 8% to 12% moisture content (essential for exported wood

products, particularly furniture) is less than five percent of the potential export capability of the country.

- (ii) Four to six-head planer/moulders - of the modern quick change high speed type to produce dressed/moulded components in volume are not prevalent within the industry, though several of the older Madkin and Weinig type do exist. These machines however require large volume manufacturing runs to make them economic due to the long change-over times and general setting/re-setting and tend to be used for low value products produced in bulk such as parquet flooring, tongue and groove, weather boarding etc. The alternative methods of dressing timber used within the industry i.e. surface planers/thicknessers, jointers etc. are slow, labour intensive and provide considerable problems in waste removal as they are rarely coupled to an efficient dust extraction system.
- (iii) Specialist Jointing Equipment to produce precision joints in volume are again not prevalent within the industry. Whereas nailed joints of the rebated butt type may well be produced in fairly large quantities, joints of this type are not of exportable quality. The type of machinery required includes single and double-end tenoners, multi-head mortisers, 9 or 15 pin-dovetailers, horizontal and vertical multi-borers, and dowel making machinery.
- (iv) High Frequency or Radio Frequency - fast glue curing presses along with carousel type frame presses are commonly used in developed countries to produce glued components and panels, doors etc. in high volumes. These remain very much in the high capital cost bracket and there would appear to be little likelihood of even the larger Guyanese wood products manufacturers affording this type of equipment. Depending on the dimensions, H.F. presses for instance can produce a glued panel up to 80" x 40" x 2" in one to three minutes. Common methods employed in Guyana include pegging, g-clamps and basic hydraulic cramping equipment, none of which will produce volumes which are in any way sufficient to service a meaningful export business particularly in cabinet and table type

furniture products.

- (v) Automatic and Semi-Automatic Single and Multi-Spindle Copy Lathes - to produce turned components in large quantities particularly for chair and small table/cabinet products do not exist in any relevant numbers. As well as restricting output, quality suffers through the inconsistent repeatability of hand turned parts.

### 3.3 Management/Craft Skills

3.3.1 The reasons for the lack of management and craft/technical skills in the Guyanese wood products industry are, in part, shared by all areas of industry within Guyana. These are:

- (i) Large scale migration by the technical/managerial/entrepreneurial classes.
- (ii) Poor incentives to labour through low wages and benefits resulting in a "go it alone" mentality and the forming of numerous one-man businesses.
- (iii) Minimal national training facilities.
- (iv) A general lack of knowledge of modern management production techniques.

3.3.2 There are however some contradictions to these problems found in the Guyana wood products industry. For instance in some factories visited by the Consultant there was a surplus of skilled operators as compared to the average European or American company of similar size and similarly tooled and equipped. This is due to the fact that companies abroad do not expect all their operators to be multi-skilled in all aspects of wood products manufacture. They in fact de-skill the operators with one operator knowing enough to carry out his own work and perhaps trained to carry out a second task to assist in creating a degree of mobility in the labour force

to overcome absenteeism and line balance fluctuations. The result is a highly repetitive, high volume production system based on serial manufacturing techniques with a few higher skilled support operators in the areas of electrical and engineering maintenance.

3.3.3 In summary therefore the training needs of the Guyanese wood products industry should be geared to creating a disciplined labour force knowledgeable in modern serial production techniques, aware of the quality requirements of their customers and motivated by good environmental working conditions, adequate wages and incentive earnings potential and relevant fringe benefits. They would not be highly skilled in a wide range of machinery and hand operators as in the old craft style. In the Consultant's opinion the provision of this type of training and the adoption of these operating conditions would increase the productivity by at least 500% given a well designed, marketable product range. It is no accident that foreign competitors paying three to five times as much for material and at least ten times the rate for labour can undercut Guyanese manufacturers in the outside market and produce what is vastly superior in manufacturing and design quality.

#### 3.4 Quality/Design and Marketing

3.4.1 Although the export of inferior wood products has undoubtedly damaged Guyana's reputation abroad, the situation is not irreversible. The China Province of Taiwan, the Philippines, the Republic of Korea, Thailand, Indonesia, Singapore and countries in Eastern Europe have all, at their initial export attempts, gained poor reputations for quality and reliability and all have by varying degrees redeemed their reputations. Collectively they account for around a third of the American furniture and wood products market estimated at around US\$ 7 billion in 1989. None of these countries, with the possible exception of C.P. Taiwan, have any home produced designers. They depend almost entirely on viewing the market, gaining information on successful product lines and copying.

- 3.4.2 With the exception of Scandinavia and Italy and to a lesser extent, the U.S.A., the U.K. and Canada there are few countries who boast original, trend-setting designers who in anyway revolutionize the design requirements of the market. The market is in fact highly conservative, depending on "variations on a theme".
- 3.4.3 Guyana will not and most certainly should not, attempt to produce original home-based designers. Instead the industry should concentrate on training individuals who are capable of taking known market winners, utilising 80% to 90% of the existing design features and introducing a local touch to the product by utilising local indigenous tropical hardwoods. These persons should be fully conversant with the principles of quality by design, should have a good knowledge of the outside market and an equal knowledge of their own timbers and the capabilities of the Guyanese manufacturer. Equally they should know the dimension requirements of chairs tables etc. which do not vary regardless to where the product is sold, in the U.S.A., Canada, Europe or the Caribbean.
- 3.4.4 It should be common acceptance that Guyana is at least three to five years away from achieving an export capability, which in quality and volume terms, has a potential in any market outside of the Caribbean. However the market in the Caribbean is more than sufficient, given present production capacities, to provide a springboard for Guyanese exporters. The Caribbean is in fact an excellent practice ground. The market in furniture is ultra conservative depending on rather clumsy, bulky colonial type copies and perceived "modern" designs which are in fact circa 1960. As such the market is ripe for the introduction of well designed modular ranges of both modern and the finer classical furniture styles.
- 3.4.5 Similarly in pre-fabricated housing, Guyana could revolutionise the Caribbean concept of medium to low-cost housing, which is currently very basic. A well designed range of single and two storey dwellings

of truly prefabricated status (not component housing) offering verandahs, open plan staircases, hurricane defence features, well planned bedrooms, bathrooms and kitchens could find immense success in the area and could well extend to the southern U.S.A. states such as Florida, the Carolinas etc. The provision of prefabricated housing could well lead to the provision of furniture on an all-in package basis. A similar approach could be given to beach chalet type dwellings for the tourist industry.

3.4.6 Joinery products such as external/internal doors and window frames do tend to be conservative in design and these designs are well known within Guyana. The problem in this area is one of volume.

3.4.7 The general strategy for marketing and design in Guyana should therefore be:

- (i) Increase market knowledge through trade shows, publications, overseas travel, market survey and the purchase of overseas products as benchmark teaching aids.
- (ii) Train copy design draughtsman and educate them on indigenous woods and industry capabilities and shortcomings.
- (iii) Rather than react to the demands of the conservative Caribbean market, seek to influence the market into a desire for better quality, better designed products and adopt a modular approach to a range of furniture and pre-fabricated housing that reflects this enhanced requirement.
- (iv) Given acceptance of this enhanced market, strive to improve the quality of products in terms of precision, jointing, finishing etc. to an export standard that is suitable for U.S.A and European markets, also seeking to utilise profits from these ventures to fund volume-boosting capital machinery and equipment.

- (v) Establish links with U.S.A., European and Japanese marketing houses to support an export drive circa 1994.

### 3.5 Industry Co-operation

- 3.5.1 The existence of jealous and protectionist type policies and attitudes in the developing wood products industry is prevalent but not unique to Guyana. Almost all countries go through similar phases of ultra-independence, jealous protection of the Company's manufacturing methods, constant accusations of labour poaching and charges of design theft and copying. In time these attitudes are seen to be regressive and to affect negatively the development of the industry.
- 3.5.2 The China Province of Taiwan, probably the most successful wood products exporting country in the world, (despite having no national timber resources) has developed inter-company co-operation into an art form. There is hardly a product that leaves C.P. Taiwan that has been produced entirely within the confines of the Company. They achieve mass volume production by the avoidance of self sufficiency in all manufacturing techniques preferring to use the wheel concept of rim, spoke and hub with various manufacturers on the rim specialising in (say) moulding, shaping or turning, producing components for a centralized finishing and assembly/packaging unit.
- 3.5.3 The protectionist attitude of the various manufacturers in Guyana can be seen in:
- (i) Poorly utilised specialist machinery at one factory with another factory struggling to achieve production targets on less effective machinery - a lost opportunity to both companies.
  - (ii) A protective attitude to manufacturing techniques and any exchange of production knowledge and skills.
  - (iii) Constant duplication of efforts in solving re-occurring industry problems.

- (iv) A reluctance to share market knowledge on the sourcing and cost effectiveness of purchased materials.
- (v) Reluctance to share high volume contracts with other manufacturers, often preferring to turn down the order due to insufficient factory capacity rather than enter into joint ventures to meet the capacity.
- (vi) Refusal to complete industry market surveys and generally provide information to both government and private sector bodies.

3.5.4 The sawmilling industry is not heavily involved in wood products manufacture and it should be actively encouraged to do so. This would help to maximize the use of timber in value-added exports. It is estimated that the value added factor from sawn timber to furniture is at least six-fold: a good incentive to diversify.

### 3.6 Materials sourcing

- 3.6.1 The procurement of essential materials and spares has historically been difficult because of hard currency restrictions. Although the introduction of the Cambio System has relieved the situation to a degree, there are several residual problems, being:
- (i) Guyanese manufacturers have, in the past, found it necessary to seek cheaper, often local, alternatives and as such have not engaged in wider market searches resulting in a generally poor knowledge of supplies sourcing.
  - (ii) As foreign suppliers base their discount rates on volumes relevant to their major, more, developed customers the relatively low quantities required by the less developed Guyanese manufacturers are more expensive.
- 3.6.2 As a result of these factors the ability of the wood products manufacturers to organize production efficiently has been seriously



hindered as has product quality through the use of inferior tooling, glues, grit papers, finishing materials, etc.

#### 4. THE DEVELOPMENT AND BASIS OF THE PROPOSED SERVICES

- 4.1 In determining the scope and nature of the products and services to the industry from a re-vitalised F.I.D.U., the following factors were established as being pre-requisite requirements.
- 4.1.1 The unit should assist and complement the wood products industry and should not compete with the industry as a manufacturer of finished products.
- 4.1.2 The unit should be financially self-sufficient and generate a level of profits that will:
- (i) Provide adequate funds to subsidize the training and research facilities required.
  - (ii) Fund the day-to-day cash flow/working capital needs of the company.
  - (iii) Provide adequate capital reserves for future expansion plans.
  - (iv) Ensure a relevant investment return to members/shareholders initially subscribing to the equity of the Company.
  - (v) Be based on sales prices of products and services that are competitive to the wood products industries in terms of their own costs for similar products or services.
- 4.1.3 The products and services selected should increase the wood products industries export volume and extend their knowledge of efficient manufacturing methods thus enabling the industry to generate profits at an increased level to fund their own capital expansion.

- 4.2 It was determined at an early stage that, in terms of the F.I.D.U.'s productive capability to assist increased export volume manufacture by the wood products industry, the key area was the unit's ability to produce a relevant volume of kiln-seasoned timber.
- 4.3 Given the existing state of the kilns and in particular the condition and rehabilitation needs of the steam boilers, considerable efforts were made to determine the most efficient and most effective methods of providing an adequate kilning facility.
- 4.4 Specialist advice was sought from three main areas, the Guyana National Engineering Company (GUYNEC), Mr Joseph N. O'Lall of Caribbean Energy Company International Limited and Mr K S Walia of Saroup and Company, New Delhi, India. In addition, as there were no manuals or technical data on any of the kilns or boilers neither at the F.I.D.U. nor the Forestry Commission, telexes were sent to the two kiln manufacturers: G.F. Wells of Sheffield U.K. and Irvington - Moore of the U.S.A., requesting technical data to assist the rehabilitation programme. Neither company could provide any assistance on the kilns as they had not been purchased direct from them but second-hand and the original purchasers were not known.
- 4.5 The results of the dealings with the three main potential suppliers/contractors were as follows:
- 4.5.1 GUYNEC - The state-owned Company had undertaken a survey of the existing F.I.D.U. kilns and boilers during 1988 (as requested by the Forestry Commission). A report should have been received within one month of the survey but as of September 1990 this report had not been seen. Several visits were made to GUYNEC to determine the whereabouts of the report but it transpired that the person/persons who had done the survey had left the country. A further request for another survey and quote on repairing the boilers was denied on the basis of a lack of expertise to carry out the work (GUYNEC was involved in the initial installation of the kilns and some work on

the uncompleted wood-fired boiler adjacent to the Osmose kiln).

4.5.2 Caribbean Energy Company International Limited- Joseph O'Lall

Mr O'Lall was the original designer/installer of the main Yorkshire steel wood-fired boiler and the screw-feed wood waste transfer unit. It was five weeks before the Consultant was able to contact Mr O'Lall who was working on a hydro scheme up country. When finally contacted Mr O'Lall surveyed the facilities. His comments were as follows.

- (i) The poor condition of the Yorkshire steel boiler was due to malpractice by F.I.D.U. staff who had failed to carry out the necessary maintenance procedures. They had habitually thrown water on the burner at the end of shifts. Thus damage had occurred through a burn-out of excess smoke residue in the heat transfer tubes and damage through too rapid contraction.
- (ii) The original design of the boiler being a three pass system was incorrect and if he was commissioned to restore the boiler it would be converted to a one-pass system.
- (iii) The screw-feed wood waste transporter had failed due to dampness in the collection silo with wet waste clogging the feed mechanism and excessive exhaust from the cyclone fan. (The feed system had been disconnected and prior to breakdown the burners had been hand fed.)
- (iv) The Yorkshire steel boiler and the ancillary feed equipment could be restored and would provide sufficient steam capacity for the Wells high temperature kiln.
- (v) The existing (un-used) oil-fired steam boiler adjacent to the Osmose kiln could be converted to wood-fired facility and generate sufficient steam to service the Osmose F.B.M. 20,000 Kiln.
- (vi) The uncompleted wood fired boiler in the same area would, when

complete. generate sufficient steam to service the Irvington - Moore F.B.M. 40,000 kiln. The boiler would need to be raised approximately one metre to facilitate wood-waste feeding and general access/maintenance.

Mr O'Lall undertook to provide a quote on rehabilitation costs and delivery by the end of October 1990. A quote was subsequently received but contained only a request for a retainer consultancy fee of US\$ 25,000 to "undertake consultancy and advice services" on the boiler facilities at the F.I.D.U. The Consultant requested a meeting with Mr O'Lall and informed him that the U.N.D.P. had no intention of paying for what was in effect a tender. Mr O'Lall then withdrew the request of a pre-payment of US\$ 25,000 and said that he would provide a "ball-park" quote on cost and delivery by 9th November, 1990. Mr O'Lall was not heard from since and numerous calls were unanswered.

#### 4.5.3 Saroup and Company - Mr K.S. Walia

This Company is pre-dominantly concerned with the design and installation of steam boilers fired by rice husk but has good experience of providing similar wood waste fired facilities. The Company has a long association with Guyana having installed a number of facilities in the various rice growing areas. The Company's representative Consultant Engineer Mr Walia arrived in Guyana on 5th December, 1990 and the Consultant met with him to discuss the requirements of the F.I.D.U. on 6th December. Mr Walia viewed the three existing boilers and made the following comments.

- (i) The Yorkshire steel boiler had been converted from an oil fired facility but the tube and flue diameters had not been altered to suit the greater smoke residue/particles from wood burning. In addition the Yorkshire burner had been designed incorrectly both in size and the lack of an ash removal facility. It could however be restored to the correct specification at cost and provide sufficient capacity (25 P.S. I. to a temperature of 140°F) to serve the Wells

high temperature kiln.

- (ii) The oil fired boiler was not of the type that could feasibly be converted to a woodburning facility due to the chamber sectioning, tube diameters, burner requirements and likely resultant capacity.
- (iii) The partly built boiler is designed as a coal or charcoal burning unit and would require a major rebuild to successfully convert it to wood waste.
- (iv) It may well be more cost effective in the long term to consider a new purpose-built centralized boiler to replace the existing three boilers, all of which require considerable work and expenditure to rehabilitate and will not in any case provide spare capacity for future expansion. Down-time for maintenance on such a boiler could be reduced from 30 minutes per shift to 40 minutes per week.

Mr Walia left Guyana on 8th December and undertook to provide a full proposal and quote and forward it to the Consultant for inclusion in the report. (See Annex 13).

- 4.6 The two existing solar kilns are not included in the future plans of the revitalised unit, their capacity and operating efficiency are minimal. The possible use of the vacuum type kiln to provide a quick response to particular orders was considered but as they are entirely powered by electricity and the required voltage (210 v single phase) can only be obtained via the mains supply (which operates for only 20 hours per week) this type of kiln is impractical until a constant mains supply can be guaranteed.
- 4.7 Given that the kilning facilities are restricted to the three powered kilns the resultant annual capacity of 696,000 F.B.M. was taken as being the productive capacity of the unit on which production services should be based.

- 4.8 It was determined that the most suitable use of the kiln capacity would be for dressed/moulded components and glued panels provided to the wood products industry in volumes that they could not currently achieve without investing heavily in capital equipment, which as stated, is outside the financial capabilities of the individual companies.
- 4.9 The machinery required to produce wood products of the type described and which are additional to the existing machinery or available machine capacities were determined as being:
- 4.9.1 An additional cross-cut saw to supplement the existing cross-cut.
  - 4.9.2 A band saw re-saw for the ripping of timber to increase the rip capacity above the current capability of the existing edge saw.
  - 4.9.3 A four-sided planer/moulder to increase the capacity above that achievable by the existing Wadkin six-head moulder.
  - 4.9.4 A radio-frequency panel press capable of producing glued panels up to 2000 mm x 1000 mm x 50 mm within a maximum three minute cycle along with supplementary glue spreading equipment.
  - 4.9.5 A panel saw for trimming of panels of precise finished dimensions.
  - 4.9.6 A wide-belt sander to sand panels to finish standards.
  - 4.9.7 Plasting strapping equipment to poly wrap palletized panel batches for despatch.
- 4.10 The provision of dovetail jointing facility was considered desirable: there is no such facility in Guyana and this type of joint is a quality feature of cabinet drawer manufacture. Besides providing a contract service to the industry a 9 or 15 pin dovetail machine would be an important feature of the craft training syllabus. The technology of this type of machinery with the exception of the auto feed has not altered to any extent over the years and a second hand rebuilt machine would be adequate.
- 4.11 The introduction of the machinery of the type described above fully utilizes the seasoned timber capacity of the unit. It should be a strict rule of the new unit that kilned sawn timber should not be sold to the industry under any circumstances. To do so would seriously

reduce the profitability of the unit and as such make the purchase of the machinery un-economic.

4.12 With regard to the impregnation facilities at the F.I.D.U. the rehabilitation costs were determined as being minimal and the possible use of the facilities was investigated in terms of the species of a less durable nature that were suited to treatment of this type.

4.13 Dr. James Amofa the Wood Anatomist (U.N.V.) assigned to the G.N.R.A. advised the Consultant that the following species could be treated (either in plain sawn form or "spiked" i.e. incised/punctured to permit easier impregnation).

Shibidan - *Aspidosperma album*

Simarupa - *Simaruba amara*

Dukali - *Parahancornia amapa*

Baromalli - *Catostemma altsonii*

Baromalli - *Catostemma commune*

Baromalli - *Catostemma fragrans*

Dalli - *Virola surinamensis*

and the sapwood of"

Tatabu - *Diploporis purpurea*

Mora - *Mora excelsa*

All these species are found in commercial quantities and would make suitable substitutes for the more durable and commonly used timbers. particularly on the lower value wood products such as shingles, weather boards joinery items and construction timbers.

4.14 Additional research would be required to determine the logistics of transporting the species from the logging and milling operating areas and the various time cycles in which deterioration/infestation occurs and the optimum moisture content levels that facilitate effective treatment. Storage facilities at the F.I.D.U. will be limited and as such the service could only be offered to customers own timbers delivered to the unit, treated and returned within a maximum five day cycle.

- 4.15 The tool servicing centre was examined with a view to improving the turn-around period from the delivery of a tool to the centre and the return of the tool to the customer, ready for use. The need to provide constant power, telephone connections, better advertising of both the services available and the correct tool change frequencies to the industry are self-evident. In addition the feasibility of providing a tool exchange service was investigated. This would require the unit to hold a reasonably large range/stock of the commonly used saws, blades, etc. but given a degree of industry standardization of tooling the service was determined to be feasible and could also assist the industry by encouraging them to operate with the correct frequency of changes. Further market research would be required to fully evaluate this idea and establish an acceptable pricing structure.
- 4.16 The potential of a revitalized F.I.D.U. as a central training facility was examined in relation to the needs of the wood products industry in an expanded state. The provision of the carpentry/joinery type craft school would not address the industry's problems in achieving improved productivity levels and in any case courses of this type were available via the Guyana Technical Institute.
- 4.17 The training needs were detailed as being:
- 4.17.1 Specialist training on the setting and operating procedures of specific machinery types geared to volume batch production manufacture including.
- (i) Quality control procedures - tolerance/frequency checks, measuring equipment, identification of wood faults, operator control of quality.
  - (ii) Tooling maintenance - problem identification, tool change frequencies, on site maintenance equipment and techniques.
  - (iii) Production control - job cards, operator booking sheets, component counting and recording.
  - (iv) Disciplined working - work place layout, house-keeping/waste control, palletization/stacking procedures, production targets, incentive working conditions, permissible rest periods/personal time. All these subjects would be geared to the shop floor operator/supervisor level of a typical wood products manufacturing company.



4.17.2 In addition to the factory floor training needs, training in ancillary support areas should be provided including:

(i) Timber management - air drying techniques, kilning methods/schedules etc. timber selection, stock rotation and inventory control, timber utilization control, material handling techniques.

(ii) Factory services - planned maintenance schedules, power services/electrical maintenance, lubrication systems and frequencies, jig and tool design, safety guards/fences, compressed air, machine fitting and mechanical maintenance/repair.

4.17.3 Specialist occasional courses on:

(i) Managerial Control Systems - product costing, production planning and control, capacity planning, labour controls.

(ii) Finishing - wood preparation, sanding machinery and techniques, relevant grit sizes, sealers, lacquers, stains, fillers, spray equipment and environment control, specific finishing methods for particular indigenous woods, drying techniques, conveyerized systems.

(iii) Design - modular approach to the product range, classical and contemporary design features, knock down furniture design concepts, design drawing/presentation dimensioning to design standards, one to one templates, design copying and re-design to local conditions/materials.

(iv) Marketing - market surveys, promotion of a product/range, product targeting to specific markets i.e Caribbean, USA/Canada, Europe etc., marketing methods and procedures in foreign countries, marketing houses, import restrictions, foreign legislation on material safety.

Visiting lecturers/experts could be invited to provide seminars on the above subjects to be organized by the new Company and held at various venues.

4.18 The provision of a central purchasing facility was investigated in terms of the estimated volumes of the various tooling and materials that would potentially be required by the wood products industry, the ability of the new Company to provide the initial finance for the

agency purchases and the existence of suitable storage facilities at the F.I.D.U. site.

- 4.19 It was determined that within six months of the unit reaching the target levels of production materials purchases in the region of US\$ 100.000 were conceivable and that adequate space could be provided for the storage of such levels.
- 4.20 Further investigations in the form of market research would be required to form some idea of existing requirements but the new Company would look to advising the various manufacturers as to improved tooling and materials usage.
- 4.21 A small profit (ca. 5%) could be made after handling costs overheads were recovered with the cost to the manufacturer reduced by an estimated 15%. In addition the purchases will be subject to strict quality controls to ensure that they are of the right type and quality relevant to the manufacturers machinery and products needs.
- 4.22 The existing F.I.D.U. layout was drawn up (see Annex 12) and examined in relation to the determined production and service facilities envisaged. From this a revised layout was established with the following features:

## 5. RECOMMENDATIONS

### 5.1 Organizational Structure and Management Control

5.1.1 A new private limited liability company should be formed by Government and private sector interests and controlled in keeping with the draft Articles of Association as shown in Annex 10.

5.1.2 The UNDP should find and appoint a Project Manager to oversee the rehabilitation programme and manage the initial operating stages of the company for a total period of eighteen months.

5.1.3 The management structure of the company should be in keeping with the Organization Chart as shown in Annex 7.

5.1.4 A salary and wages structure should be introduced as shown in Annex 8 to ensure that trained personnel are retained. A financial incentive scheme should be introduced (time plus 1/3) for all production operatives.

5.1.5 The new Controlling Company should obtain Government exemption from consumption tax and all import duties. In addition the Company should seek exemption from all corporation taxes for a five-year period.

## 5.2 Kilning

5.2.1 The three existing boilers which are out of commission should be sold off and the monies should go towards the purchase of a single centralized wood waste fired boiler with sufficient capacity to serve the three existing kilns and fifty percent spare capacity to cater for future kilning expansion.

5.2.2 The new centralized boiler should be designed and installed by Saroup and Company of New Delhi India subject to the receipt of acceptable quotes on cost and delivery/installation.

5.2.3 The total kilning capacity of the unit should be absorbed by the wood products manufacturing area. Sale of rough sawn kilned timber to the local manufacturers would reduce the capacity of the wood products area to an extent that potential profits could not justify the purchase of the additional machinery recommended above.

5.2.4 To complement the kilning facilities of the unit, two air drying sheds and a seasoned timber store should be constructed and situated as shown in the proposed site layout in Annex 12.

5.2.5 Doors should be manufactured and fitted to the Osmose Kiln. GUYNEC should be commissioned to carry out this work.

5.2.6 Dependant upon the guarantee of a consistent mains electricity supply, a vacuum kiln of 2000 F.B.M. capacity operating on ...

approximate 4 day cycle should be purchased to provide the facility to react swiftly to customers orders for specific panels.

### 5.3 Wood Products

5.3.1 The Wadkin 6 head moulder should be overhauled.

5.3.2 The Robinson moulder which is not in service should be sold off as scrap.

5.3.3 A four-sided planer/moulder should be purchased to increase the capacity of dressed and moulded products and to provide accurately machined panel components for panel production.

5.3.4 An additional cross-cut saw should be purchased to increase the capacity in this area and to assist product scheduling.

5.3.5 A band saw re-saw should be purchased to supplement the existing edge/rip saw.

5.3.6 A radio frequency (R.F.) press should be purchased with the capability of producing panels up to 2000 mm x 1000 mm x 50 mm to increase the volume potential of the local industry in exporting table and cabinet type products.

5.3.7 To complement the manufacture of panels via the R.F. press, a panel saw, a wide belt sander and strapping equipment should also be purchased.

### 5.4 Lands and Buildings

5.4.1 Specialist advice should be sought regarding the considerable drainage problems that are prevalent throughout the F.I.D.U. Site. Based on this advice, action should be taken to improve the situation particularly in the wood products manufacturing and kilning areas.

5.4.2 all existing roadways within the compound should be recovered and repaired and an additional roadway immediately in front of the sea wall should be constructed to facilitate efficient fork-lifting of incoming timbers.

5.4.3 All existing buildings should be rehabilitated with all rotted timbers replaced. additional structuring of outer walls. new glazed windows and general repainting. Extensions and conversions of existing buildings should be implemented in keeping with the proposed site layout in Annex 12.

5.4.4 All existing concrete floors should be re-screeded to provide good surface movement for work-in-progress.

5.4.5 General repairs to all roofing should take place to eliminate rain damage.

5.4.6 The existing Forestry Commission vehicle. maintenance shop and compound area should revert to the ownership of the F.I.D.U. and should be converted to a Electrical/Engineering Workshop and an extension to the existing Joinery Shop (to be used as a Training School).

5.4.7 The total cost of the rehabilitation and construction of buildings. all drainage and concreting/re-screeding should be funded by the equity shareholders of the new Company.

### 5.5 Wood preservation

5.5.1 Repairs to the existing equipment as described in Section 2.4 should be carried out by GUYNEC.

5.5.2 All timber preservation should be of customer's own stocks. air/kiln dried by them to the required moisture content. The F.I.D.U.'s air drying and kilning capacity should not be used for this purpose.

## 5.6 Laboratory/Technical Services

5.6.1 laboratory facilities should be developed over two three-year phases as follows:

(i) Phase I - Research into the practical requirements of the industry on such subjects as:

- (a) Kilning research into schedules, relative degrade rates, defects analysis etc. for the relevant species.
- (b) Wood preservation research into preservative solutions, impregnation pressures/porosity per species, dip immersion technology/solutions etc.
- (c) Research into finishing materials and processes, including stains, sealers, lacquers, fillers, grits ancillary processes, spray equipment all geared to local species.
- (d) Gluing research into glue types per species, species resistance through acid, resin etc. application rates, pot/shelf life, effect on moisture content levels.
- (e) General problems on failures of specific species.
- (f) Tool/saw sharpening per tool life, change frequencies per species.

(ii) Phase II - Long term academic research into lesser-known (commercially less-accepted) species i.e. wood anatomy, durability levels, practical uses, treatments and similar subjects as Phase I above applicable to lesser-known species.

5.6.2 The laboratory should be re-equipped in keeping with the list of equipment as detailed by Dr. James Amofa which can be found in Annex 2.3.

5.6.3 The new company should establish library facilities and data collection for distribution to the industry of technical papers, market trends, technical developments, trade journal articles, etc.

5.6.4 The Company should liaise with the Guyana National Bureau of Standards to establish industry quality standards for wood products and monitor these standards on behalf of the Guyana National Bureau of Standards. A compliance certificate should be awarded by the Guyana National Bureau of Standards to companies that achieve the required standard allowing them to carry a hallmark on their products.

5.6.5 The Company should offer project consultancy services to the industry (at local rates/fees). The short term projects should be aimed at achieving industry standardization of production methods and management systems.

#### 5.7. Tool Servicing Centre

5.7.1 The recommendations as contained in the technical report of G.A. Woods "Assistance in Saw Doctoring and Tool Maintenance" as part of UNDP/UNIDO Project DP/GUY/86/005 should be implemented by the new company.

5.7.2 The manning levels of the centre should be increased from two persons to three and Mr. Rishton Welcome should be appointed Tool Services Manager.

5.7.3 A tool exchange service should be introduced with the Company purchasing a range of saws, knives, profile blades, etc. and replacing tools delivered for service on an exchange basis, all tools being the property of the Company.

5.7.4 A full market research on industry use of tooling should be undertaken to determine the scope of the required services and as a basis for determining tooling stocks for the proposed exchange services.

#### 8.8 Central Material and Spares Unit

5.8.1 The new Company should provide central purchasing services acting on an agency basis to source and bulk purchase industry materials and consumables such as tooling, hardware, finishing materials, glues etc. These items should be sold to the industry at mutually beneficial prices.

5.8.2 The materials requirements of the industry should be determined via the market survey recommended in 5.7.4 above.

## 6. SUMMARY

6.1 The successful development of the proposed Company balances on two outstanding matters which must be resolved as a pre-requisite of future UNDP funding. These are:

6.1.1 Land Tenure - The various happenings surrounding this matter are well documented in this report but unfortunately at the time of writing clear indication that tenure, in the form of an extended lease, had not been granted in principle (subject to 6.1.2 below). The failure to obtain tenure has had a very damaging effect on the attempts by the Consultant and the G.M.A. to attract likely private sector investors and it is highly unlikely that suitable investors will be found unless this matter is resolved.

It must be made clear that any question of a shared facility with Demevara Woods Limited (or their acquirers) is totally unacceptable. There is already a space problem under the plans for the new Company and any expansion may well depend on the new company acquiring the adjacent land currently used by the Guyana National Service.

6.1.2 Private Sector Investment - It is a cause of considerable disappointment to both the consultant and the officers of the G.M.A. that they have jointly failed to attract firm private sector investors within the period of the project. After a very good initial response from the private sector their attendance at the five subsequent meetings was virtually non-existent. Whereas the G.M.A. will continue in their attempts to identify investors, the failure to do so must signal an end to any future involvement by the UNDP/UNIDO in additional aid to the F.I.D.U. in its present form.

The consultant firmly believes that given the value of the existing land, buildings, wharfage, machinery and equipment the level of the proposed additional UNDP funding and the profits potential of the new Company, any investment would be an extremely good one besides contributing immensely to the export ability of the Guyanese wood products industry.



- 6.2 The agreed equity share between the Government at one-third and the private sector at two thirds represents a good compromise which should ensure that as well as providing a good return to private capital the general interests of the industry will be protected. The technical, research and development services proposed are just as important to the industry as the profit-making production side and the sizeable presence of the Government in the equity of the new Company should help to ensure that these services are maintained at the maximum level possible. Given the considerable efforts of the officials of the G.N.R.A. in promoting this project as compared to the relatively low response of the private sector, the consultant could not reasonably argue that the Government should take a lesser share.
- 6.3 The proposed services and production facilities have been selected on their respective importance to the industry within the confines of the available space, resources and likely funding levels. Whereas there is good scope for the future expansion of the non-productive services the production operations are at their maximum possible as governed by the existing kilning capacity. Future expansion in this area must include the acquisition of additional adjacent land to house the extra timber storage areas necessary for the three month air drying cycle. It is estimated for instance that the addition of the land currently occupied by G.N.S. would, given the re-organization of facilities on the existing site, at least double the capacity (and profits potential) of the Company.
- 6.4 In conclusion it should be said that the proposed revitalization of the F.I.D.U. affords a unique opportunity for Government and the private sector to combine in providing the wood products industry with a major support infrastructure which can only assist the promotion of the export-market. If this opportunity is not taken it is difficult to see where or when a similar opportunity may arise.

ANNEX 1

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

GUYANA  
SI/GUY/90/801/11-01  
JOB DESCRIPTION

POST TITLE: Wood processing industries consultant  
(Furniture and Joinery)

DURATION: 3 man/month

DATE REQUIRED: ASAP

DUTY STATION: Georgetown with travel within the country

PURPOSE OF PROJECT: To improve the operating efficiency of the secondary woodworking sector and advise on how the existing Forest Industrial Development Unit, Kingston, can be used for this purpose.

DUTIES: The expert will:

1. Survey the existing facility of FIDU assessing the state of the premises, the equipment, the spare parts and tooling. Assessment will also be made of value the of equipment and costs of repairs and spares needed for efficient operation.
2. Calculate the production capacities of the various machines and assess the qualifications of the personnel on board, and indicate the training requirements to upgrade their skills and eventually become trainers.
3. Enumerate extra equipment needs of the industry for operations that could be carried out by a common service facility (drying, preservation, tool maintenance, specialized machining, etc.).
4. Elaborate a training programme for the industry using equipment existing at FIDU and proposed. (Programme to be of a modular nature, and comprise training at various levels of skills).
5. Estimate possible machine loadings for such operations and costs of operating them (based on production for the local market and for export).
6. Draw up a putative work plan for the FIDU centre covering both training and common service facilities and the cost of operation and tentative estimate of income.
7. Propose an organization structure, management needs and a system for pricing services to be provided for the wood products industry for the revitalized FIDU.
8. Prepare a terminal report upon completion of his assignment containing analyses of his findings and give appropriate recommendations.

QUALIFICATIONS: Industrial Engineer, wood technologist with long experience in furniture and joinery production in both developed and developing countries. Training experience and advantage.

LANGUAGE REQUIREMENT: English.

BACKGROUND INFORMATION: The Government policy puts great emphasis on export-lead growth, reduction in state expenditures and in current account deficits, privatization and encouragement of inward foreign investment. Along with bauxite, rice growing, sugar, and gold mining, the timber industry is seen as a target for development. Prospects for Guyana being the principle supplier of not only sawnwood but manufactured wood products to the Caribbean region are good but will require considerable efforts to realize.

An Economic Recovery Programme (ERP) was begun in mid-1988 with World Bank help, and a more liberal foreign investment code drawn up in later 1988. With regard to improving control of forest resources (and energy) the Guyana Natural Resources Agency (GNRA) was set up to promote foreign interest in the sector. The Forestry Commission now falls under the CNRA responsibility. Also the private sector has been encouraged to play a larger role in investment and development.

Problems in developing the timber sector relate to: irregularity of raw material supplies, lack of manpower at all levels but especially skilled, semi-skilled, supervisory and middle-technical management, difficulty in getting foreign currency for replacement parts and consumables.

Other problems relate to frequent power shortages/cuts, and poor awareness of production planning and control, costing procedures and marketing contacts. For the secondary wood manufacturing sector, additional problems relate to cutting tool maintenance, use of jigs, and low-cost automation, design and quality control for export.

On the other hand, large-scale private investment has started to return in other sectors and foreign companies are less worried about nationalization than before and are showing cautious optimism about prospects, agriculture and timber follow after mining as the mainstays of economic recovery and some sources even says that timber potential is greater than that of rice or sugar - perhaps due to global scarcity and the 165,000 Km<sup>2</sup> of forests which have not been over-cut and whose currently main commercial species, greenheart, regenerates fairly readily. A greater awareness on the part of Government can be perceived of the need to stabilize logging concessions to permit investment in machines and human resources development and to ensure conditions that will stimulate secondary wood manufacturing industries and ultimately lead of export increases.

Investment opportunities have been identified in many sectors including forestry and sawmilling. Advertisements sponsored by the Government, along with statements on ownership and security of investments, foreign payments transfer, legal framework and support for companies operating in Guyana have appeared in international journals (eg. South, No 109, November 1989). Production statistics from the Guyana Forestry Commission (reported in Mr. Borretti's report IO/R.58, 6 April 1988, project UC/CAR/86/201) show a total of

8,676 m<sup>3</sup> sawnwood exported in 1986 out of a total of 16,026 m<sup>3</sup> total primary wood products exported for a value of US \$ 4,182,264. This was produced by 9 main sawmills and a few "others" whose installed capacity was estimated at 175,000 m<sup>3</sup>/year and which had been working at 30 - 35% capacity.

During 1989, the Forestry and wood Products Group (FWPG), recognizing the need for renewed initiative within the ERP, took a number of steps to make their members more productive. On 26 June 1989, a letter was written to the Deputy Prime Minister, Mr. Haslyn Parris, requesting access to the Forest Industry Development Unit (FIDU) facility in Kingston for training purposes. Their goals included improving quality standards and operational effectiveness with a view to increasing exports especially.

At a meeting on 20 September 1989, a number of other decisions were made, reflecting a wish of members to infuse new spirit into the FWPG, including that of requesting the chairman of GNRA for assistance in reorganizing the FIDU and manage the facility for the benefit of members. It was also agreed then that long-term training was needed, including in-plant demonstration both at the shop floor and management levels. Access to and identification of markets, along with help from contacts and initial negotiations was also suggested. These requirements have been discussed and developed in accordance with Government's plans for the future development of the FIDU within the context of the National Forestry Action Plan for Guyana.

EQUIPMENT MACHINERY STATUS REPORT

Saw Doctoring Unit:

All equipment are likely to be utilised since this Unit is well maintained and completely serviceable.

There is, however, a need for a wider variety of grinding wheels with profiles to match the various gullet profiles.

Joinery Workshop:

1. Wilson Cross-cut Saw

Traverse action is stiff and attention may be required to the bearings and or running rails. This may only amount to cleaning and lubrication.

2. Overhead Pad Sander - Dominion

The existing belts are too coarse. Finer grit belts from 180 grit plus are required for finish sanding.

3. Dewalt Cross-cut Saw

This machine is in poor condition and surplus to requirements. It is recommended that <sup>the</sup> machine be overhauled and sold.

4. Small Wadkin Surface Planer (Joinery Bench Area)

This machine is not serviceable. Has scrap value only.

5. Edge Sander - Lathe

The Lathe section is surplus to requirements. The Edge Sand Unit requires higher grit (180 +) rating. This is not an industrial machine.

6. Jig Saw

This machine is not serviceable. Has scrap value only.

7. Compressor

Machine is in working order, requires more extensive piping and bayonet type plug in points.

EQUIPMENT/MACHINERY STATUS REPORT (CONT'D.)

8. Robinson Surface Planer

Machine is in reasonable condition. Requires guards on the belt drive since it is unsafe in its present condition.
9. Wilson Surface Planer/Routes

This machine is in reasonable condition. Spare knives are required to ensure continuity of use.
10. Wilson Mortice Machine

The existing chain head on this machine is slack, requires correct tensioning.

Only one width head is present. Additional heads of varying diameters are needed.
11. Dominion Hand Lathe - Large

There exists a possible play in the bearings or wear on the internal moving parts on the drive chuck, which would cause vibration and non-concentric turning.. Requires general overhaul.
12. Witton Drilling Machine

There exists some amount of play in the spindle/chuck of the machine which makes it inaccurate. It is not worth repairing as the future life span and use are limited.
13. Wilson Spindle Moulder

This machine requires a new block and a variety of knives for profiling, finger jointing, tensioning, etc.
14. Wedkin Circular Band Saw

Machine is in serviceable condition but requires bands to ensure continuity of use during doctoring.
15. Wilson Circular/Dimension Saw

This machine is a complete write-off, an essential tool requires capital investment and replacement, i.e. glued panel sizing.

EQUIPMENT/MACHINERY STATUS REPORT (CONT'D.)

16. Wadkin Rip Saw

The fences for this machine are missing. These must be found and replaced for both accuracy and safety.

The starter is missing. This also requires replacement since motor is currently wired directly to the mains - again a safety hazard.

17. Small Wood Lathe

A starter is required for this machine (currently wired directly to mains).

18. Wadkin Overhead Router

The Arbour/Chuck is missing, replacement is required. A wide variety of router bits is needed to ensure maximum utilisation for this essential tool.

Sizing Section

19. Wadkin Edger

This machine is in serviceable condition. It possibly needs spare "dogs" for future replacement as existing "dogs" are worn, thus reducing the feed grip.

20. Wadkin Cross-Cut Saw

This machine requires a starter. Also, the traverse bearings/track rods require overhaul.

TOOL SHARPENING CENTRE - CURRENT EQUIPMENT - STATUS REPORT

ANNEX 1.1

Item No.	Description of facility	Location	Remarks
1.	<p>Armstrong Circular Saw Sharpener.                      Armstrong Manufacturing Company                      Portland, U.S.A.                      Serial No. 7666</p> <p>Electric Motor (driving sharpener)                      ½ H.P. NO. 5K42BG2572</p>	Saw Doctor Shop	<p>In Service</p> <p>A.C. I.P. 520/220V                      3ph. 50 HZ. 2.2 amp.</p>
2.	<p>Vollmer Saw Sharpener. type CANA/E                      Original Vollmer Maschinenfabrik GMBH W/Germany. 1987                      Electric Motor (driving cam) type. 30F71C-2                      Greiffenberger Aninebstenick GMBH Markfredwitz                      Serial No. F0936657015,0 75kw                      Electric Motor (grinding stone) - same for cam motor</p>	"	<p>In Service</p> <p>A.C. I.P. 44 220/580V                      50 H.Z. 32/1.85 amp.                      3ph</p> <p>" " "</p>
3.	<p>Vollmer Circular Saw Sharpener Uniapp 600.                      Vollmer Dornham. W/Germany. 1987                      Serial No. 1102</p> <p>Electric Motor (driving sharpener) Type. TB 25/90-02                      Brinkmann-Pumpen, D-5980                      Werdohl. 0.10 KW.</p>	"	<p>In Service</p> <p>A.C. I.P. 44 220/580V                      3ph.                      50/60 H.Z. 0.51/0.18 amp.</p>
4.	Band Saw Holder	"	In Service
5.	Band Saw Holder	"	In Service
6.	<p>Armstrong Setting Vice/Filing Clamp. Me. No. 58                      Armstrong Manufacturing Company                      Portland, U.S.A.</p>	"	In Service
7.	<p>Armstrong Setting Vice/Filing Clamp.Me. No. 58                      Armstrong Manufacturing Company                      Portland, U.S.A.</p>	"	In Service
8.	<p>Vollmer Circular Saw Sharpener (Carbide tip). Vollmer Dornham W/Germany. 1987.                      Serial No. MF. 600</p>	"	In Service



Item No.	Description of facility	Location	Remarks
	Electric Motor (driving cam) Type - TB 25/90-02 Brinkmann - Pumpen D-5980 Werdohl. 0.10 K.W Electric Motor (grinding stone) Siemens Motors Limited Serial No. 1LA9063-2AA97-Z	Saw Doctor Shop	A.C. I.P. 44. 220/380V 3 p.h. 50/60 H.Z. 0.31/0.18 amp.  A.C. 220/254V. 3p.h. 50 H.Z. 1.63 amp.
9.	Vollmer Band Saw Sharpener (small) Model. LIL.S-175. Vollmer Dornham W/Germany. 1976 Serial No. 14311	"	In Service
	Electric Motor (Cam) Type. TB 25/90-02 Brinkmann-Pumpen D-5980 Werdohl 0.10 K.W. Electric Motor (grinding stone) Siemens Motor Serial No. 1LA 9063-2AA97-Z 0.37 K.W		A.C. I.P. 44. 3.p.h 50/60 H.Z. 220/380V 0.31/0.18 amps  A.C. 3.p.h. 50 H.Z. 220/254V. 1.63 amps
10.	Butt Welding Machine Type. BAS-046. Ideal - Werk.D4780 Lippstadt. W/Germany Serial No. 203303. 3.5 KVA.		A.C. 2 p.h. 220V 50 H.Z.
11.	Heavy duty setting vice (bench type)	"	In Service
12.	Band Saw Shearing Machine (bench type)	"	In Service
13.	Armstrong Welding Clamp Size No. 12 Armstrong Manufacturing Company Portland, U.S.A.	"	In Service
14.	Vollmer Circular Saw Setting Machine Type ADN/VI Vollmer Werke Biberach KSS 1987	"	In Service
15.	Grifo Cutter Grinder Machine Type GM 1000 Electric Motor (for horizontal transport) Asincrono trifase. 0.25 K.W. Electric Motor (grinding stone) 2.2 K.W.	"	In Service  A.C. 2p.h. 50 H.Z. 220/380V. 1.4/0.8 amp.  A.C. 2.p.h. 50 H.Z. 220/380. 9.3/5.2 amp

Item No.	Description of facility	Location	Remarks
16.	Armstrong stretcher roller Type No. 5-10 Armstrong Manufacturing Company Portland, U.S.A. Serial No. 12806	Saw Doctor Shop	In Service
17.	Vollmer Gang Saw Setting Machine Type PRSDBP Vollmer Werke Biberach KiSS 1987 Serial No. 644	"	In Service
18.	Band Saw Anvil (Bench type)	"	In Service
19.	Band Saw Anvil (Bench type)	"	In Service
20.	Grinding Stone Type Ker Slibette GM. T.T. Vaerstedsmaskiner DE-5000 Odensec Denmark	"	A.C. 3 p.h. 60 H.Z. 380V (In Service)
21.	Grinding Stone Type Slibette SM T.T. Vaestedsmaskiner DE-5000 Odensec Denmark Serial No. 1036240	"	A.C. 3 p.h. 60 H.Z. 380V (In Service)
22.	Cutter Balancing Machine with Accessories Wood working machinery Headquarters, Paisley Scotland Ref, No. W193320	"	In Service
25.	Wadkin Knife Grinder Wadkin Limited Leicester, England Machine No. NH. 1041	"	In Service
	Electric Motor (driving grinder) Brook Motor Limited Huddfield, England Serial No. U131240. 1.5kW.		A.C. 3 p.h. 50 HZ 220/380V. 4.18/2.8 amp
24.	Grifo Tool and Cutter Grinder Type Grifo P25 Serial No. 27836	"	In Service
	Electric Motor (driving grinder)		A.C. 220/380V. 50 HZ.

Item No.	Description of facility	Location	Remarks
25.	Anvil for Circular Saw	Saw Doctor Shop	In Service
26.	Armstrong Cutting Shears Size No. 14 Armstrong Manufacturing Company Portland, U.S.A.	"	In Service
27.	Brazing Clamp Machine Spear and Jackson Machine Wood Working Division England	"	In Service
28.	Robinson Lap Grinder Machine Size No. 12 T. Robinson & Son Limited Rochdale, England Machine No. 371 Type SQ/E  Electric Motor (driving grinder) Type 10K22/15 Associated Electrical Industries Limited Serial No. 4192525. 1h.p	"	Out of Service Table to be secured and machine needs servicing.  A.C. 3p.h 380/440V 50A
29.	Setting Vice	"	In Service
30.	Cutting Shears	"	In Service
31.	Clamp for hand saw (fabricated) (locally)	"	In Service
32.	Electric Fans (wall mounted) Three (3) in number	"	In Service

- 5 -

LABORATORY EQUIPMENT STATUS REPORT

ANNEX 1.1

QUANTITY	EQUIPMENT/INSTRUMENT	MANUFACTURER SERIAL #	COMMENT
11 (40)	Moisturemeter (wooden case) Rest at GFC	Irvington Moore Serial # 7275	40 was delivered through FAO Project
8	Moisturemeter Probes		Only 1 appears working
1	Sledge Microtone	Reichert	Good
1	Microtone Knife Profile C	"	Good
1	PH Meter	PYE Unican DY 1636	Needs Servicing
2	PH Electrode		Faulty
2	Avery Moisture Meter Scale		Rusty
2	Moore Moisturemeter Scale	Irvington Moore	Rusty
1	Electrothermal Melting Point Apparatus		Faulty
1	Student Microscope (monocular)	Olympia	Irreparable (Many parts missing)
1	Student Microscope	Swift and Son	"
1	Drying Oven Size 2	Gallenkamp TB 9982 A	Good
2	Muffle Furnance	(1) Carbolite 7-67-1580 (2) Griffin 68-8C37-A	Needs Servicing
2	Hot Plates	Gallenkamp	Good, rusty, needs polishing and cleansing
2	Mini Ovens		
1	Magnetic Stirrer		
8	Thermometers		Good
1	Blender		Faulty
1	Electronic Digital Balance		Adaptor cord missing

QUANTITY	EQUIPMENT/INSTRUMENT	MANUFACTURER SERIAL #	COMMENT
1	Laboratory Pressure Impregnation Plant	Industrial Pressure Vessel Ltd. Nanta C 5510 AXB	Not in working condition. Rusty and pressure gauges to be repaired.
1	Experimental Lumber Dry Kiln	Moore Jacksonville	Needs servicing and parts supply
1	Venier Caliper		Good
1	Balmann Digital Moisturemeter		Needs manual for calibration
2	Spray Machine		Needs servicing.

.....  
 Dr. J. Amofa

Equipment list for Wood Research and Utilization Laboratory

A. <u>General Laboratory Equipment</u>		
1.	1-Mettler top loading electronic balance 6000 - 0.1g	= \$ 1,500.00
2.	1-Mettler analytical balance with digital readout 200g - 0.1 mg	2,000.00
3.	1-Heating mantles 6 units of 250 watts per unit	285.00
4.	1-Vacuum pump - single phase, 1/3 hp 1725 rpm with dial gauge	120.00
5.	2-Stereo binocular microscope (zeiss)	1,100.00
6.	2-Binocular compound microscope with built in illuminator (30% intensity control) objectives: x10, x43, x100. eye piece: x10 (zeiss)	3,200.00
7.	6-Soxer illuminator bulbs	48.00
8.	1-Laboratory fume cupboard unit complete with motor, blower 1/5 hp	700.00
9.	2-Water bath, temp-range: Room temp to 100°C) thermostatic, circulator and cover size: 735 x 330 x 275 mm.	320.00
10.	2-Desiccator, plastic, vacuum pattern top internal diameter 200mm.	98.00
11.	1-Desiccator (pyrex) with ground in interchangeable stop cock cover, vac. pattern Dia diameter 200mm.	90.00
12.	1-Deionizer (distills 3 litres per hour)	725.00
13.	1-Rotary evaporator (vacuum type), 24/40	595.00
14.	1-pH meter with triple purpose glass electrodes, pH range: 0-14, temp. 5°C - 100°C	800.00
15.	1-Universal Calorimeter (Bangh & Camb) Spectron: 20. standard for spectrophotometry and calorimetry.	450.00
16.	1-Centrifuge apparatus, provision for 1-100 ml capacity. variable speed control	550.00
17.	2 cases (10 each) Centrifuge tubes, round bottom heavy duty, screw cap, polycarbonate capacity 50 ml.	100.00
18.	1-Stirrer hot plate with bars 4 each of 30 mm and 60 mm	90.00

19.	1-Grinder (Wiley mill)	275.00
20.	1-Rectangular drying oven, mechanical convection type. range: Room temp - 200°C, thermostatic working chamber: WxDxH=625 x 450 x 500 mm	700.00
Sub. Total		13,946.00

B. Accessories/Supplementary equipment to Preservation and Seasoning

21.	Moore Experimental dry kiln 2 - electric motors (3 phase, 1/2 HP, 220 volts, 1728 RPM) 2 - heating elements (240 volts) detail specs. unknown (about)	600.00 265.00
22.	Pressure Impregnation Plant (Industrial Pressure Vessel Ltd, England). 2 - motors (3 phase, 2HP, 220 volts, 1226 RPM)	100.00
23.	4-magnifiers, pocket. mag. x 10 lenses diameter 38 mm	24.00
24.	1 box (25) Extraction thimbles, fat free filter pulp, 43 x 123 mm.	35.00
25.	1-Dial gauge comparator for measuring timber shrinkage and movement (Mazcers)	350.00
26.	3-Venier calipers (double scale: 1/10 mm and 1/128" venier readings) plastic	45.00
Sub. Total		<u>2,039.00</u>

C. Equipment for Biodeterioration and Wood Anatomy Studies

27.	2-Reichert microtome, knife profile type C	60.00
28.	1-Microtome knife sharpener (Antanetic) A O Soencer (with 2 bottles each of coarse, fine abrasive, honeglass compound)	1,635.00
29.	1-Photomicrographic equipment: Zeiss attachment camera I. (attachment for tubes 25 mm diameter, basic body, 35 mm camera attachment with shutter)	2,000.00

30.	1-Incubator: fan convection, temp range 5°C above ambient to 100°C. Direct reading thermostat, Innershield door. volume; 66 litres; shelves, thermometer	1,500.00
31.	2 cases (36) Culture bottles (McCarthy)	70.00
32.	1 case (10 ea) of Cover glass/slide No. 0 or 1 18 x 18 mm	30.00
33.	1 case (20 boxes) Micro slides (75 x 25 mm)	60.00
34.	2 cases (72). Petri dishes (Culture) Kunex or Pyrex) diameter: 100 mm x 20 mm (ht)	60.00
35.	1-Knock down unit of sterilization or laminar flow bench	1,440.00
Sub. Total		<u>6,855.00</u>

SPARE TOTAL=

+ \$ 13,946.00  
2,039.00  
6,855.00  
\$ 22,840.00  
                    

\$ 22,840.00



ANNEX 3

EXPLANATION NOTES ON "APPRAISAL OF CURRENT F.I.D.U. STAFF"

1. When making an assessment of the existing F.I.D.U. staff it is important to make some allowance for the general neglect that has occurred over the years in terms of low investment in machinery, tools, spares and the very low wage levels that afford little incentive. Coupled with this is the general mis-management of the area which has shown little guidance of direct supervision to the work-force.
2. The rating to measure present and future potential is a simple 1 - 10 scale with 5 being average and 10 excellent. The ratings are totally subjective being based on the consultant's opinion or those of the existing management.
3. It is obviously difficult to gage a person's reaction to working in a completely different environment and how he/she would react to various incentives and as such all staff recommended to be retained should only be on the basis of a three months trial period. There should be a clear understanding that failure to meet the standards of performance and conduct set by the new management will result in dismissal.

NAME	POSITION	RATING		APPRAISAL OF CURRENT PERFORMANCE	RECOMMENDATION FUTURE POTENTIAL/TRAINING
		PRE-SENT	POTEN-TIAL		
Bentham, Winston	Works manager (AG)	4	4	Obviously knowledgeable on Guyanese timber species. Appears to have lost any drive or ambition that he may have had, possibly due to difficulties in funding. Deterioration of existing machinery and equipment during his tenure indicates few industrial/management skills. Tends to "administrate" from his desk.	Cannot be recommended for a similar position in the proposed new company. Difficult to place in new environment. Age is such that re-training is not relevant. Faithful service deserves some position in Forestry Commission for remaining (2 years) service.

APPRAISAL OF CURRENT F.I.D.U. STAFF

Welcome,  
Righton

Production  
superinten  
dant

4

6

Although he appears to get more involved in the day to day activities of the FIDU, he is rather lethargic and has a very negative attitude to problem-solving. Lacking in management skills and according his superior is loathe to make management decisions or "go into writing", shows good skills within the Tool Sharpening Centre

Has been on G.A. Wood's saw doctoring course in UK and such rare skills in Guyana cannot be wasted. Recommended for supervisor/manager of Tool Sharpening Centre subject to management training course.

Smith,  
Shirley

Billing/re  
cords  
clerk

5

-

Appears under-employed. Intends leaving very shortly.

Not included in future staffing plans.

Gainer,  
Jocelyn

Officer  
supervisor

4

4

Typing apparently very poor (W. Bentham). Suffers from poor health and consistently absent.

Not recommended for retention.

Bruce, Gladwin	Electrical supervisor	5	8	Qualified, shows good skills but appears to have an attitude problem. Very self-seeking consistently looking for "private" work outside own duties. Talks of emigrating. Drinks alcohol on site.	Has good potential if attitude and personal discipline can be improved. Recommended trial period as Electrical Maintenance Engineer under a good supervisor. Proposed enhanced wage rates may motivate him.
Stewart, James	Electrician	3	3	Lazy, has no ambition, has already refused training courses at Guyana Technical Institute.	Not recommended for retention.
Joseph, Tony	Saw doctor	4	7	Both reasonably well trained, but further exposure to tooling of a wider range than currently handled is required. Activity level very low, not supervised correctly.	Both recommended for retention within Tooling Centre. Must produce more and must have very close supervision.
Stewart, James	Saw doctor	4	7		

Anthony,  
Martin

Moulding  
foreman

7

8

Very willing and keen to see the FIDU become a successful unit. No mean achievement in keeping the Wadkin 6-head moulder working despite a good spares/tooling replacement facility. Well thought of by local manufacturers. In staff terms the FIDU's major asset.

Obvious choice for moulding section working supervision. Requires exposure/training on more modern machinery and tooling which despite his age (mid-fifties) he would have no problem in undertaking. Must be retained.

Roberts,  
Clarence

Moulder  
operator/  
setter

5

8

Trained by Anthony. Willing and ambitious. Operates at a reasonable pace.

Again requires additional training on more modern equipment and again would react positively. Recommended as Moulder Setter/Operator.

Burrowes,  
Mark

Carpenter/  
Joiner 1

4

4

Lethargic. Basic knowledge of carpentry, joinery, though untrained. Building rather than furniture/joinery carpenter.

Unlikely to progress. Would not manage pace of high volume production areas. Not recommended for retention.

Pertab, Chetram	Grader/sto ckyard	6	8	Good knowledge of local species and identification of timber faults.	Potential to succeed as yard man given additional training in storage methods and inventory control/stock rotation. Recommended to retain on trial basis.
Harris, Cuthbert	Cross-cut operator	7	7	Appears willing and will work at a reasonable pace when work is available. Has knowledge of all sizing operations, including band-saw rip, from previous employment.	Recommended to retain as sizing shop operator.
Fredricks , Brian	Labourer III	5	8	Very willing and has ambitions to improve to machine operator. Has youth on his side.	Recommended for re-training in production area. Could progress well.
Moore, Ivan	Joiner	4	4	In his 60's. Basic joinery skills. Shows not great pace. No supervisory abilities.	Not likely to progress with retraining and not recommended for retention.

Chisholm, Sean	Joiner	5	8	Both young, able to "work through" all operations to finish assembly. Energetic and ambitious though frustrated through lack of work continuity.	Recommended to be re-trained as production operators in the new facility.
Cossou, Wendel	Joiner	5	8		

EXPLANATORY NOTES ON OPERATION CAPACITY  
AND MANNING CALCULATIONS

1. All machine capacities are based on the available capacity of kilned timber established at 696,000 F.B.M. per annum.
2. Calculations of capacities on machinery dedicated to panel production is based on a weekly production of panels sized 1950mm x 950 x 22 at 300 panels per week at the usage of 30.33 F.B.M. per panel on 9100 F.B.M. per week/436,800 F.B.M. per annum
3. The remaining available kilned timber capacity of 259,200 F.B.M. has been dedicated in total to the production of dressed and moulded components processed by the Wadkin 6-head moulder.
4. All calculations "per week" are based on a 39 hour week and all calculations "per year" are based on a 48 week year.
5. The work content in occasional cutting of dressed and moulded components on circular/dimension saws has been included in the Estimates of Panel Saw Capacity for ease of calculation.
6. To ensure an efficient line balance two additional "float" operators have been included in the total manning requirement.



**ESTIMATED PRODUCTION CAPACITIES****KILNS**

Kiln Description	F.B.M PER CHARGE	Average Kiln Cycle	CAPACITY F.B.M	
			Per Week	Per Year
MELLS HIGH TEMPERATURE	7500	3 Weeks	2500	120000
OSMOSE LOW TEMPERATURE	20000	5 Weeks	4000	192000
IRVINGTON-WOORE LOW TEMPERATURE	40000	5 Weeks	8000	384000
Total F.B.M Capacity:			696000	

**MACHINERY**

MACHINE DESCRIPTION	No. of m/cs	Production:			F.B.M Per Hour	75% CAPACITY	
		Set/Ancill: Mine/F.B.M	Total Mine/F.B.M	Total Mine/F.B.M		/39hr Week	/48week Year
Cross Cut Saws	2	0.030	0.100	0.130	923	27000	1296000
Edge/Rip Saw	1	0.020	0.250	0.270	222	6500	312000
Band-Saw Rip	1	0.010	0.200	0.210	286	8365	401544
4 Sided Planer	1	0.012	0.051	0.063	952	27857	1337143
Wadkin Moulder	1	0.080	0.183	0.243	247	7222	346666
Radio Frequency Press	1	0.015	0.100	0.115	521	15260	732480
Panel Saw	1	0.005	0.020	0.025	2400	70200	3369600
Wide Belt Sander	1	0.002	0.020	0.022	2727	79772	3829056

**PERCENTAGE OF CAPACITY REQUIRED**

	REQUIRED CAPACITY P.A	AVAILABLE CAPACITY P.A 75%	% AVAILABLE / REQUIRED
CROSS CUT SAW	696000	129600	53.7%
EDGE/RIP SAW BAND SAW RIP	696000	713544	97.5%
4 SIDED PLANER	436800	1337143	32.7%
WADKIN MOULDER	259200	346666	74.8%
RADIO FREQUENCY PANEL PRESS	436800	732480	59.6%
PANEL SAW	436800	3369600	13.0%
WIDE BELT SANDER	436800	3829056	11.4%

**MANNING LEVELS**  
**DIRECT LABOUR - MANNING REQUIREMENTS**

OPERATION	F.B.M. PER 39 HOUR WEEK	TOTAL MINUTES PER F.B.M.	TOTAL MINUTES PER 39 HOUR WEEK	STANDARD HOURS PER WEEK @ 100%	HOURS PER WEEK @ 75%	MAN OPERATION	MAN HOURS REQUIRED PER WEEK
CROSS-CUT	14500	0.130	1885	31.4	41.9	2	83.8
RIP - EDGE SAW	7250	0.270	1957.5	32.6	43.5	2	87.0
RIP - BAND SAW	7250	0.210	1522.5	25.4	33.8	2	67.7
4 SIDED PLANER	9100	0.063	573.3	9.6	12.7	2.5	31.9
MAKIN MOULDER	5400	0.243	1312.2	21.9	29.2	2.5	72.9
RADIO FREQUENCY PRESS	9100	0.115	1046.5	17.4	23.3	2	46.6
PANEL SAW	14500	0.025	362.5	6.0	8.1	2	16.6
WIDE BELT SANDER	18200	0.022	400.4	6.70	8.9	2	17.8
GRAIN/COLOUR MATCH	9100	0.132	1201.2	20.0	26.7	1	26.7
WRAP AND STRAP PANELS	9100	0.013	119.3	2.0	2.6	1	2.6

PROCESS  
-->  
11 OPERATORS

PANEL  
-->  
5 OPERATORS

TOTAL = 453.2  
 No of Operators - 39 = 11.6  
 Plus 15% Absenteeism = 13.3 Operators (say 14)  
 Plus Balance 2 Operators = 16 Operators

MANNING LEVELS

INDIRECT LABOUR - FACTORY AND STAFF

OPERATION	NO.
Timber Yard/kilns	2
Boilermen	2 (one on serondment)
Stores	1
Process Foreman	1
Factory material handling	1
Panel Foreman	1
Tooling Foreman	1
Sawdoctoring	3
Maintenance Foreman	1
Electrical Maintenance	1
Mechanical Maintenance	1
Total	<hr/> 15

STAFF

Job description	No.
Production Manager	1
Materials Manager	1
Technical Manager	1
Administration Manager	1
Training Manager	1
Production Controller	1
Stock Controller	1
Laboratory Assistants	2
Draughtsman	1
Technician	1
Accounts Clerk	1
Sales Clerk	1
Purchase Clerk	1
Total	<hr/> 14

ANNEX 5

ESTIMATED PRODUCTION COSTS AND PROFITS PROJECTION

EXPLANATION ON BASES OF COST CALCULATIONS

LABOUR

Labour costs are calculated at an averaged level of US\$ 0.36 per hour (G\$ 36) and have been recovered either on the basis of the number of hours required or as a pro rata share of the annual labour cost relevant to the particular time cycle of the production process. For example the direct labour involved in the loading and unloading of the Wells kiln is calculated to be equivalent to 32 man hours per cycle whereas the indirect labour cost of manning the steam boiler has been pro-rated from the total labour cost of manning the boiler per annum.

MATERIAL

Costs of the timber required to manufacture wood products is based on the current price of Crabwood which is considered to be the most common timber likely to be used.

OVERHEADS

The overhead recovery rate is set at 50% . The actual recovery rate calculated was 38% but given the unstable price movements that are currently prevalent in Guyana a safety factor was added. The 38% calculated is the total cost of overheads as a percentage of the total annual cost of labour and raw materials (timber).

EXPLANATION ON BASES OF COST CALCULATIONS

OVERHEADS

The total overhead cost includes: -

- Light, Heat and Power
- Consumable Materials
- Compressor/Generator Fuel
- Staff and Ancillary Workers Wages and Salaries
- Vehicles/Transport
- Rent of Land
- Tooling Replacement/Machine Maintenance
- Interest on Loans
- Subsidies to Training School and Laboratory/Library
- Building Maintenance
- Office/Stationery Supplies
- Telephones

GENERAL

All annual costs or parts thereof have been calculated on a 48 week year. All weekly costs or parts thereof have been calculated on a 39 hour week.

ANNEX 5.1

ESTIMATED PRODUCTION COSTS

1. KILNING COSTS

(a) Irvington - Moore - 40,000 FBM per 5 week cycle

Costs per cycle: -

Direct Labour:-	US\$
Fork Lift - Load/unload kiln - 6 m/h	2.16
Monitor - 40 m/h	14.40
Pre-kiln cross-cut - 40 m/h	14.40
Indirect Labour:	
Wood Yard/material handle/air dry	31.68
Boiler staff	106.30
Electricity - controls/fans	17.30
	<hr/>
	186.24
50% plus overheads	279.36
33 1/3 plus profit	372.39

Total cost - US \$ 373.39 per 40,000 FBM  
- US \$ 0.0093 per FBM  
- US \$ 0.93 per 100 FBM

N.B. Costs for the 20,000 FBM Osmore kiln will be the same.

(b) Wells High Temperature - 7500 FBM per 3 week cycle

Costs per cycle: -

Direct Labour:-	US\$
Fork Lift - Load/unload kiln - 16 m/h	5.76
Monitor - 28 m/h	10.08
Pre-kiln cross-cut - 7.5m/h	2.70
Indirect Labour:	
Wood Yard/material handle/air dry	5.94
Boiler staff	19.92
Electricity - controls/fans	10.38
	<hr/>
	54.78
50% plus overheads	82.17
33 1/3 plus profit	109.53

Total cost - US \$ 109.53 per 7,500 FBM  
- US \$ 0.0146 per FBM  
- US \$ 1.46 per 100 FBM

AVERAGED KILN COSTS

Kiln	Annual Production FBM	US\$ Cost/FBM	US\$ total Cost
Irvington-Moore	384 000	0.0093	3571.20
Osmore	192 000	0.0093	1785.60
Wells	120 000	0.0146	1752.00
	<u>696 000</u>		<u>7108.80</u>

Average cost - US\$ 7108.80 - US\$ 0.0102/FBM

696 000 FBM

2. DRESSED/MOULDED COMPONENTS

Direct Labour: -		US\$
Cross Cut @ .0043 man hrs/FBM		.0016
RIP @ .008 man hrs/FBM		.0029
(Average wadkin/4 side plane)		
Mould @ .0054 man hrs/FBM		.0019
Dimension saw @ .0043 man hrs/FBM		.0016
Indirect Labour		
Factory material handle		.0010
Material		
Kilned Timber per FBM		.3322
	Total	<u>0.3412</u>
(To cover special mouldings)	15% Tooling surcharge	0.3924
	50% Overheads	0.5886
	33 1/3 profit	0.7848

Total cost - US \$ 0.79 per FBM

3. GLUED PANELS - 80" x 40" x 1" - 30.33 FBM

Direct Labour: -		US\$ (Panel)
Colour/grain match @ .0029 man hrs/FBM		0.0317
Glue Press @ .0051 man hrs/FBM		0.0559
Panel saw @ .0011 man hrs/FBM		0.0120
Wide belt sand @ .0010 man hrs/FBM		0.0109
Wrap and strap @ .0003 man hrs/FBM		0.0033
Indirect Labour: -		
Factory material handle		0.0303

Material: -

Glue	0.0500
Poly-wrap	0.0250
Strapping	0.0015
Pallet	0.0250

Total	0.2456
50% Overheads	0.3684
33 1/3 profit	0.4912

\* Dressed timber prise 30.33 FBM @ US \$ 0.79 per FBM 23.9607  
Total sales price per panel 24.45  
Say US \$ 25.00/panel

\* Dressed timber price already includes overhead recovery and profit.

TENTATIVE ANNUAL PROFITS PROJECTION

1. WOOD PRODUCTS

(a) GLUED PANELS (based on 1975 mm x 975 x 22) US\$

Sales Price Per M<sup>3</sup> = 349.33  
Cost Price Per M<sup>3</sup> = 251.28

Profit Per M<sup>3</sup> = 98.05

Annual Production = 1163M<sup>3</sup>

Annual Profit = US\$ 114,032

(b) MOULDED/DRESSED COMPONENTS

Average Sales Price Per M<sup>3</sup> = 334.82

Average Cost Price Per M<sup>3</sup> = 250.05

Profit Per M<sup>3</sup> = 84.77

Annual Production = 480M<sup>3</sup>

Annual Profit = US\$ 40,690

N.B.- Additional Charges will be levied for special tooling at cost.

Total Wood Products Profit US\$ 154,722

2. IMPREGNATION

Average Charge Price Per M<sup>3</sup> = 38.00

Average Cost Price Per M<sup>3</sup> = 26.85

Profit Per M<sup>3</sup> = \$9.15

Volume Processed Per Annum = 4030

Annual Profit = US\$ 36893

3. TOOLING SERVICE CENTRE

The various purchase costs of a range of saws and blades/knives etc. have not as yet been received from suppliers. These costs are required to calculate the



level of hire charges and sharpening fees charges to the industry.

However it is proposed that on an estimated volume of 7200 exchanges per annum profits should be set at US\$ 18000 P.A.

4. CENTRAL MATERIAL AND SPARES UNIT

It is proposed that on an estimated annual turnover of US\$ 250,000, profits should be set at 5% over and above the purchase cost of the goods plus handling charges and overhead recovery. this would generate a profit of US\$ 12500 P.A.

All other services of the Company will be non-profit making and receive subsidies from the profitable activities of the unit. The subsidy has been included in the overhead recovery rate used to calculate the above profits.

The total estimated profit potential is therefore:-

US\$ 222,115 P.A.

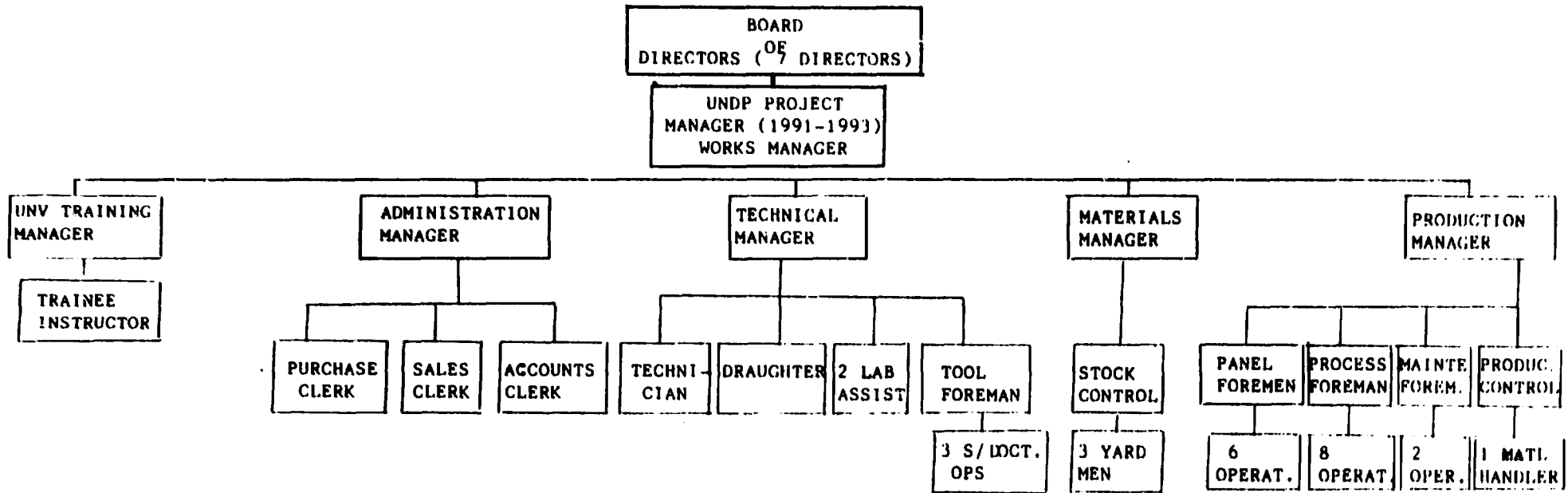
"WOOD PRODUCTS CENTRAL SERVICES" - REHABILITATION SCHEDULE/COSTS

PROJECT REF NO	PROJECT TASK	TASK DURATION - WEEKS		ESTIMATED COST US\$	
		FROM	TO	TOTAL	
<b>1 KILNS</b>					
1.1	Rehabilitate Yorkshire Boiler	April 1st	May 11th	6 Weeks	8400
1.2	Alternations to Wood Waste Screw Feed	May 11th	May 28th	2 Weeks	3500
1.3	Complete/Fit Controls to Osmore Boiler	May 27th	June 24th	4 Weeks	6500
1.4	Install Wood Waste Feed System to Boiler	June 25th	July 16th	3 Weeks	3500
1.5	Convert Oil Fired Boiler to wood fired	July 17th	Aug 14th	4 Weeks	8000
1.6	Install Wood Waste Feed System to Boiler	Aug 15th	Aug 29th	2 Weeks	2000
1.7	Refit Irvington Kiln Doors	April 1st	April 8th	1 Week	250
1.8	Make and Fit osmore Kiln doors	April 9th	April 30th	3 Weeks	1050
1.9	Fit exhaust roof covers	May 1st	May 15th	2 Weeks	750
1.10	Rehabilitate Walls kiln/controls	May 16th	May 23rd	1 Week	1850
<b>TOTALS</b>		<b>April 1st</b>	<b>Aug 29th</b>	<b>28 Weeks</b>	<b>35880</b>
<b>2 LAND CLEARANCE AND DRAINAGE</b>					
2.1	Clear and Drain Air-Dry Shed No. 1	April 1st	April 22nd	3 Weeks	1750
2.2	Clear and Drain Press/Mould Shop Areas	April 23rd	May 7th	2 Weeks	800
2.3	Clear and Drain Sizing Shop and Timber Store	May 8th	May 29th	3 Weeks	950
2.4	Clear and Drain Air Dry Shed No. 2	May 30th	June 20th	3 Weeks	1750
2.5	Secure Drainage in Impregnation Shed	June 21st	July 5th	2 Weeks	500
2.6	Secure Drainage and Clear Store Area	July 6th	July 20th	2 Weeks	500
2.7	Miscellaneous Site Drainage - Pumps	July 21st	Aug 11th	3 Weeks	2500
<b>TOTALS</b>		<b>April 1st</b>	<b>Aug 11th</b>	<b>18 Weeks</b>	<b>8750</b>
<b>3 CONCRETE AND RE-SCREEDING</b>					
3.1	Hardcore and Concrete Air Dry No. 1	April 23rd	May 14th	3 Weeks	6750
3.2	Concrete and Re-screed Press/Mould Shops	May 15th	May 29th	2 Weeks	3250
3.3	Concrete and Re-screed Sizing Shop/Timber Store	May 30th	June 20th	3 Weeks	3750
3.4	Hardcore and Concrete Air Dry/Shed No. 2	June 21st	July 12th	3 Weeks	6750
3.5	Concrete Impregnation Shed Entrance	July 13th	July 20th	1 Week	350
3.6	Concrete and Re-screed Store Block Area	July 21st	Aug 4th	2 Weeks	3250
3.7	Re-screed Training School Area	Aug 5th	Aug 12th	1 Week	850
3.8	Miscellaneous Concrete repairs	Aug 13th	Aug 27th	2 Weeks	1800
<b>TOTALS</b>		<b>April 23rd</b>	<b>Aug 27th</b>	<b>17 Weeks</b>	<b>26750</b>
<b>4 BUILDING EXTENSIONS/REFURBISHMENT - TEAM 1</b>					
4.1	Build/Refurbish Generator Room	April 1st	April 15th	2 Weeks	750
4.2	Refurbish Maintenance Shop	April 16th	April 30th	2 Weeks	750
4.3	Refurbish Office Block	May 1st	May 15th	2 Weeks	1000
4.4	Build Air Dry Shed No. 1	May 16th	June 13th	4 Weeks	12250
4.5	Restructure/Refurbish Laboratory	June 14th	July 12th	4 Weeks	8500
4.6	Build Air Dry Shed No. 2	July 13th	Aug 10th	4 Weeks	12250
4.7	Restructure/Refurbish Training Area	Aug 13th	Aug 27th	2 Weeks	3750
<b>TOTALS</b>		<b>April 1st</b>	<b>Aug 27th</b>	<b>20 Weeks</b>	<b>39250</b>

\* The costs for boiler rehabilitation are shown for record only since the recommendations is to buy a new boiler. (See quote from Saroup and Annex 1).

PROJECT REF NO	PROJECT TASK	TASK DURATION - WEEKS		TOTAL	ESTIMATED COST US\$
		FROM	TO		
<b>5 BUILDING EXTENSIONS/REFURBISHMENT - TEAM 2</b>					
5.1	Refurbish Wharf	April 1st	April 29th	4 Weeks	4500
5.2	Refurbish Raw material Store	April 30th	May 14th	2 Weeks	850
5.3	Refurbish Training School Rest Room	May 15th	May 29th	2 Weeks	700
5.4	Build and Refurbish Press/Mould Shops	May 30th	June 27th	4 Weeks	16250
5.5	Build & Refurbish Sizing Shop & Timber Store	June 28th	July 19th	3 Weeks	8500
5.6	Refurbish Boiler Rooms	July 20th	Aug. 3rd	2 Weeks	700
5.7	Rebuild Stores Block Area / Rest Room	Aug. 5th	Sept. 2nd	4 Weeks	9750
<b>TOTALS</b>		April 1st	Sept. 2nd	21 Weeks	41250-
<b>6 MACHINERY AND EQUIPMENT</b>					
6.1	Re-Build / Re-Tool Madkin Moulder	April 1st	April 29th	4 Weeks	5000
6.2	Install Generator And Oil Tank	April 30th	May 14th	2 Weeks	500
6.3	Install Maintenance Equipment	May 15th	May 22nd	1 Week	850
6.4	Re-Build / Re-Tool Existing Machinery	May 23rd	June 27th	5 Weeks	6000
6.5	Commission & Test New 4 Side Planer	June 28th	July 18th	2 Weeks	2500
6.6	Commission & Test Radio Frequency Press	June 28th	July 12th	2 Weeks	3500
6.7	Commission & Test Wide Belt Sandmill	July 12th	July 19th	1 Week	750
6.8	Commission & Test Panel, Band, Dimension Saws	July 12th	July 19th	1 Week	750
6.9	Install/Refurbish Dust Extraction System	July 20th	Aug. 17th	4 Weeks	12250
6.10	Miscellaneous Engineering Work	Aug. 18th	Sept. 1st	2 Weeks	2500
<b>TOTALS</b>		April 1st	Sept. 1st	24 Weeks	30100
<b>7 ELECTRICAL INSTALLATIONS</b>					
7.1	Electrical Work - Existing Machinery	April 1st	April 29th	4 Weeks	1250
7.2	Electrical Work - Raw Material Store	April 30th	May 7th	1 Week	350
7.3	Electrical Work - Maintenance Shop	May 8th	May 15th	1 Week	750
7.4	Electrical Work - Generator Room	May 18th	May 23rd	1 Week	500
7.5	Electrical Work - Office Block	May 24th	May 31st	1 Week	500
7.6	Electrical Work - Rest Room - Training	June 1st	June 8th	1 Week	300
7.7	Electrical Work - Laboratory/Office	June 9th	June 23rd	2 Weeks	1750
7.8	Electrical Work - Press Moulding Shops	June 24th	July 22nd	4 Weeks	2500
7.9	Electrical Work - Sizing Shop	July 23rd	Aug. 3rd	2 Weeks	850
7.10	Electrical Work - Boiler/Controls	May 4th	Aug 18th	2 Weeks	1250
7.11	Electrical Work - Stores Block/Rest Room	Aug 19th	Sept. 2nd	2 Weeks	500
7.12	Electrical Work - Training School	Sept. 3rd	Sept. 24th	3 Weeks	1500
<b>TOTALS</b>		April 1st	Sept. 24th	24 Weeks	12000
<b>8 IMPREGNATION PLANT</b>					
8.1	Repair Impregnation Chamber Door	May 1st	May 8th	1 Week	750
8.2	Clean/De-Scale Chamber	May 9th	May 23rd	2 Weeks	350
8.3	Replace Pump	May 24th	May 31st	1 Week	750
8.4	Refurbish Bogies/Tacking	June 1st	June 15th	2 Weeks	500
<b>TOTALS</b>				6 Weeks	2350
<b>GRAND TOTALS:-</b>					
Man Weeks - 158					
Cost = US\$ 196330					
UNDP - US \$ 80330					
New company US\$ 116000					

F.I.D.U. \_ PROPOSED ORGANISATION CHART



ANNEX 8

F.I.D.U.  
 PROPOSED SALARY STRUCTURE AND BENEFITS  
 GUYANESE DOLLARS PER MONTH

GRADE	JOB TITLE	BASIC SALARY RANGE		HOUSING ALLOWANCE	TRANSPORT ALLOWANCE
4	Works manager	12000	15000	7500	5000
3	Production manager	9000	12000	5000	4000
3	Materials manager	9000	12000	5000	4000
3	Technical manager	9000	12000	5000	4000
3	Administration manager	9000	12000	5000	4000
3	Training manager	9000	12000	5000	4000
2A	Training instructor	7500	9000	3500	3000
2	Purchase clerk	5000	7500	2000	2000
2	Sales clerk	5000	7500	2000	2000
2	Accounts clerk	5000	7500	2000	2000
2	Technician - standards	5000	7500	2000	2000
2	Draughtsman - Design	5000	7500	2000	2000
2	Laboratory assistant	5000	7500	2000	2000
2	Stock controller	5000	7500	2000	2000
2	Panel foreman	5000	7500	2000	2000
2	Process foreman	5000	7500	2000	2000
2	Maintenance foreman	5000	7500	2000	2000
2	Production controller	5000	7500	2000	2000
1A	Direct operators	2500	4167	1500	1500
1	Indirect operators	2000	3250	1000	1000

PROPOSAL TO POTENTIAL PRIVATE SECTOR INVESTORS IN  
"WOOD PRODUCTS CENTRAL SERVICES LIMITED" (F.I.D.U. KINGSTON)

It is proposed that a new private limited Company "Wood Products Central Services Limited" be formed to operate the existing Forest Industries Development Unit in a revitalised form, supplying a range of products and services to the Guyana furniture and joinery manufacturers to assist them in increasing the export potential of their industry.

The Company will be completely autonomous and comprise of a thirty per cent Government and seventy per cent private sector holdings in equity. Private sector investors will be drawn solely from members of the Forestry and Wood Products Group of the Guyana Manufacturers Association Limited.

Funding via the United Nations Development Programme will be sought, to finance the rehabilitation of existing machinery and equipment and consultancy assistance in the initial development and management of the Company.

Investment by the private sector will be used for the rehabilitation of existing building, the construction of additional buildings and initial working capital. The Company will operate on a profit-making basis and the profits will be used in part to finance the non-profit making areas of operation including research/laboratory facilities, library/data collection, training and future expansion in capital machinery and equipment.

The various production facilities and services to be offered by the new Company are as follows:

1. TRAINING UNIT:

A facility to train up to fifteen apprentices per three month course in modern furniture and joinery manufacturing techniques. The apprentices will be sponsored by

local manufacturers who will pay their course fees and provide a subsistence allowance during the period of their training. In addition to training in the setting and operating of a range of wood-working machinery, instruction will also be given on safety and discipline at work, the handling of production control and labour control documentation and the principles of serial production methods.

Additional specialist training courses will be offered on a variety of subjects including:

- (i) Timber Management - air drying storage techniques, kilning methods and schedules, timber selection, stock rotation and inventory control.
- (ii) Tooling Maintenance - saw doctoring, knife sharpening methods and machinery, tooling change frequencies, damage fault finding.
- (iii) Management Control Systems - product costing, production planning and control, labour controls, job cards, capacity planning.
- (iv) Quality Assurance - organisation of effective quality control systems, measuring equipment, quality check frequencies/tolerances.
- (v) Finishing - wood preparation/sanding techniques, grit sizes/uses, finishing materials, sealers, lacquers, spray equipment, booths environment control, drying techniques/times conveyerised systems.
- (vi) Design - the optimum product range, popular design features/styles, designing to indigenous species, modular techniques of design, component commonality.

(vii) Marketing - market surveys, developing a product range, market identification, features of various foreign markets - USA, Canada, Europe, etc.

2. KILNING:

A combined kilning facility for the seasoning of up to 700,000 FBM per annum of a variety of indigenous hardwoods. Kilning facilities in Guyana are limited and seasoned timber to a moisture content of between 8% to 12% is essential for the export of furniture and joinery products. It is proposed that the UNDP fund the rehabilitation of the existing kilns and boilers and provide additional funds for a vacuum type kiln for short cycle seasoning.

In addition there will be 1350 M<sup>2</sup> of air drying sheds and a 225 M<sup>2</sup> seasoned timber store.

All kilned timber will be utilised by the Company in their wood products operations (See 4 below).

3. WOOD PRESERVATION:

The FIDU has extensive wood preservation facilities provided some time ago by the UNDP. Although this plant is not currently functioning, it can be made operational at quite minimal cost. The plant has a capacity of 4032 M<sup>3</sup> of timber per annum.

The absence of plant of this type is a serious block to the use of the quite prolific forestry stocks of less durable species found in Guyana, many which are attractive alternatives to the more common durable species currently used. It is proposed that the company charge fees to local saw mills to impregnate these



species or buy these species, treat and sell them to the industry at enhanced prices.

4. WOOD PRODUCTS:

Much of the capital equipment and machinery on which the more developed countries have based their efficient wood products industry is outside the financial ability of the small to medium-sized Guyanese manufacturers. It is proposed that a centralised facility incorporating this type of machinery be established via funding to provide semi-processed componentry to local industry at a cost lower than their existing machinery can achieve, but at a level of cost that is still profitable to the new Company.

In addition, the volume that could be produced with the more efficient higher cost equipment would be considerably higher than the existing capability of the industry, allowing a higher level of export production.

This equipment would include:

- i) Four-sided Planners/Moulders to provide fully dressed timber and mouldings. The Guyanese methods of jointing, surface planners/thicknessers is time consuming and as such a constraint on volume production of dressed timber. Similarly, the methods employed in the joinery industry in producing mouldings for window and door components via the above methods plus spindle moulders, routers, saws etc. is equally a restraint on volume production. The Company, through efficient moulding and four-sided planer facilities would sell dressed and profiled components to the industry at prices that are again mutually profitable to both the

industry and the Company.

- ii) Radio Frequency (RF) Glued Panel Press - This type of equipment can produce a glued panel up to 2,000 mm x 1,000 mm x 50 mm in around one to three minutes. A panel of similar size produced via the methods commonly employed in Guyana would take up to twelve (12) hours. This is a serious block to the volume export of table and cabinet type furniture. The provision of this centralized service would vastly improve the export potential of Guyanese manufacturers. It is again proposed that this equipment be funded by the U.N.D.P. as would a wide belt sander and panel saw, which are machines complementary to the panel press process.

5. LABORATORY

It is intended that laboratory services will be developed in two phases. Phase I will cover the first two years of operations and will be concerned with providing services that are complementary to the practical requirements of the industry including:

- i) kilning research into schedules, relative degrade rates, defect analysis etc. for the relevant species.
- ii) Wood preservation research into preservative solutions, impregnation pressures per species, dip immersion cycles etc.
- iii) Research into finishing materials and processes including stains, fillers, lacquers, sealers, spray equipment suitable for use with local species.

- iv) Gluing research into glue types per species, species resistance through acid, resin etc. application rates, pot or shelf life, effects or moisture content levels.
- v) General problem solving on failures on particular species.
- vi) Tool/Saw sharpening and change frequencies per species.
- vii) Basic data collection and information/library services.

It is proposed that the necessary equipment be funded by UNDP. Phase II will be conducted with more long term academic research into lesser known species, wood, anatomy, durability, "graveyard" testing etc. This Phase should be financed through profits accrued from the first two years operations of the new Company.

Access to laboratory and information/library services will be through individual company subscriptions although it is envisaged that this area, along with the training unit will attract subsidies from the profit-based activities of the Company.

6. CENTRAL MATERIALS AND SPARES UNIT

The problems associated with industry acquisition of materials and spares, tooling etc, wither through hard currency restrictions of lack of sourcing knowledge, is well known. It is proposed that the Company act as a central purchasing agency for the industry to allow bulk purchase at discount prices and to improve the industry knowledge on materials sourcing.

The revised site plan for the proposed Company includes substantial storage areas for tooling, hardware etc. and a raw material store for stains, sealers, lacquers, glues, etc.

7. FURNITURE AND JOINERY EXPORT STANDARDS

It is intended that the Company will assist the Guyana Bureau of Standards in establishing industry quality standards for exported wood products and will act as an arbiter/monitor of these standards as implemented by Guyanese manufacturers. The standards set will not only reflect the quality of the finished product but also the standards that exist within the individual companies in terms of general environmental conditions, house keeping, safety procedures, management control systems, product costing systems, quality assurance methods, machine and tool maintenance scheme all designed to ensure a progressive and constantly improving manufacturing base in Guyana and export quality that the industry can feel justly proud of.

A compliance certificate would be awarded by the Guyana Bureau of Standards to Companies that achieve the required standard allowing them to carry an industry "hallmark" on their furniture.

8. SAW DOCTORING/TOOL SHARPENING

The existing service should be considerably expanded both in personnel manning and tooling volume. It is proposed that a tooling exchange service be introduced whereby users delivering saws, blades etc. for sharpening will immediately receive a replacement. The various tools will remain the property of the Company with users paying a rental plus servicing charge.

This should help to make the service more attractive to the industry and encourage the individual companies to operate the correct tool change frequencies, a major problem that seriously effects both quality and timber utilisation.

DRAFT MEMORANDUM AND ARTICLES OF ASSOCIATION

THE COMPANIES ACT CHAPTER 89:01

A PRIVATE COMPANY LIMITED BY SHARES

MEMORANDUM OF ASSOCIATION

OF

WOOD PRODUCTS CENTRAL SERVICES LIMITED

1. The names of the Company is Wood Products Central Services Limited.
2. The registered office of the Company will be situated at.
3. The objects for which the Company is established are:-
  - (a) To carry on the business of Support Servicing to the Wood Products Industry of Guyana
  - (b) To provide seasoned timber componentry to any other company/companies or persons involved in the export of furniture and joinery products from Guyana or to export directly alone or with any other company/companies or persons the said seasoned timber componentry.
  - (c) To provide services to the Guyana Wood Products Industry in the areas of preservation treated timbers and tooling maintenance.
  - (d) To advise on the materials sourcing and economic purchase costs of any product or services of benefit to any business industrial activity highlighted in para (b) and to make purchase of such products and services either alone or jointly with any business industrial activity highlighted in para (b) as deemed beneficial to the interests of the Company.
  - (e) To conduct training programmes for any personnel involved in the industrial business of wood products manufacture including personnel of both middle and senior management levels.
  - (f) To conduct any research, laboratory, library or data collection activities deemed necessary by the Company to support any business industrial activity highlighted in para (b) either alone or in conjunction with any other company/companies, organisations or persons.

- (g) To engage in the business of providing consultancy services in the areas of the manufacturing processes, management control systems, financial, accounting, design and marketing to any business industrial activity highlighted in para (b) either alone or jointly with any other person, company, companies, organisation or funding agencies either national or international.
- (h) To assist in the establishment of quality standards for Guyanese furniture and wood products exports in conjunction with any organisation or agency prescribed by the Government of the Co-operative Republic of Guyana, and under the direction of the said Government, to assist in the monitoring and compliance certificating of any business industrial activity highlighted in para (b).
- (i) To amalgamate, enter into partnership or into any arrangement for sharing profits, unions of interest, co-operation, joint ventures or reciprocal concessions with any person or company carrying on, or engaged in, or about to carry on or engage in any business transaction which the Company is authorised to carry on or engage in, or which can be carried on in conjunction with or which is capable of being conducted so as directly or indirectly to benefit the Company. And to lend money to, guarantee the contracts of or otherwise acquire share and securities of any such company and to sell, hold re-issue, with or without guarantee, or otherwise deal with same. To amalgamate with any other company having objects altogether or in part similar to those of the Company.
- (j) To improve, manage, develop, grant rights or privileges in respect of, or otherwise deal with all or any part of the property and rights of the Company.
- (k) To vest any real or personal property, rights or interest acquired by or belonging to the Company in any, person or company on behalf of or, for the benefit of the Company, and with or without any declared trust in favour of the Company.
- (l) To subscribe for, take or otherwise acquire, and hold shares, stock debentures, or other securities of any other company having objects altogether or in part similar to those of the Company, or carrying on any business capable of being conducted so as directly or indirectly to benefit the company.

- (m) To invest and deal with monies of the Company not immediately required in any manner.
- (n) To lend any advance money or give credit to such persons of companies and on such terms as may seem expedient, and in particular to customers and others having dealings with the Company.
- (o) To carry on any other business as in the opinion of the directors may be advantageously carried on by the Company, or is reasonably and fairly incidental to any of the stated objects of the Company.

4. The liability of the members is limited.

5. The share capital of the Company is million dollars dividend into one hundred dollars each.

We, the several persons whose names and addresses are subscribed, are desirous of being formed in a Company, in pursuance of this memorandum of association, and we respectfully agrees to take the number of shares in the capital of the Company set opposite our respective names.

---

NAMES, ADDRESSES AND  
DESCRIPTIONS OF SUBSCRIBERS

NUMBER OF SHARES TAKEN  
BY EACH SUBSCRIBER

---

1. ....

.....  
Address

.....  
Description

2. ....

.....  
Address

.....  
Description



---

NAMES, ADDRESSES AND DESCRIPTIONS OF SUBSCRIBERS	NUMBER OF SHARES TAKEN BY EACH SUBSCRIBER
---	--

---

3. ....  
.....  
          Address  
.....  
          Description

4. ....  
.....  
          Address  
.....  
          Description

4. ....  
.....  
          Address  
.....  
          Description

5. ....  
.....  
          Address  
.....  
          Description

6. ....  
.....  
          Address  
.....  
          Description

7. ....  
.....  
          Address  
.....  
          Description

---

**NAMES, ADDRESSES AND  
DESCRIPTION OF SUBSCRIBERS**

---

**NUMBER OF SHARES TAKEN  
BY EACH SUBSCRIBER**

8. ....

.....  
Address

.....  
Description

9. ....

.....  
Address

.....  
Description

10. ....

.....  
Address

.....  
Description

.....  
TOTAL SHARES TAKEN

DATES THIS .... DAY OF .....

WITNESSES: TO THE ABOVE SIGNATURES

1. ....

2. ....

THE COMPANIES ACT

CHAPTER 89:01

ARTICLES OF ASSOCIATION  
OF  
WOOD PRODUCTS CENTRAL SERVICES LTD.

1. Subject to hereinafter provided the Regulations captioned or incorporated in the First Schedule, Table A, of Chapter 89:01 of the Laws of Guyana (hereinafter referred to as Table A) shall apply to the Company save in so far as they are varied or excluded hereby, this is to say, Regulations ..... and ..... shall not apply.

PRELIMINARY

2. In these Regulations, unless the context otherwise requires, expressions defined in the Companies Act, or any statutory modification thereof in force at the date, at which these Regulations become binding defined, and words importing the singular shall include the plural, and vice-versa, and words importing the masculine gender shall include females, and words importing persons shall include bodies corporate.
3. The shares shall be at the disposal of the Directors, who may allot grant options over or otherwise dispose of them in accordance with these Regulations.
4. The Company is a Private Company and accordingly:-
  - (a) the right to transfer shares is restricted in manner hereinafter prescribed.
  - (b) the number of members of the Company (exclusive of persons who are in the employment of the Company) is limited to fifty. Where two or more persons hold one or more shares in the Company jointly they shall for the purpose of this Regulation be treated as a single member.
  - (c) any invitation, to the public to subscribe for any shares or debentures of the Company is prohibited.
  - (d) the Company shall not have power to issue share warrants to bearer.
  - (e) Members of the Company will be restricted to persons, company, companies or any business organisations who are either existing members of the Guyana Manufacturers Association Ltd., Forestry and Wood Products Group or agencies persons or representative of the Government of the Co-operative Republic of Guyana unless determined

otherwise by a resolution at a general meeting of the Company members.

WRITTEN RESOLUTION

5. Subject to the provisions of the Companies Act, a resolution in writing signed by all members for the time being, entitled to receive notice and to attend and vote at the general meeting, shall be as valid and effective as if the same had been passed at a general meeting of the Company duly concerned and held.

RESTRICTION ON ALLOTMENT OF SHARES

6. The Government of the Co-operative Republic of Guyana, being a member of the Company shall be prohibited from obtaining shares in the Company in excess of an amount that is equivalent to one-third of the total share capital of the Company. This will include any person, agency, organisation, company or companies that are owned administered controlled or deemed to be acting on behalf of the said Government by the Directors of the Company.
7. With the exception of any person, agency, organisation, company or companies deemed to represent the Government of the Co-operative Republic of Guyana, no other person agency organisation company or companies will be permitted to hold shares in excess of one-sixth of the total share capital of the Company.

RESTRICTED RIGHT TO TRANSFER

8. (1) Hereinafter any Article contained in the Restricted Right to Transfer will be subject to Article 6 and Article 7 of the "Restriction on Allotment of Shares".  
(2) A share may be transferred by a member or any person entitled to transfer to any member selected by the transferor, but save as aforesaid and save as provided by Articles 8(7) and 8(9) hereof, no shares shall be transferred to a person who is not a member so long as any member (or any person selected by the Directors as one whom it is desirable in the interest of the Company to admit to membership) is willing to purchase the same at the fair value.  
(3) Except where the transfer is made pursuant to Article (3) or (5) hereof the person proposing to transfer any share (hereinafter called "the proposing transferor") shall

give notice in writing (hereinafter called the "transferor notice") to the Company that he desires to transfer the same. Such notice shall specify the sum he fixes as the fair value, and shall constitute the Company his agent for the sale of the shares to any member of the Company (or person selected as aforesaid) willing to purchase the shares (hereinafter call the "purchasing member") at the price so fixed, or, at the option of the purchasing member, at the fair value to be fixed by the auditor in accordance with Article (5) hereof. A Transfer notice may include several shares, and in such case shall operate, as if it were a separate notice in respect of each. A transfer notice shall not be revocable except with the sanction of the Directors.

- (4) If the Company shall within the space of 28 days after being served with a transfer notice, find a purchasing member and shall give notice, thereto to the proposing transferor, he shall be bound, upon payment of a fair value as fixed in accordance with Article (3) or (5) hereof to transfer the share to the purchasing member.
- (5) In case any difference arises between the proposing transferor and the purchasing member as to the fair value of a share, the auditor shall, on the application of either party, certify in writing the sum which, in his opinion, is the fair value, and in so certifying the auditor shall be considered to be acting as an expert and not as an auditor.
- (6) If in any case the proposing transferor, after having becoming bound as aforesaid, make default in transferring the share, the Company may receive the purchase money, and the proposing transferor shall be deemed to have appointed any one Director or the secretary of the Company as his agent to execute a transfer of the share to the purchasing member and upon the execution of such transfer the Company shall hold the purchase money on trust for the proposing transferor. The receipt of the Company for the purchasing money shall be a good discharge for the purchasing member, and Registrar in purported exercise of the aforesaid power the validity of proceedings shall not be questioned by any person.
- (7) If the company shall not within the space of 28 days after being served with a transfer notice find a purchasing member and give notice in the manner aforesaid, the proposing transferor, shall at anytime within three months afterwards be at liberty subject to Article (9) hereof to sell and transfer the share (if where there are more shares than one, those not placed) to any person at any price.

- (8) The Company in General Meeting may make from time to time any vary rules as to the mode in which any shares specified in any transfer notice shall be offered to the members and as to their rights in regard to purchase thereof, and in particular may give any member or class of members a preferential right to purchase the same. Until otherwise determined, every such share shall be offered to the members in such order as the Directors think fit.
- (9) A share may be transferred by a member to any child or other issue, son-in-law, daughter-in-law, father, mother brother, sister, nephew, niece, wife or husband or such member and any share of a deceased member may be transferred by his executors or administrators to any child or other issue, son-in-law, daughter-in-law, father, mother, brother, sister, niece, widow, or widower of such deceased members may have specifically bequeathed the same (and shares standing in the name of a deceased member or his executors or administrators may be transferred to the trustees of the will) and shares standing in the name of the trustees of the will of any deceased member may be transferred upon any change of trustees to trustees for the time being of such will and the restrictions in Article 2 shall not apply to any transfer authorised by this Article.
- (10) The Directors may refuse to register any transfer of a share:-
- (a) where the Company has a lien on the share of
  - (b) where the Directors are not of the opinion that it is desirable to admit the proposed transferee to membership.

But paragraph (b) of this Article shall not apply to a transfer made pursuant to Article (9) hereof.

#### QUORUM

8. No business shall be transacted at any General Meeting unless a quorum of members is present at the time when the meeting proceeds to business, save as herein otherwise provided one-half of the members entitled to attend and vote in person or by proxy shall be a quorum.

CONVENING EXTRAORDINARY MEETINGS

9. Regulation 48 of Table A shall be read as excluding the sentence beginning "if at any time there are not within the Colony ....." to the end of that sentence.

VOTE OF MEMBERS

10. Each share shall entitle its holder to one vote.

REMOVAL OF DIRECTORS

11. (1) The Company may by extraordinary resolution remove a Director before the expiration of his period of office, notwithstanding anything in its articles or in any agreement between it and him.
- (2) Special notice shall be required of any resolution to remove a Director under this regulation or to appoint somebody instead of a Director so removed at the meeting at which he is to be removed and receipt of notice of an intended resolution to remove a Director under this resolution, the Company shall forthwith send a copy thereof to the Director concerned and the Director shall be entitled to be heard on the resolution at the meeting.
- (3) If a Director removed by extraordinary resolution, represents the Government of the Co-operative Republic of Guyana as a member of the Company, the vacancy resulting from his removal must be filled by a person nominated by the Government of the Co-operative Republic of Guyana.
- (4) A vacancy created by the removal of a Director under this Section, if not filled at the meeting at which he is removed, may be filled as casual vacancy.
- (5) A person appointed Director in place of a person removed under this Section shall be treated for the purpose of determining the time at which he or any other Director is to retire, as if he had become Director on the day on which the person in whose place he is appointed was last appointed Director.
- (6) This Regulation shall be taken as depriving a person removed thereunder of any compensation or damages payable to him in respect of the termination of his appointment as Director or of any appointment terminating with that as Director and will not derogate from any power to

remove a Director which may exist apart from this Regulation.

#### DUTIES OF DIRECTORS

12. (1) A Director shall not make use of any money or other property of the Company or of any information acquired by virtue of this position as a Director or officer of the Company to gain directly or indirectly as improper advantage for himself at the expense of the Company.
- (2) The provision is in addition to and not in derogation of any other enactment or rule of law relating to the duties or liabilities of Director of a Company.
- (3) Subject to the provisions of this regulation it shall be the duty of a Director who is in any way whether directly or indirectly, interested in a material contract or proposed material contract with the Company to declare the nature of this interest at first meeting of the Directors of the Company at which it is practicable to do so.
- (4) Such material contracts shall include those which do not come before the Board.
- (5) A statement of the Directors's interest may be given in the form of a general notice to the Board that he is a member of a specified Company or Firm, and shall include the nature and extent of the Director's interest and that the Director may be regarded as interested in any contract which may after the date of notice be made the Company or Firm.

#### LOAN TO DIRECTORS

13. (1) The Company shall not make a loan to any person who is its Director or to another Company in which one or more of the Directors of the lending Company hold singly or collectively, or whether directly or indirectly, a controlling interest save the loan be in the form of customer credit whereby the Director or Directors of the Company hold the position of Director or Directors of a Company that trades with the Company.
- (2) The Company shall not enter into any guarantee or provide any security in connection with a loan made to such person as aforesaid by any other person.



INDEMNITY

14. Every Director, Managing Director, Agent, Auditor, Secretary and other office for the time being of the Company shall be indemnified out of the assets of the Company against any liability incurred by him in defending proceedings, whether civil or criminal, in which judgement is given in his favour or in which he is acquitted.

DIRECTORS POWERS

15. The Directors may exercise all the powers of the Company to borrow money, and to mortgage or charge its undertakings, property and .....capital, or any part thereof, and to issue debentures, debenture stock, and other securities whether outright or as security for any debt, liability or obligation of the Company of any third party.
16. In Regulation 115 of Table A the words "including bearers of share warrants)" shall be omitted.

NAME, ADDRESSES AND DESCRIPTIONS OF SUBSCRIBERS

Dated this            day of            .

Witnesses to the abovementioned signatures:

Name: .....

Address: .....

Name: .....

Address: .....

G U Y A N A

THE COMPANIES ACT CHAPTER 89:01 DECLARATION OF compliance with the requirements of the Companies Act Chapter 89:01 on application for registration of a Company pursuant to Section 19 (2).

Name of Company .....

Presented by .....

Director.

I,

Georgetown, Guyana declare that I am a Director engaged in the formation of ..... and that all the requirements of the Companies Act Chapter 89:01 in respect of matters precedent to the registration of the said Company incidental thereto have been complied with.

AND I make this declaration conscientiously believing the same to be true and according to the Statutory Declarations Act, Chapter 5:09.

Declarant

Declared before me this )  
day of November , 1990 )

A COMMISSIONER OF OATHS

TO AFFIDAVITS

G U Y A N A

No. of Company .....  
THE COMPANIES ACT CHAPTER 89:01  
Notice of Situation of Registered Office.

(Pursuant to Section 66 (2))

Name of Company .....

Presented by .....

Director

To the Registrar of Companies.

..... hereby gives you notice in  
accordance with section 66 (2) of the Companies Act Chapter 89:01,  
that the registered office of the Company is situate at  
.....  
Georgetown, Guyana.

Dated this            day of

Director

G U Y A N A

No. of Company .....  
THE COMPANIES ACT CHAPTER 89:01  
PARTICULARS OF DIRECTORS  
(Pursuant to Section 83 (1))

Name of Company .....  
Presented by .....

PARTICULARS OF THE PERSONS WHO ARE DIRECTORS  
OF THE COMPANY AT THE DATE OF THIS RETURN.

Name	Address	Occupation
	Georgetown Guyana.	
	Georgetown Guyana.	

Dated this . . . . . day of

Director

G U Y A N A

No. of Company .....  
THE COMPANIES ACT CHAPTER 89:01  
PARTICULARS OF SECRETARY

(Pursuant to Section 84 (3))

Name of Company .....

Presented by .....

Director

PARTICULARS OF THE PERSON WHO IS SECRETARY  
OF THE COMPANY AT THE DATE OF THIS RETURN.

Name	Address	Occupation
	Georgetown Guyana.	

Dated the            day of

Director

DRAFT AGREEMENT BETWEEN THE GOVERNMENT OF THE  
CO-OPERATIVE REPUBLIC OF GUYANA  
AND THE GUYANA MANUFACTURERS ASSOCIATION LTD.  
ON THE FORMATION OF A NEW COMPANY:  
"WOOD PRODUCTS CENTRAL SERVICES LTD.

1. The Government of the Co-operative Republic of Guyana through its appointed representatives the Guyana Natural Resources Agency (GNRA), agrees to form a new Company in partnership with members of the Forestry and Wood Products Group of the Guyana Manufacturers Association Ltd. (GMA-FWPG).
2. The Company will be known as "WOOD PRODUCTS CENTRAL SERVICES LIMITED" and will be of private limited liability status.
3. The Regulations of the new Company will be as contained in the attached Memorandum of Association and Articles of Association.
4. The initial resolutions of the Company will include:
  - (a) the division of share equity in the Company being one-third held by the Government of the Co-operative Republic of Guyana and two-thirds of the share equity held by members of the Guyana Manufacturers Association - Forestry and Wood Products Group.
  - (b) The authorised share capital of the Company set at one hundred million Guyana dollars (G\$100,000,000).
  - (c) The initial issue capital of the Company set at thirty million Guyana dollars (G\$30,000,000).
  - (d) In return for a one-third equity share in the new Company, the Government of the Co-operative Republic of Guyana will:
    - (i) Transfer all existing plant, machinery, equipment, buildings, materials, fixtures and fittings shown on the attached inventory of the Forest Industries Development Unit (FIDU) which are owned by the said Government, to the ownership of the new Company.

- (ii) Issue a ninety-nine year lease on all lands shown on the attached evaluation in favour of the new Company.
  - (iii) Grant exemption to the new company of any Consumption taxes, import or export duties and in addition grant to the new Company a five-year exemption on all capital gains taxes. The one-third equity owned by the said Government will be deemed to be valued at ten million Guyana dollars (G\$10,000,000).
- (e) In return for a two-thirds equity share in the new Company the investing members of the Guyana Manufacturers/Forestry and Wood Products Group will:
- (i) Provide equity capital at the level of twenty million Guyana dollars (G\$20,000,000).
  - (ii) Undertake to maintain the business of the new Company as described in the Memorandum of Association attached.
  - (iii) Make payment to the Government of the Co-operative Republic of Guyana or its appointed agent the sum of three hundred and sixty thousand Guyana dollars (G\$360,000) per annum as rent against the ninety-nine year lease as described in 4(d)(ii) as above.

5. The Parties concerned in this Agreement will seek additional United Nations Development Programme funding for necessary consultancy assistance, the rehabilitation of existing machinery, plant and equipment and the purchase of further machinery, plant and equipment as required to ensure the successful operation of the new Company. The funding will be at the (tentative) level of US\$600,000.

6. The Parties further agree to accept United Nations Development Programme management of the new Company for (the first) eighteen



months of the Company's operation, given all management decisions and policies will be subject to the Board of Directors approval.

7. It is agreed that the initial members meeting will determine:
- (a) The size and composition of the Board of Directors.
  - (b) The appointment of a Managing Director, a Company Secretary and the Company's Auditors and Bankers.

SIGNED ON BEHALF OF THE GOVERNMENT OF THE CO-OPERATIVE REPUBLIC

OF GUYANA .....

SIGNED ON BEHALF OF THE GUYANA MANUFACTURERS ASSOCIATION LIMITED

.....

WITNESSED BY:.....

.....

DATE: .....

EXISTING SITE LAYOUT

See map at the end.

PROPOSED SITE LAYOUT

See map at the end.

QUOTES AND CORRESPONDENCE

WORLD OF ENVIRONMENTAL ACTION AND CHANGE OVER RECENT YEARS

## GUYANA NATIONAL BUREAU OF STANDARDS

OUR REF: .....

YOUR REF: .....

1990-11-26.

Mr. Paul Hays  
FIDUC Wood Processing Industries  
Consultant  
Guyana Natural Resources Agency  
Brixham  
GEORGETOWN.

Dear Mr. Hays,

I write to express our interest in the rehabilitation of the Forest Industries Development Unit (FIDU) (UNEP Project SI/Guy/90/301).

The Guyana National Bureau of Standards (GNBS) has programmed for 1991, the development of standards for the seasoning of wood for the manufacture of furniture. We see this project as a step towards standardisation for the furniture industry.

Eventually, we hope to provide incentives for the manufacturers of quality furniture, through a certification scheme.

It is envisaged that the FIDU could be the agency with the expertise to test and inspect furniture as part of a National Certification Scheme.

We also expect experts from the Guyana Forestry Commission, GFC, and FIDU to be involved in the process of formulating Guyana Standards for the manufacture of furniture.

Please accept our deepest appreciation for the discussions we have had on the topic.

Yours co-operatively,  
GUYANA NATIONAL BUREAU OF STANDARDS

QUOTES FOR CENTRALIZED BOILERS

SAROUP AND CO.  
NEW DELHI

MSC:E:2

8th January 1991

Mr. Paul R. Hayes,  
Production Consultant,  
122, Eastcotes, Tile Hill  
Conventry, CV4 9AS,  
West Midlands,  
U. K.

Dear Mr. Hayes,

UNDP PROJECT NO.S1/GUY/90/801

Rehabilitation of Forestry Industry  
Development Unit, Kingston, Georgetown.

It was a matter of pleasure as well as privilege meeting you in Georgetown on 5th December, 1990 in connection with above project.

I now take pleasure in enclosing our offer for following :

- A) Conversion of 2 steam boilers from oil/coal firing to waste wood firing.
- B) Supply & erection of a new 1 TPH waste wood fired boiler ( as an alternate to A above)
- C) 250 KVA Diesel Engine Generating set.
- D) 53/117 cfm Air Compressor.

We trust our offer meets with your requirement. However, if you need any clarifications or modifications in our proposal, we shall be very glad to do whatever necessary, on hearing from you.

With best regards,

Yours sincerely,

Encl: as above

UNDP PROJECT NO.S1/GUY/90/801

Rehabilitation of Forestry Industry  
Development Unit, Kingston, Georgetown.

S E C T I O N - A

CONVERSION OF STEAM BOILERS FROM  
OIL FIRING TO WASTE WOOD FIRING

Three boilers in all were shown to us. Only the first two can be converted to waste wood firing. These are of smoke tube multi-pass package type and were originally supplied with coal firing furnaces. Later they were converted to oil firing. It is now intended to convert them to waste wood firing. This is possible by providing a separate external furnace for each boiler. You will be able to burn wood waste as well as saw dust in these furnaces. The steam output of the boilers will not be effected. But since the boilers are of multi-pass arrangement, the flue gas velocity through the tubes will not be very high and soot deposition in the tubes will take place. Therefore it will be necessary to clean the tubes once every shift by shutting down the boiler. The shut down may be for about 1½ to 2 hours per shift.

To avoid fall of steam pressure during such shut down we recommend installation of one steam accumulator.

P R I C E

<u>Sl. No.</u>	<u>D e s c r i p t i o n</u>	<u>Quantity</u>	<u>US\$ C &amp; F Georgetown</u>	
01.	Supervision of construction of external furnaces as per our design and connecting same to the respective boilers.	2 Nos.	4000	8000
02.	Supply of fire bricks to IS 8 specification.	10000 Nos.	0.65	6500
03.	Supply of fire clay in 40 kg bags.	50 bags	15	750
04.	Supply & installation of one steam accumulator 6' dia X 9' long complete with safety valve, inlet and outlet valves, drain valve and air vent.	1 No.	10500	10500
				<u>25750</u>

D E L I V E R Y

The accumulator and the refractory materials will be shipped within one month after receipt of your L/C. The technicians will reach within 10 days after arrival of materials at your site. The job will be completed within 3 weeks thereafter provided ofcourse there is no delay in provision of masons by you.

A L T E R N A T E

Considering the fact that after provision of external waste wood furnaces the above two boilers will have to be shut down every shift for cleaning of tubes and further that, only 2 boilers can be converted, it may actually be better to instal a new boiler having a steam output of 1 TPH which will be slightly higher than the combined output of existing 3 boilers. This will take care of some expansion in future.

Our offer for such a boiler is enclosed.



S E C T I O N - B

OFFER FOR 1 TPN STEAM BOILER

Equipment	:	Steam Boiler
Type	:	Single Cross Drum, Double Box Header, Multipass type Water Tube Boiler.
Code of Manufacture	:	Indian Boiler Regulations
Capacity	:	To generate 1 tonne of saturated steam per hour.
Working Pressure	:	7 kg/cm <sup>2</sup> g (100 psig)
Fuel	:	Wood waste/Saw Dust

Encl: G/A Drawing No. SKT - 119 <sup>1/</sup>

S P E C I F I C A T I O N S

Model	:	WT/SD-100
Type	:	Single Cross Drum, Box Header, Multi-pass, Water Tube Boiler, patented under Indian Patent No.152232 of 28.11.81.
Steam Capacity	:	1000 kg/hr.
Working Pressure	:	7 kg/cm <sup>2</sup> g (100 psig)
Fuel	:	Wood Waste/Saw Dust
Thermal Efficiency (at full load)	:	70% ± 2%
Heating Surface	:	50 m <sup>2</sup> (538 ft. <sup>2</sup> )
Boiler Tubes	:	51 Nos.
C.D.	:	76.2 mm(3") approx.
Wall Thickness	:	3.25 mm( $\frac{1}{8}$ ") approx.
Drum	:	
O.D.	:	1200 mm (3'-11") approx.
Length	:	1800 mm (5'-11") approx.
Headers (Main)	:	2 Nos.
Width	:	1200 mm (3'-11") approx.
Height	:	1000 mm (3'-3" ) approx.

Header (Intermediate)	:	1 No.
Dia	:	150 mm (6") approx.
Length	:	1200 mm (3'-11") approx.
 Inspecting Authority	:	 The Boiler will be inspected by Chief Inspector of Boilers at various stages of manufacture as per Indian Boiler Regulations and all certificates issued by him will be furnished along with the boiler.

P R I C E

Supply	:	US\$ 34,500/- C&F Georgetown
Erection	:	US\$ 5,500/-  We shall depute one supervisor and one foreman to supervise erection.
Delivery	:	The boiler with all other items included in the scope of supply will be despatched within 8 weeks after receipt of L/C.  The technicians will reach within 10 days after receipt of equipment at site.  The installation will be completed within 4 weeks after arrival of technicians at site.
Payment	:	Against confirmed irrevocable L/C from any International bank of repute.

GENERAL DESCRIPTION OF THE SYSTEM:

Water Tube Design

The Boiler is a Single Drum Water Tube Boiler of welded construction. A drum is provided where water and steam are stored and with suitable internals the steam is effectively separated from carry over moisture. The feed water is pumped into the drum from where it is fed to the Rear Box Header through down comer tubes. From the Rear Header the water flows through an upward inclined bank of tubes, into the Front Header. The bank of tubes provides the main steam generating area. Mixture of water and steam that is generated in the tube bank is collected in the Front Header from where it is taken to the Drum by a set of riser tubes.

The furnace is situated at the front below the tube bank and the flue gas flows in multi-passes across the tube bank with baffles and then goes out to the chimney.

1. Drum :

The Drum is fabricated from boiler quality plates and is placed cross wise above the tube bank.

2. Tube Tube Bank :

The tube bank is built from straight boiler tubes. The bank is located above the furnace and is inclined to assist thermic circulation. The roof tubes are of finned construction ensuring a sealed roof.

3. The Headers :

The Headers are of closed box type, fabricated from boiler quality plates and closed with a thick wide ring. In the headers the tubes are expanded into machine reamed holes. Against each tube hole an elliptical opening of 137 X 89 mm is provided for cleaning. These are closed by doors from inside. This ensures a better tightness on account of steam pressure under working conditions. The Front Header is suspended with sliding bracket supports for ensuring thermal expansion of the tube bank.

4. I. D. Fan :

One I. D. Fan driven by an electric motor is provided alongwith the boiler.

5. Injector Assembly :

One steam injector assembly alongwith feed water pipeline from injector to boiler and steam line from boiler injector is quoted for the boiler.

6. Structurals :

The entire boiler is neatly arranged in a frame work providing support for all refractory work and pressure parts. The Boiler is supported in such a manner that one end of the tube bank alongwith the attached Header is fully floating permitting free forward and backward movement owing to thermal expansion and contraction. The boiler is thus completely free from thermal stresses.

SCOPE OF SUPPLY

1. Main Boiler :

Comprising the steam and water drum, 2 headers and the tube bank together with required structural to support the pressure parts and the furnace.

2. Furnace :

A stepped grate furnace will be provided to burn wood waste as well as saw dust. The furnace will be complete with all fire bars, charging doors, ash removal doors, access doors, air lancin. accrs and refractory bricks.

3. Mountings :

Full set of IER Mountings comprising:

- 3.1 One double post safety valve
- 3.2 One main stop valve
- 3.3 One Auxiliary stop valve
- 3.4 One feed check valve
- 3.5 Two pairs of water level indicators with accessories
- 3.6 Two blow down valves, one on Front Header & one on Rear Header.
- 3.7 One Air Vent
- 3.8 One pressure gauge with syphon and Inspector's test cock.

4. Accessories :

The following accessories will be provided.

4.1 I. D. Fan :

One I.D. Fan with 10 HP electric drive motor. Both on common base frame. Belt driven type with 'V' belts, pulley, bearings, etc.

The Fan will be dynamically balanced.

4.2 Injector :

One set of steam injector with IIR piping and valves to connect same with the boiler.

4.3 Insulation :

The boiler drum and steam piping within boiler limits will be insulated with mineral wool lagging and aluminium sheet metal cladding will be provided.

4.4 Soot Blowing System :

A set of steam jet type stationery jets with steam line for cleaning horizontal spaces between tube rows in flue passages will be provided.



4.5 I. D. Fan Ducting :

Ducting from furnace to I.D. Fan inlet. The ducting is limited to a maximum length of 5.0 metres. The ductings shall be complete with adequate number of dampers, compensators and will be in small sections with flanged joints for easy assembly and handling.

5. Access Doors :

The Boiler is provided with adequate number of access doors both on fire side and water side so that all parts are approachable for close visual inspection.

N O T E :

The above mentioned specifications are indicative only. We reserve the right of making improvements as and when they become possible on account of continuous R & D activity in our organisation.

FACILITIES TO BE PROVIDED AT SITE FREE OF COST BY YOU  
(For Sections A & B only)

We shall carry out erection by providing technical supervision only. The following facilities, will have to be provided by you, free of cost, at site:

- a) All civil works, such as grouting.
- b) Two chain pulley blocks of 5 Tonne capacity each with tripod stands, lifting hooks, shackles, wire rope, rope pulleys and all other lifting tools and tackles.
- c) Free water and electricity for erection.
- d) Skilled and unskilled workmen as and when required.
- e) Scaffolding material duly erected in place, wherever required.
- f) Electric Arc welding and Oxy-acetylene gas cutting set with all accessories and consumables (only for section B).
- g) Free furnished accomodation for our erection engineer and supervisor, if possible at the site itself or as near to the site as possible.
- h) Transport from place of residence to work site, to our erection personnel.
- i) All hand tools and implements.
- j) Red brick, construction sand and cement and in general construction materials.
- k) All start up fuel, chemicals and lubricants and other materials required to commission the boiler.

S E C T I O N - C

DIESEL GENERATING SET

One no. Model ~~KW~~ TD 232V12K(SRCP) 250 KVA  
Diesel Engine Generating Set with 312 HP  
Ruston engine and NGEF Alternator. The  
alternator is made in India in technical  
collaboration with AEG of West Germany, as  
per enclosed Annexures A, B, B1 and  
leaflet. (Not included in report but sent  
separately to UNDP/Georgetown).

PRICE : US\$ 46,500/- C & F Georgetown.

G U A R A N T E E

All equipments offered by us are guaranteed for a period of 12 months after receipt in Guyana for any defects in design or manufacture.

For any defects reported within the said period, we shall arrange to rectify or give replacement at our cost.

This guarantee does not cover normal wear and tear, electric motors and any rubber components such as Vee belts, oil seals, etc.

V A L I D I T Y

THIS OFFER IS VALID FOR 90 DAYS AND THEREAFTER  
IS SUBJECT TO OUR CONFIRMATION

S E C T I O N - 2

AIR COMPRESSOR

Ingersoll-Rand Model 7 X 5 ESV-1, vertical fully force feed lubricated type air compressor as per attached leaflet and Air system layout.

Bore	:	7"	
Stroke	:	5"	
*R. P. M.	:	340	750
*Output	:	53.04	164
*Motor H.P.	:	15	30
Power Supply	:	415/440 V, 3 phase 50 Hz	
Air receiver capacity	:	11 Cft.	

\* The compressor can be operated at any speed between 340 to 750 RPM depending upon the output needed. Only the driving motor has to be of suitable Horse Power. We have offered a 15 H.P. motor on the assumption that present air requirement is not more than 50 cfm. However, if larger output is required we will offer a higher H.P. motor at a nominal additional cost. There will be no extra charge in providing a different set of driver and driven pulleys.

SCOPE OF SUPPLY

- a) Compressor
- b) 15 H.P. electric motor
- c) Motor starter
- d) 11 Cft air receiver
- e. Suitable water cooled after cooler
- f) Metallic Oil Wiper Rings,  
Completely enclosed frame and distance piece  
Force-feed lubrication to all bearings  
Full-floating bearings,  
Compressor Sheave with flywheel effect.  
Constant-Speed Control.  
Low Oil pressure shutdown switch.  
Vee Belt Drive consisting of compressor.  
Pulley, Motor Pulley and necessary V-Belts.
- g) "A" Channel Valves  
Metallic packing for cylinder stuffing box.  
Shaft driven force feed cylinder lubricator.
- h) Sets Foundation Bolts for the Compressor  
Sets Foundation Bolts for the Motor  
Pairs Slide Rails for the Motor.  
Dry type intake filters.

P R I C E

Compressor with accessories as described  
in D1 & D2 1/

US\$ 6,850/-  
C & F GEORGETOWN

D E L I V E R Y

8 weeks after receipt of the L/C.

---

1/ Sent separately to UNDP/Georgetown.



SAROUP AND CO.  
NEW DELHI

Msc.E:3

12th January, 1991

Mr Paul R. Hayes,  
Production Consultant,  
122, Eastcotes, Tile Hill,  
Conventry, CV4 9AS,  
West Midlands,  
UNITED KINGDOM.

Dear Mr Hayes,

Steam Boiler

Our offer No: Msc.E:2 dt.8.01.1991

Please refer to above.

We regret in advising that there is a typographical error in our quotation. The correct price for the new boiler is US\$ 44,500 C&F Georgetown and not US\$ 34,500.

Any inconvenience caused is sincerely regretted.

Looking forward to be of service to you.

With best regards,

Yours sincerely,

SAROUP AND CO.  
NEW DELHI

MS. MSC:2:

29th February, 1951.

Mr. Paul R. Hayes,  
Production Consultant,  
120, Mastcotes, Tile Hill,  
Coventry CV4 9AS, West Midlands, U.K.

Dear Mr. Hayes,

UNEP Project No. S1/307, 90/90:  
Our offer No. MSC:2 and MSC:3 dt. 2.1.51.

We have no news from you about the status of our offer. We are sure though it is under active consideration of the authorities concerned.

In the meantime it has occurred to us that we should have offered you a slightly different model which has following advantages over the one offered earlier:

1. It <sup>is</sup> more compact and can be accommodated in a standard container. Therefore there would be much less chances of any damage during handling operations at destination port. Further it would more convenient and cheaper in transportation from port to project site.
2. Very little work needs to be done in the erection and commissioning of this boiler. This will mean a saving of about 2 weeks.

Output of the boiler would be the same viz 1000 kg/hr. based on feed water temperature of 25 deg C.

The working pressure would be anywhere from 7 to 10.5 kg/sq. cm. g. at your option.

Cost : this would be same as before that is USD 44,500 C&F Georgetown.

Delivery : Ten weeks from the date of receipt of your formal order with confirmed ir-revocable L/C in our favour.

A copy of 3/A drawing of the boiler is enclosed. 1/

This offer is valid for 90 days from the date of our earlier offer i.e. 2.1.51.

We are expecting an overall price increase in this country from end March. Please try to place the order before that.

Thanking you,

Yours faithfully,  
For, SAROUP & CO.

1/ Drawing at the end of report.

ESTIMATE FOR REPAIRS AND NEW WORKS

Building Surveyor  
Yeshoo:

Jewel C. Cameron S.M.S.S.I.  
Building Surveyor Consultant,  
Lot 104 Thim St.,  
Albertown,  
Georgetown (South America)

99-11-10

Direction:

Employer: Forest Industries Development Unit  
Kingston, Georgetown.  
United Nations Development Project.

Contractor: **ME. Warde**  
Registered Office, Situated at Melanie  
Dameshana, East Coast Demerara. Lot 92

Contractor Signature

Building Surveyor  
Member:

Jewel C. Cameron A.M.S.I.  
Building Surveyor Consultant  
Lot 104 Third St.,  
Alberttown,  
Georgetown,  
Guyana (South America)

87-11-19

Forest Industries Development Unit,  
Kingston,  
Georgetown,  
United Nations Development Project

Estimate for Repairs and New works

We hereby submit a cumulative cost for the above mentioned Project in  
the sum of Thirty Million, Six Hundred Thousand Dollars (\$30,600,000.00)

Attached is the following breakdown of the said works.

.....

REPAIR AND NEW WORKS

<u>Item</u>	<u>Description</u>		<u>Amount</u>
1.	Air Drying Shed No.1	New works	5,000,000.00
2.	Air Drying Shed No.2	New Works	5,000,000.00
3.	Panel Press Shop	New and Repairs Works	3,300,000.00
4.	Moulding Shop	Repair Works	4,000,000.00
5.	Component Sort Pallet Area	Repair Works	2,000,000.00
6.	Seasoned Timber Storage	New Works	1,700,000.00
7.	Training School	Repair Works	3,000,000.00
8.	Electrical and Mechanical Maintenance Work Shop	Repair Works	1,700,000.00
9.	Rest Room #1	Repair Work	400,000.00
10.	Sales and Administration Office	Repair Works	600,000.00
11.	Rest Room #2	Repair Works	700,000.00
12.	Vaccum Kilm Room	Repair Works	600,000.00
13.	Spare Parts Store	New Works	1,600,000.00
14.	Raw Materials Stores	New Works	1,300,000.00
15.	Kilm Osmore and Well Kilm	Repair Works	700,000.00
16.	Wood Preservation Plant	-	-
17.	Timber Preservation Storage Area	-	-
18.	Materials Control Office	-	-
19.	Kilm Livingston Moore #1	-	-
20.	Kilm Livingston Moore #2	-	-
		Totals:	30,600,000.00

SURVEY AND VALUATION REPORTS

COUNTY OF DEMERARA

REPUBLIC OF GUYANA

In respect of Parcel of land  
Mud lot, Part of Kingston  
Georgetown, Guyana.

AUTHORITY

Instructed by Mr Paul Hayes of U.N.I.D.O. - Wood  
Processing Industries Consultant U.N.D.P. - Project  
No. S1/G.U.Y/90/80.

DATE OF SURVEY

AND VALUATION

The survey and Valuation was carried out on Monday  
22nd October, 1990 (90-10-23).

PROPERTY

Concerning this Parcel of land on the Mud lot of  
Kingston, in the County of Demerara in the Republic  
of Guyana Comprises Wharf House, Wood Shed,  
Mechanical Shop and Plot of Land with discarded  
Building. Land area of occupancy 23,712.00 square  
ft. approximately.

TENURE

The ownership of the above property is vested in Guyana Forestry Commission.

Area Schedule:		Current Market
		Valuation
L Shaped Land	23,712 sq. ft. app.	2,000.000
Mechanical Bldg	5,111 " " "	4,088.800
Wood Shed	3,000 " " "	12.000
Wharf House	60 " " "	300.000
Empty Land	7,524 " " "	375.000
Discarded Bldg.	1,440 " " "	<u>8.420</u>
Total		<u>\$6,784.220</u>

VALUATION

It is my considered opinion that the current market value is \$6,784.220 (Six million, seven hundred and eighty-four thousand, two hundred and twenty dollars.

Certified Valuation Officer

COUNTY OF DEMERARA

REPUBLIC OF GUYANA

In respect of Parcel of land  
Mud lot, Part of Kingston  
Georgetown, Guyana.

AUTHORITY

Instructed by Mr Paul Hayes of U.N.I.D.O. - Wood  
Processing Industries Consultant U.N.D.P. - Project  
No. S1/G.U.Y/90/80.

DATE OF SURVEY

AND VALUATION

The survey and Valuation was carried out on Monday  
22nd October, 1990 (90-10-23).

PROPERTY

Concerning Buildings (X) Office and Utility Building  
- 2 flat timber detached.

- (B.B) Offices - 2flat Timber detached (Sales)
- (C.C) Canteen, Change Room/Work Shed.
- (D.D) Saw Mill
- (H.M) Kiln
- (2) Storeroom
- Guard Hut



(A.A) Store Room/Shed  
 (S) Saw Mill  
 (T) Inpregnition PLant  
 (V) Saw Doctor Shop  
 (W) Wood Working Shop  
 (Y) Inel Laboratory  
 (F) Cream Building

Area Schedule

<u>Description of Property</u>	<u>Area Schedule</u>	<u>Current Market Valuation</u>
(X)	9ft Offices 2,664.00 sq. ft.	1,854.400
(B.B)	77 Offices 684.00 " "	547.200
	9F Offices 637.00 " "	541.450
	77 Offices 917.00 " "	779.450
(C.C)	Canteen 684.00 " "	342.000
	Change Room 252.00 " "	1.260
	Shed 1,492.00 " "	1,193.200
(D.D)	9F Saw Mill 5,130.00 " "	7,695.750
(M.M)	Kiln 9F 2,767.00 " "	4,151.250
(T)	Inpregnition Plant 1,443.00 " "	1,154.400
	(V)	Saw Doctor Shop 7,050.00 " "
(W)	Wood Working Shop 5,394.00 " "	2,000.000

(Z)	9F	1,206.00	" "	964.000
(A.A)	Store Room	215.00	" "	172.000
	Shed	1,914.00	" "	153.000
(S)	Saw Mill	10,444.00	" "	18,799.200
(Y)	Inel Lab.	511.00	" "	255.500
(F)	Cream Bldg.	<u>768.00</u>	" "	<u>614.400</u>
	Total	<u>44,172.00</u>	" "	<u>\$44,843.460</u>

TENURE

The ownership of the above property is vested in Demerara Woods.

VALUATION

It is my considered opinion that the current market valuation is in the sum of \$44,843.460 (Forty-four million, eight hundred and forty-three thousand, four hundred and sixty dollars).

Certified Valuation Officer

**ANNEXURE-A**

M/s. Ruston & Hornsby (I) Ltd. have been manufacturing the world famous, RUSTON engines for more than 25 years in India. Thousands of these engines/generating sets have been supplied to various industries, Government departments like Railways, Defence, shipyards, DGS & D, P & T, Oil Corporations, Hotels, etc.

In continuation of the tradition of supplying the superior quality products and after recognising the need for bringing modern technology and fuel efficient engines in the higher capacities, M/s. Ruston & Hornsby (I) Ltd. entered into technical collaboration with M/s Motoren Werke Mannheim AG, West Germany, for manufacture of well known MWM engines gensets.

**SALIENT FEATURES OF MWM ENGINES/GENSETS**

The MWM engines incorporate the latest technology and have the following distinct features :-

- 1) **Requires lesser space for installation :**  
The engines are 'VEE' type design and offer the advantages of lesser length and height. The space requirement of the gensets are, therefore, substantially lesser than the other gensets. For installation in residential buildings, hotels and office basements, the sets offer a very favourable solution for the installation.  
Due to compact design, smaller rooms can be used for installing the sets resulting in substantial savings in building costs.
- 2) **Less vibration & noise and easier Installation :**  
Due to well balanced design of the engines, the vibration and noise level of the sets are substantially lower-a distinct advantage for many installations.  
Due to lesser vibrations, the sets can be mounted on antivibration mountings, thereby eliminating the need for elaborate concrete foundations, and hence further reduces the cost of installation, labour, material, etc.
- 3) **Fuel economy :**  
The engines incorporate open type combustion system. The fuel consumption of these engines is, therefore, substantially lower and continues to be so in use as compared to other engines presently manufactured in India. This results in major savings of recurring nature on the costly fuel which is already scarce.
- 4) **Ease of maintenance :**
  - a) The fuel system consists of MICO BOSCH type block fuel pump for which, negligible service is required during use. Besides, after-sales service and spare parts are easily available.
  - b) The engine is fitted with modular cylinder heads thus facilitating maintenance at reduced cost.  
As a result of the above the MWM engines can be conveniently attended to & repaired.
- 5) **Less wear & tear :**  
The low piston speed of 6-5 mtrs/sec. guarantees a long life for these engines, which are actually designed for 2500 RPM.

M/s. Ruston & Hornsby (I) Ltd. have the unique distinction of manufacturing diesel engines as well as assembling the complete generating sets so that a fully tested product is available to the actual users. The sets offer advantages like :-

- 1) **Coupling and Alignment :**  
In the case of generating sets, the degree of accuracy of alignment between engine and alternator is of the highest importance. The assembly of gensets is therefore, carried out by the factory personnel themselves and the complete sets after assembly are tested as per BS:IS Standards for continuous running and one hour of 10% overload running. Thus a completely tested products is available from Ruston. The test record sheets for all the sets as per the above test schedule can be provided to you on request.

# MWM DIESEL ENGINE

## TECHNICAL SPECIFICATIONS

### ANNEXURE B

We are pleased to offer heavy duty, rugged, reliable :

#### MWM ENGINE

MWM heavy duty diesel engine manufactured by M/s. Ruston & Hornsby (I) Ltd. in technical collaboration with M/s. Motoren-Werke Mannheim A.G. West Germany. The diesel engine is 4 stroke, direct injection, 'V' type. It develops rated horse power continuously as per DIN 6271 at 1500 RPM under NTP condition. This rating is equivalent to BS 5514, IS 10000 & ISO 3046. The engine is complete with :

Flywheel

Flywheel housing

Oil bath air cleaner

Gear type lubricating oil pump

Lubricating oil filter

Lubricating oil cooler

MICO BOSCH fuel injection system with injectoin pump, nozzles, governor (mechanical)

Fuel filter

24 volts electric-starting equipment comprising of :-

Starter gear ring

Starter motor-24 volts

Battery charging alternator with in-built regulator.

Lub. oil pressure gauge

Coolant temperature gauge

Battery charging ammeter

Stop button

Cooling system comprising of :-

Radiator

Fan for radiator

Fresh water pump

or alternatively

} In case of Radiator Cooled sets

Set of Standard tools

#### NOTE

Batteries with leads and fuel tank are not in our standard scope of supply. However these items can be provided at extra cost.

# MWM DIESEL GENERATING SET

## TECHNICAL SPECIFICATIONS

ANNEXURE B1

**(A) ALTERNATOR**

KIRLOSKAR/CROMPTON, brushless, slip ring 3 phase, 50 cycles self-regulated, self-excited screen protected, 415 V, 4 wire alternator of rated capacity at 0.8 power factor. The alternator generally conforms to relevant BS/IS standard. The choice of alternator is to us unless specifically agreed upon.

**(B) BASEPLATE & COUPLING**

A sturdy channel section steel base frame and a suitable flexible coupling for coupling the engine directly to the alternator is included.

**(C) CONTROL PANEL**

Fabricated sheet steel, floor mounting type control panel with front hinged cover which carry the indicating instruments and switches. The control panel will be complete with the following :-

- |     |  |                  |         |
|-----|--|------------------|---------|
| (a) | Suitably scaled flush mounted AC Voltmeter       | -                | 1 No.   |
| (b) | Voltmeter selector switch                        | -                | 1 No.   |
| (c) | AC Ammeters                                      | -                | 3 Nos.  |
| (d) | Frequency meter                                  | -                | 1 No.   |
| (e) | Moulded case circuit breaker/Air circuit breaker | -                | 1 No.   |
| (f) | KWH Meter  | -                | 1 No.   |
| (g) | KW Meter (160 KVA & above)                       | -                | 1 No.   |
| (h) | Starting switch with key                         | -                | 1 No.   |
| (i) | Low lub. oil pressure indication                 | } with<br>hooter | - 1 No. |
| (j) | High coolant temp indication                     |                  |         |
| (k) | Indicating lamps :                               |                  |         |

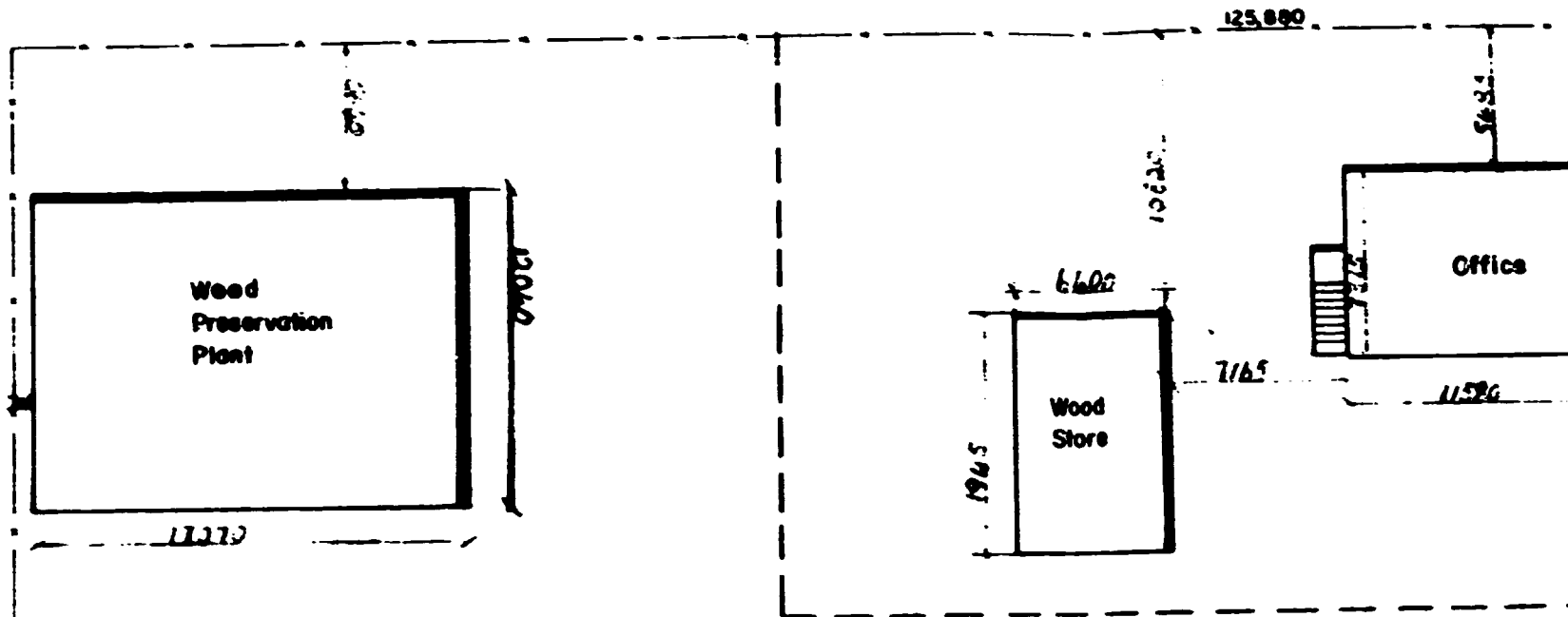
'SUPPLY ON'—LOAD ON'

The panel will be complete with internal wiring and labelling. The wiring between alternator and panel is not included in our standard scope of supply.

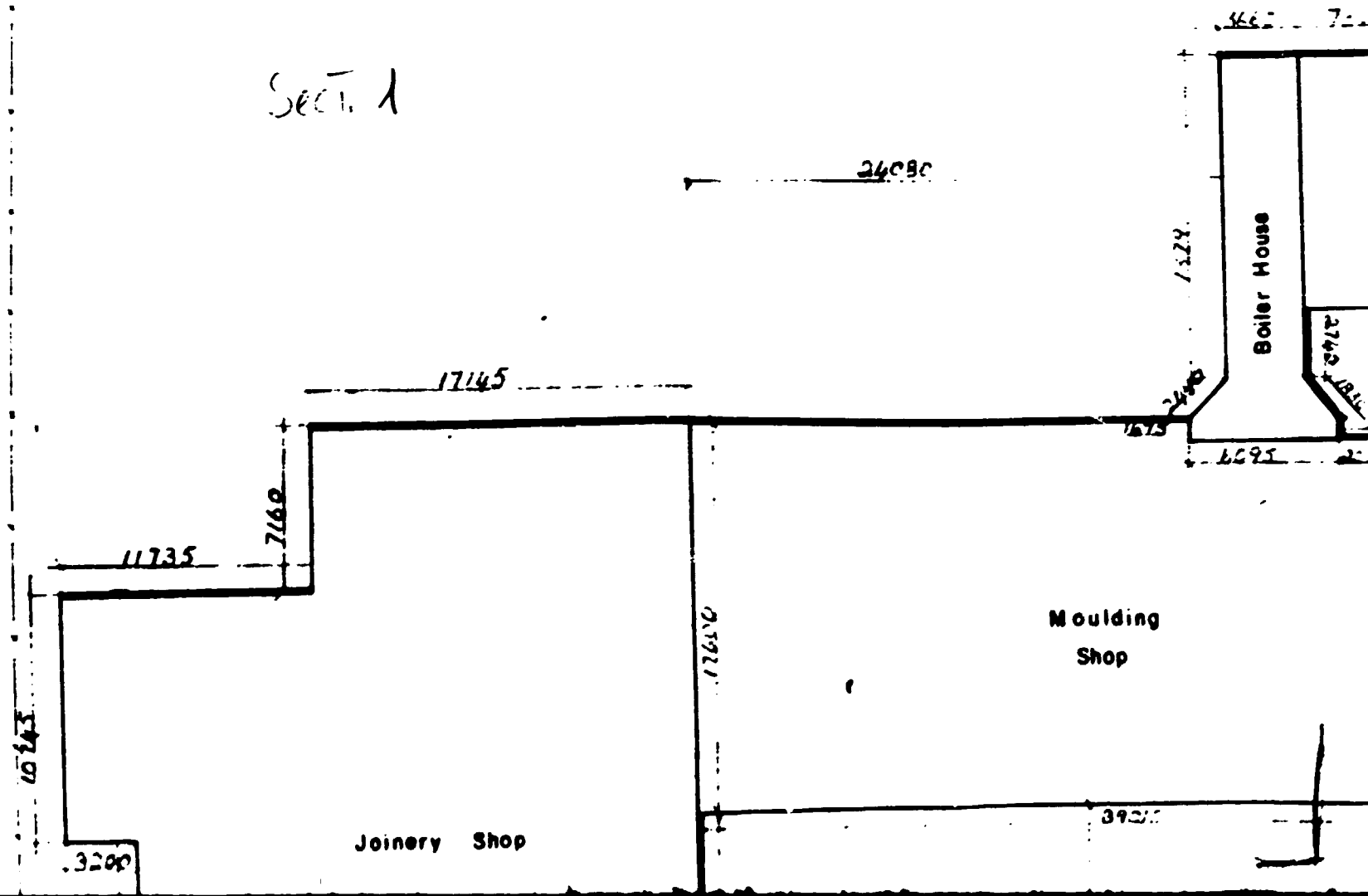
In addition to the above items, 1 No. reverse power relay and 1 No. neutral isolating switch will be provided on the above control panel when sets suitable for parallel running are required and when parallel running control panel is supplied as an additional item.

MWM DIVISION

G. E. C.



Section 1



fence

95,705

54.51

Office

11,526

25,605

SECT 2

17,375

Kiln 2  
Irvington - Moore

Kiln 3  
Irvington - Moore

11,855

29,162

13,565

Kiln 1

Boiler House

10,975

21,410  
1,830  
1,675

1,675

Kiln 4  
Wills

Office

4,950

5,610

11,282

19,515

58,290

18,900

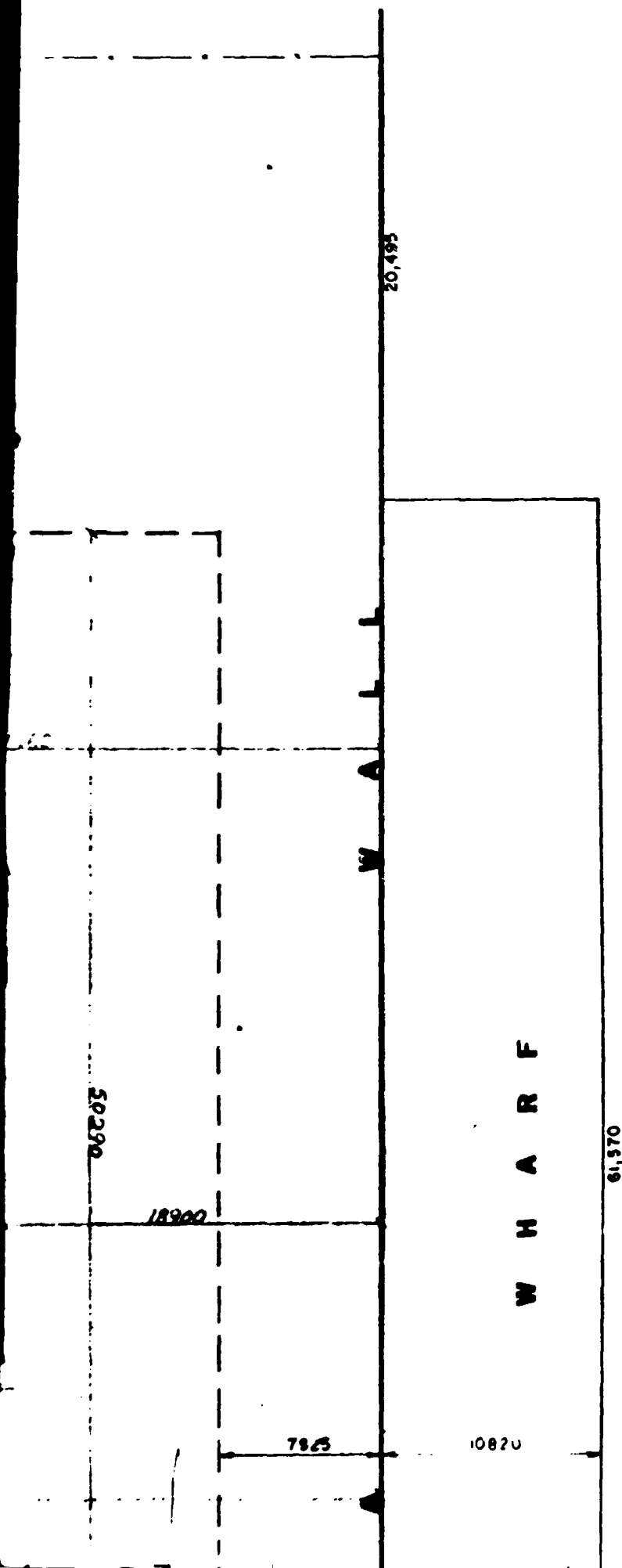
30,430

19,360  
08,750

08,400

FOREST INDUSTRIES DEVELOPMENT UN  
KINGSTON G/TOWN

EXISTING SITE LAYOUT



Legend

- area leased by D.W.L.
- perimeter fence

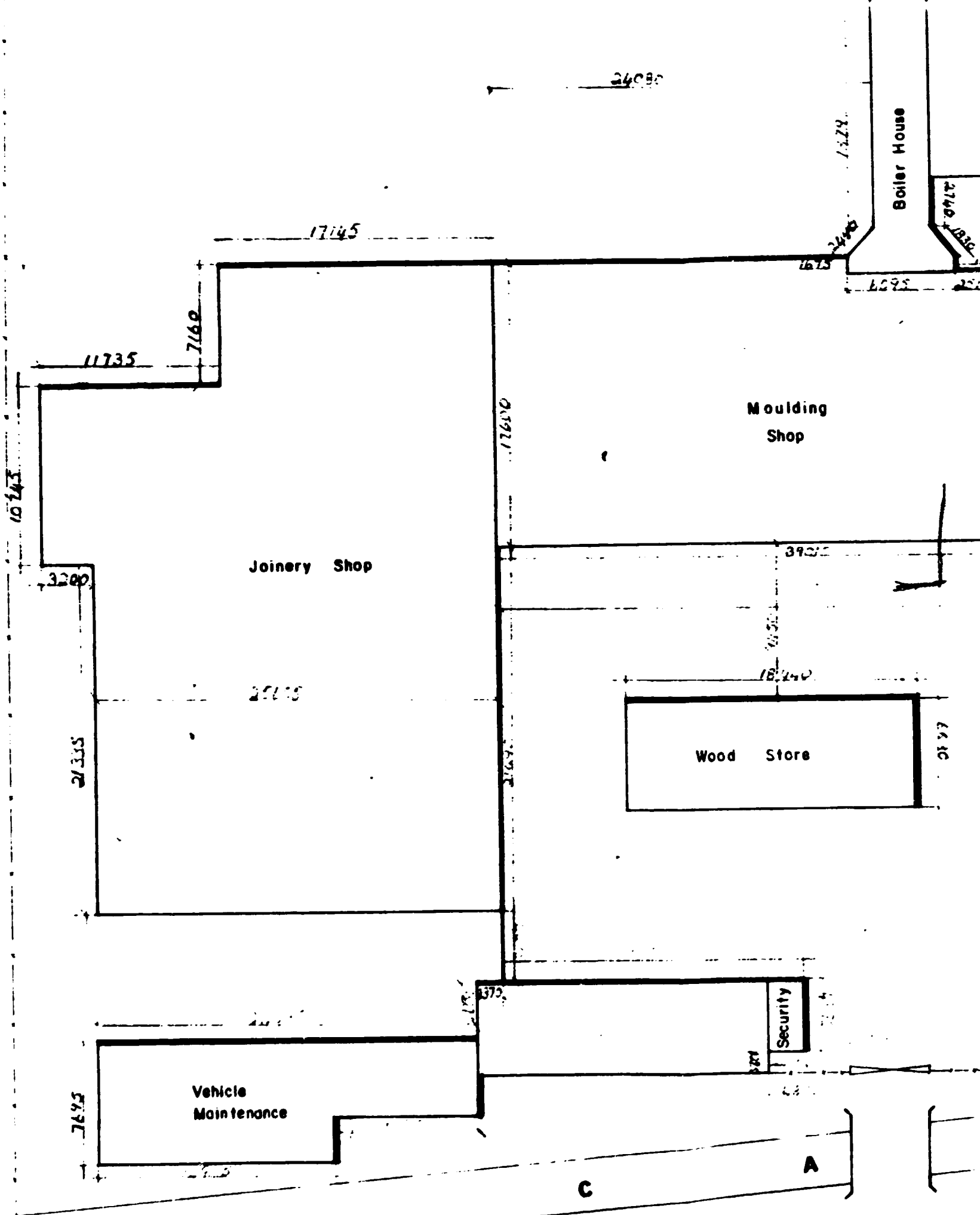
SECTION 3

Date: 25th. Oct. 1990

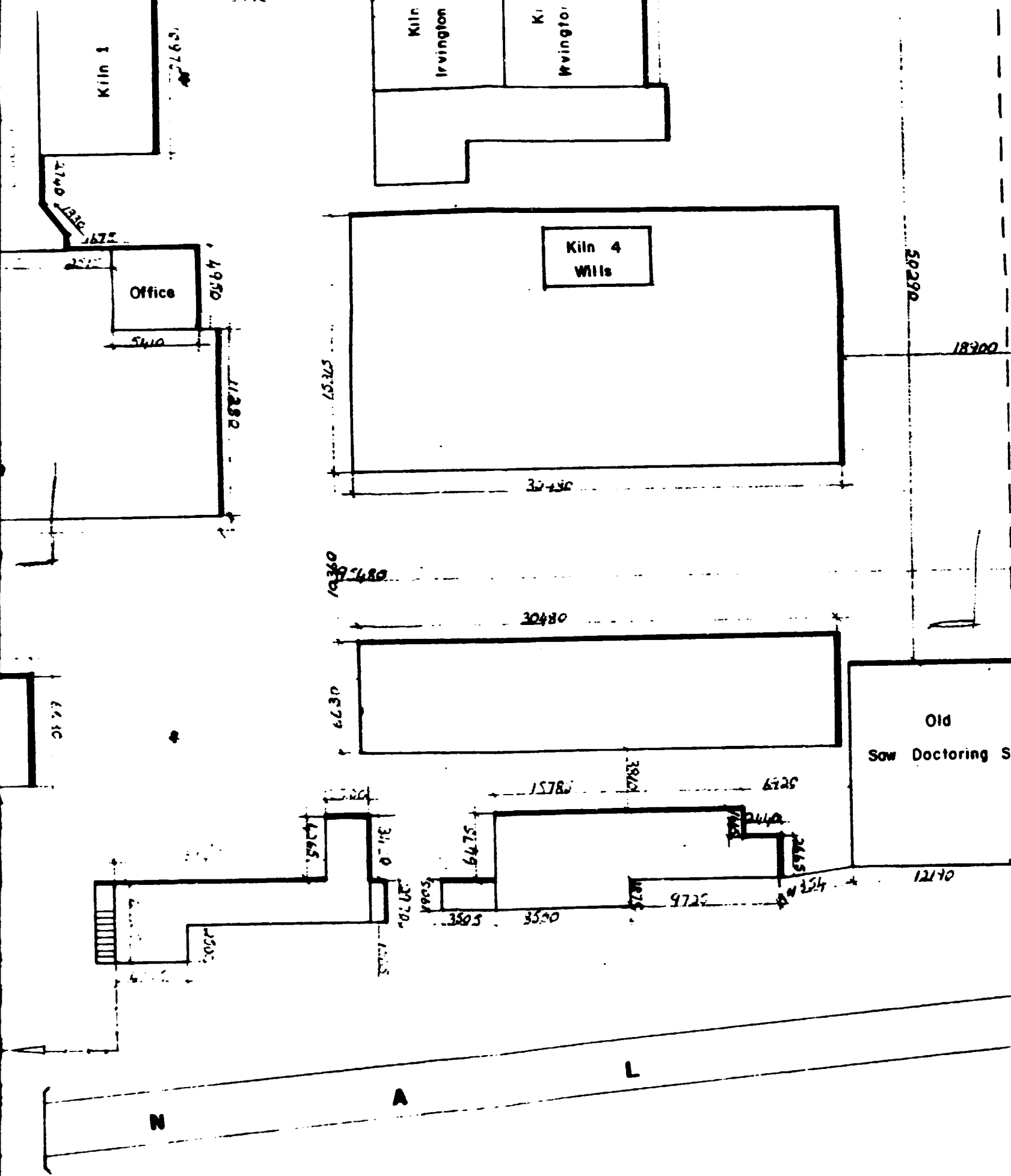
Drawn by *P. Hayes*

Scale 1:250





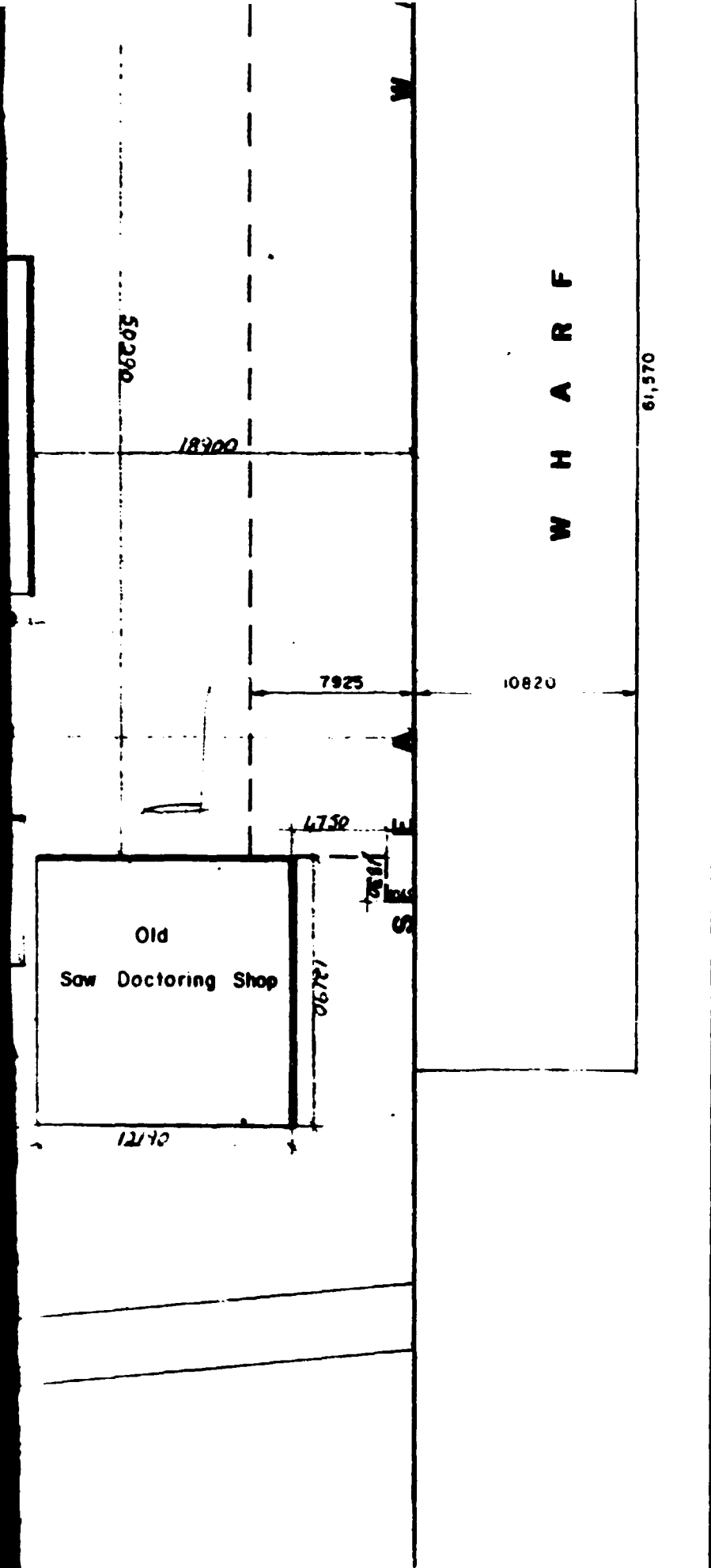
SECTION 4



SECTION 5

Legend

- area leased by D.W.L
- - - - - perimeter fence

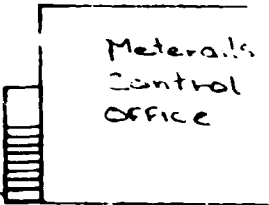
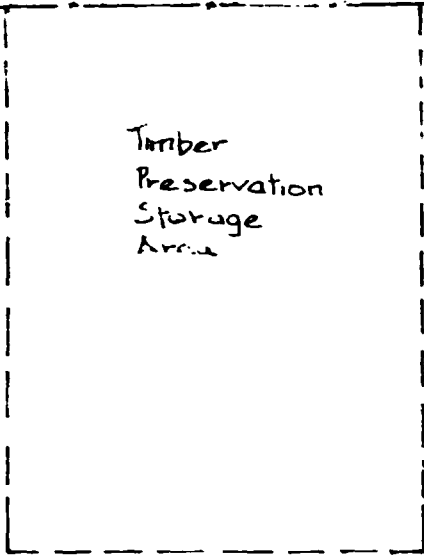
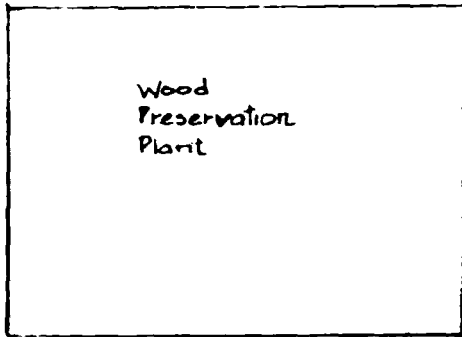


Date: 25th. Oct. 1990

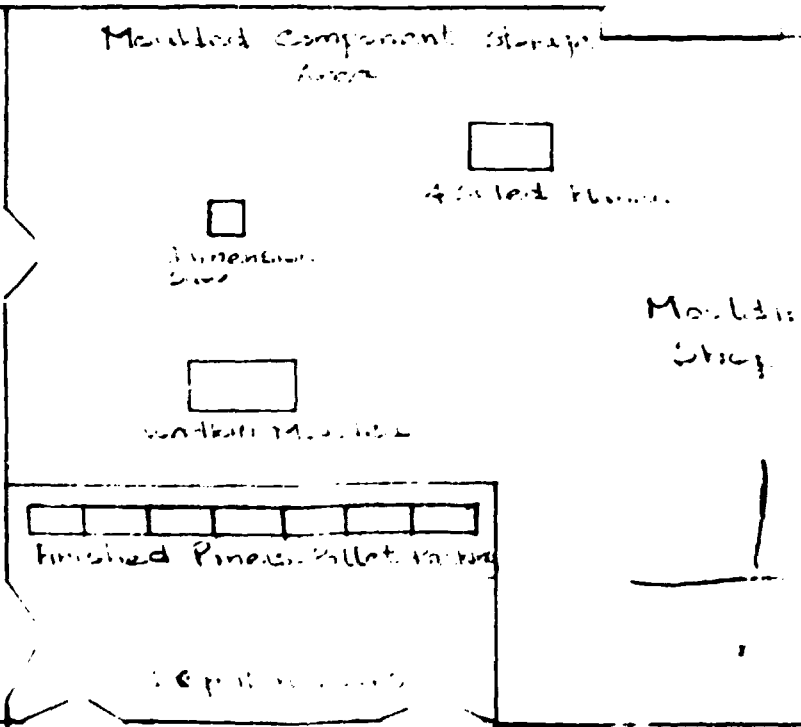
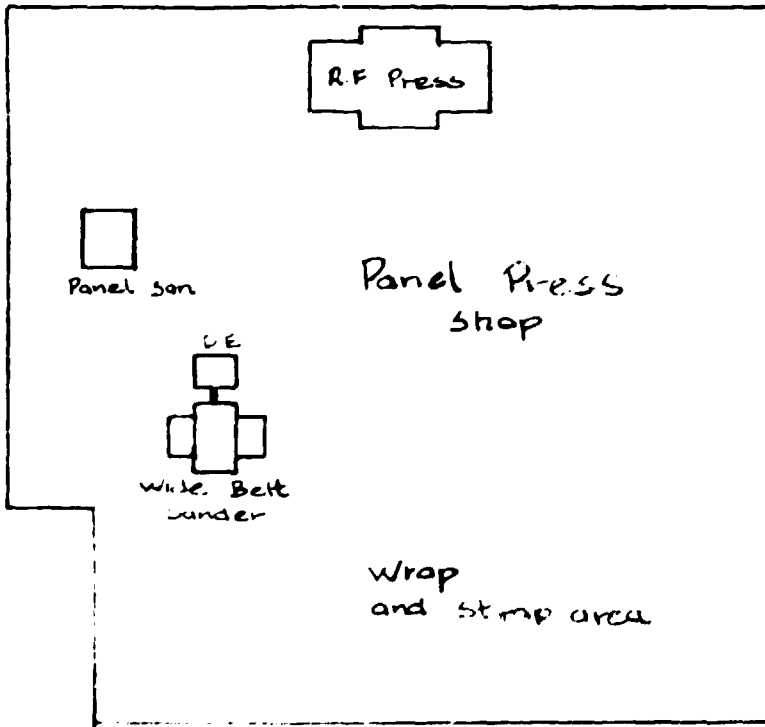
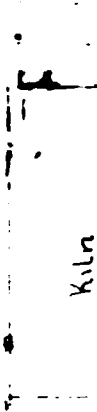
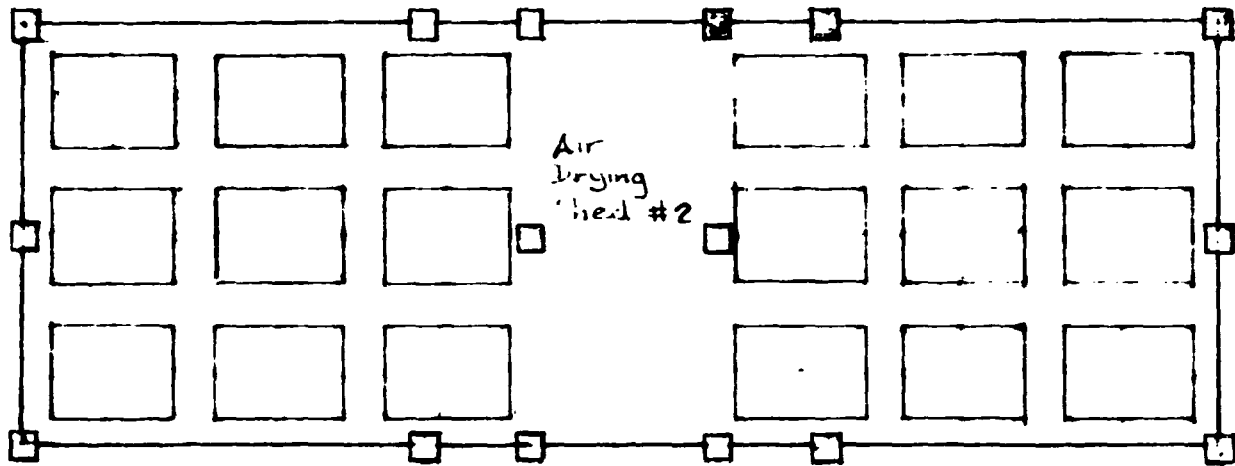
Drawn. by *P. Hayes*

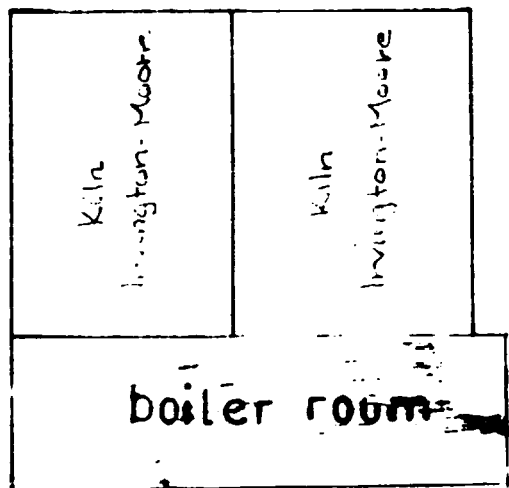
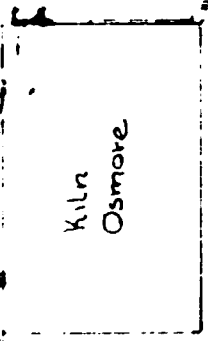
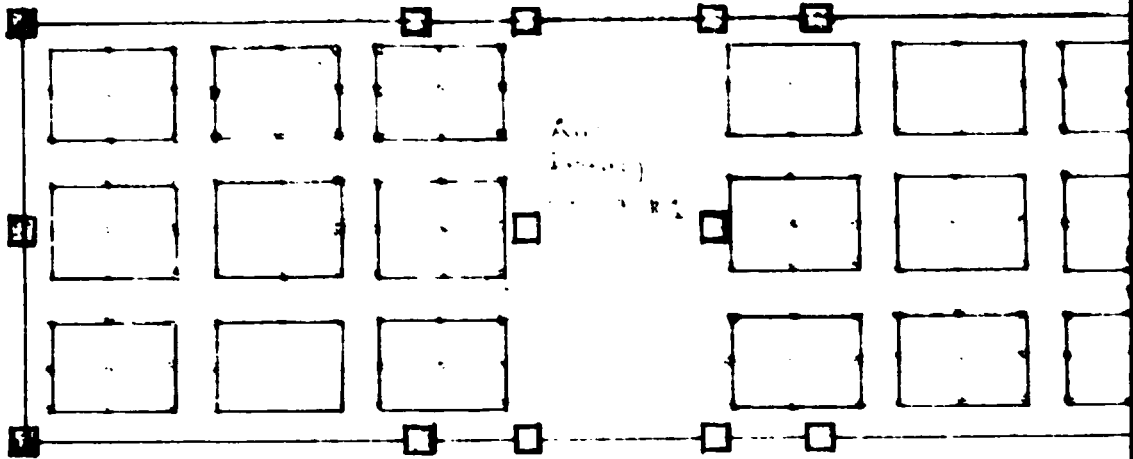
Scale: 1: 250

SECTION 6

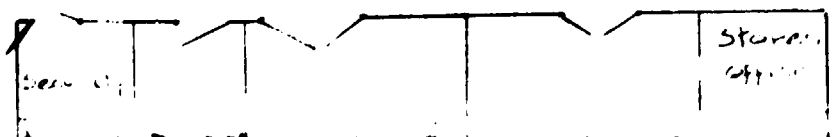
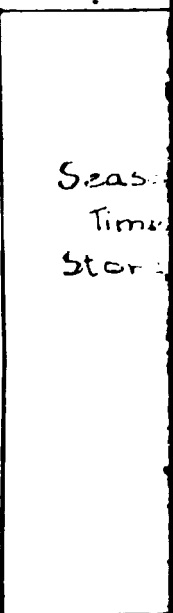
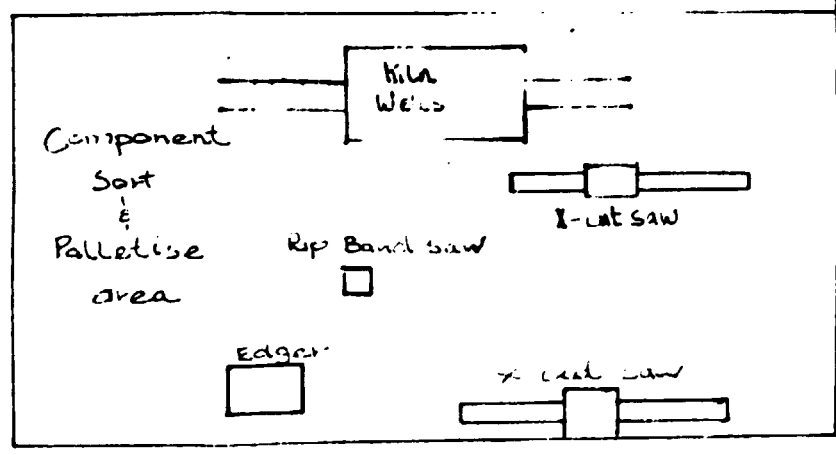
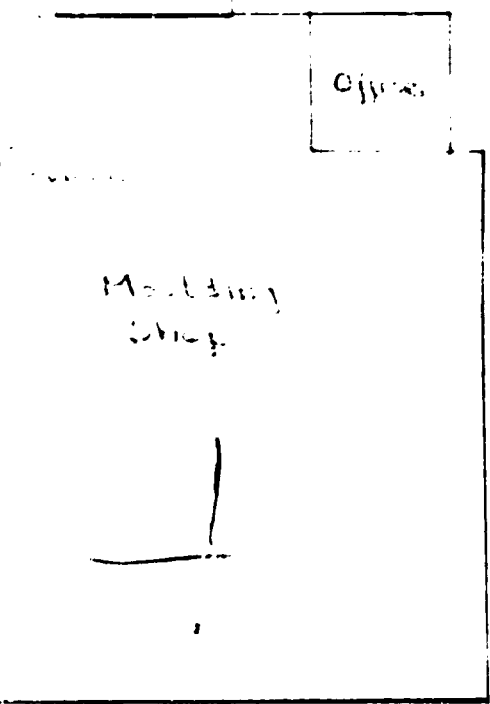


Section 1





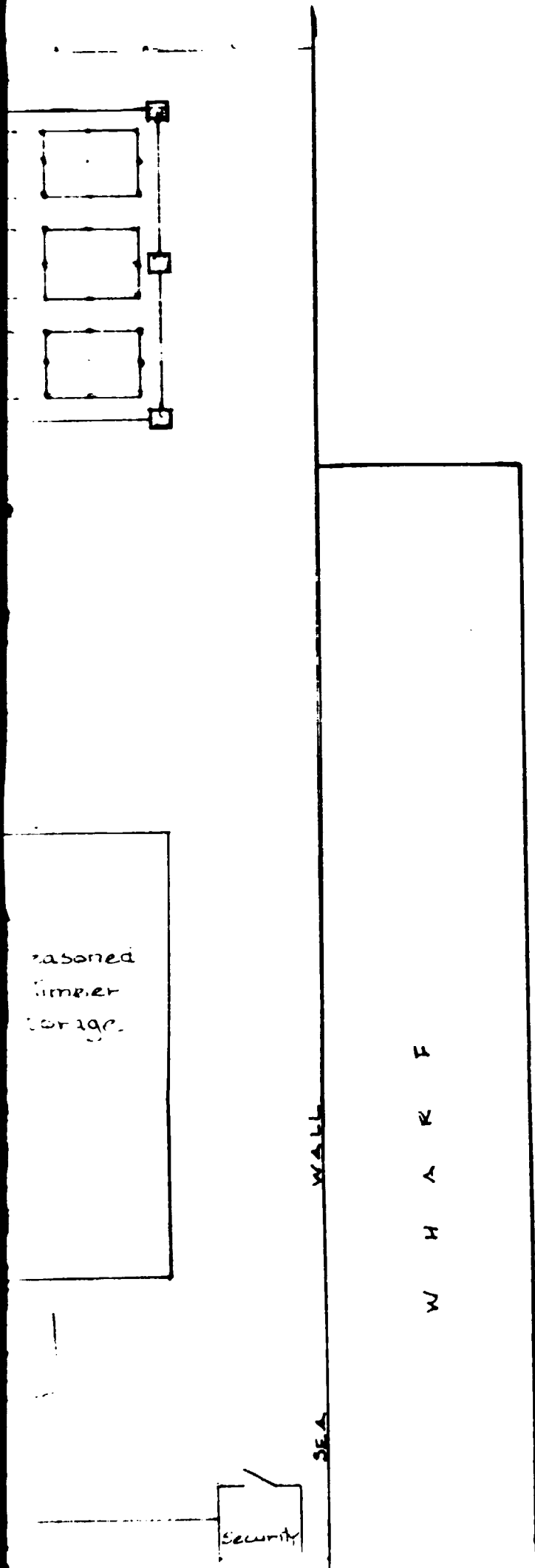
SECT 2



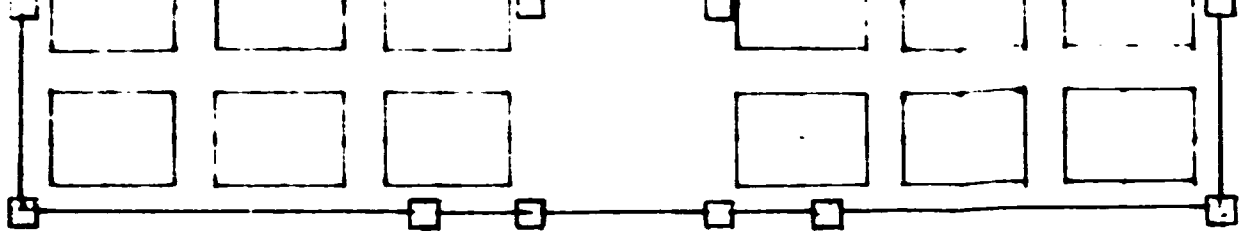
FOREST INDUSTRIES DEVELOPMENT UNIT  
KINGSTON G/TOWN

PROPOSED SITE LAYOUT  
UNDP PROJECT SI/GUY/90/801

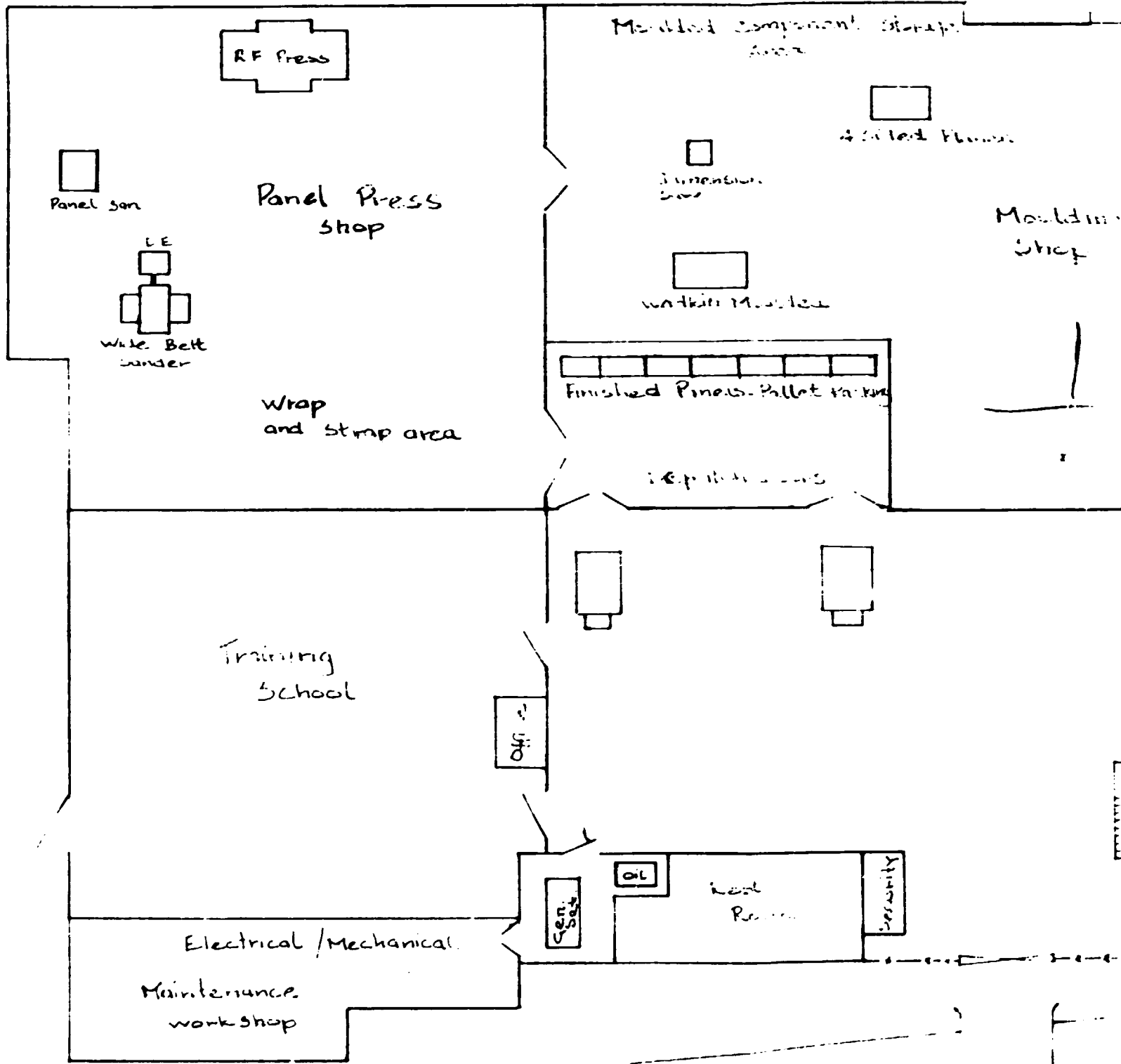
SECTION 3



DATE: 15 May 1990  
PLAN: SI/GUY/90/801-02  
DRAWN: [unclear]  
SCALE: 1/250



Kiln



SECTION 4

Kiln  
Osmore

boiler room

Seasoned  
Timber  
Storage

Component  
Sort  
&  
Palletise  
area

Kiln  
Wets

I-cut saw

Rip Band saw

Edges

x cut saw

Office

Moulding  
Shop

Security

Rest  
Room

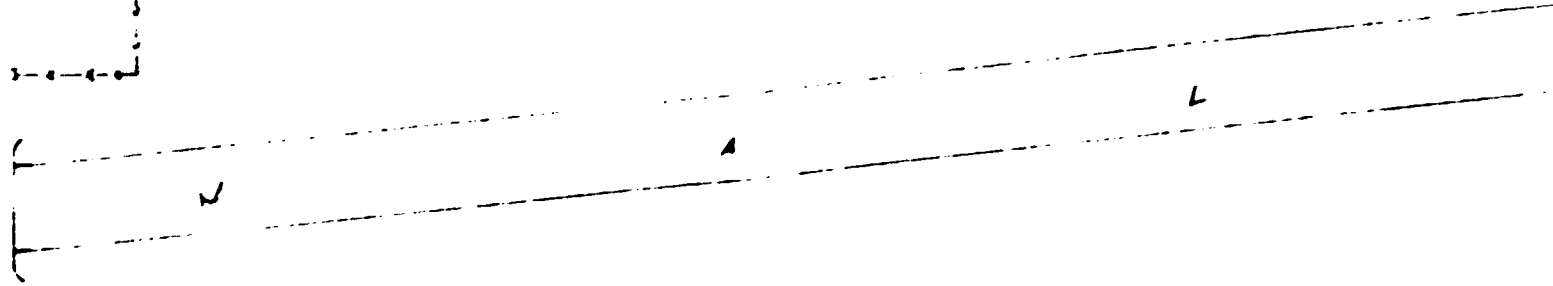
Vacuum  
Mill  
Room

Stores  
Office

Spares/parts  
Store

Raw M  
Store

Sales Admin Office



SECTION 5



Seasoned  
Timber  
Storage

WALL

W  
H  
A  
R  
K  
F

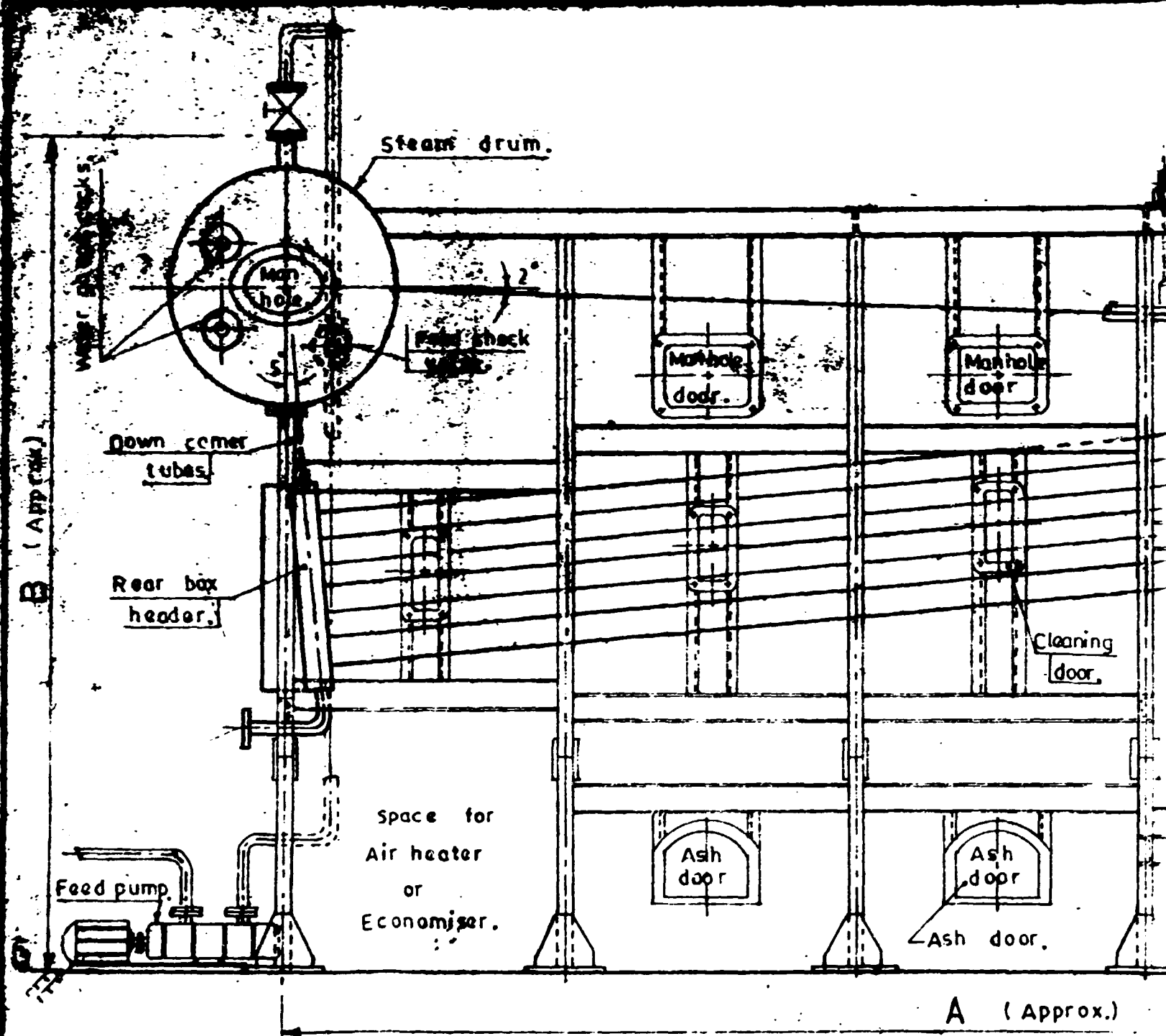
SEA

Security

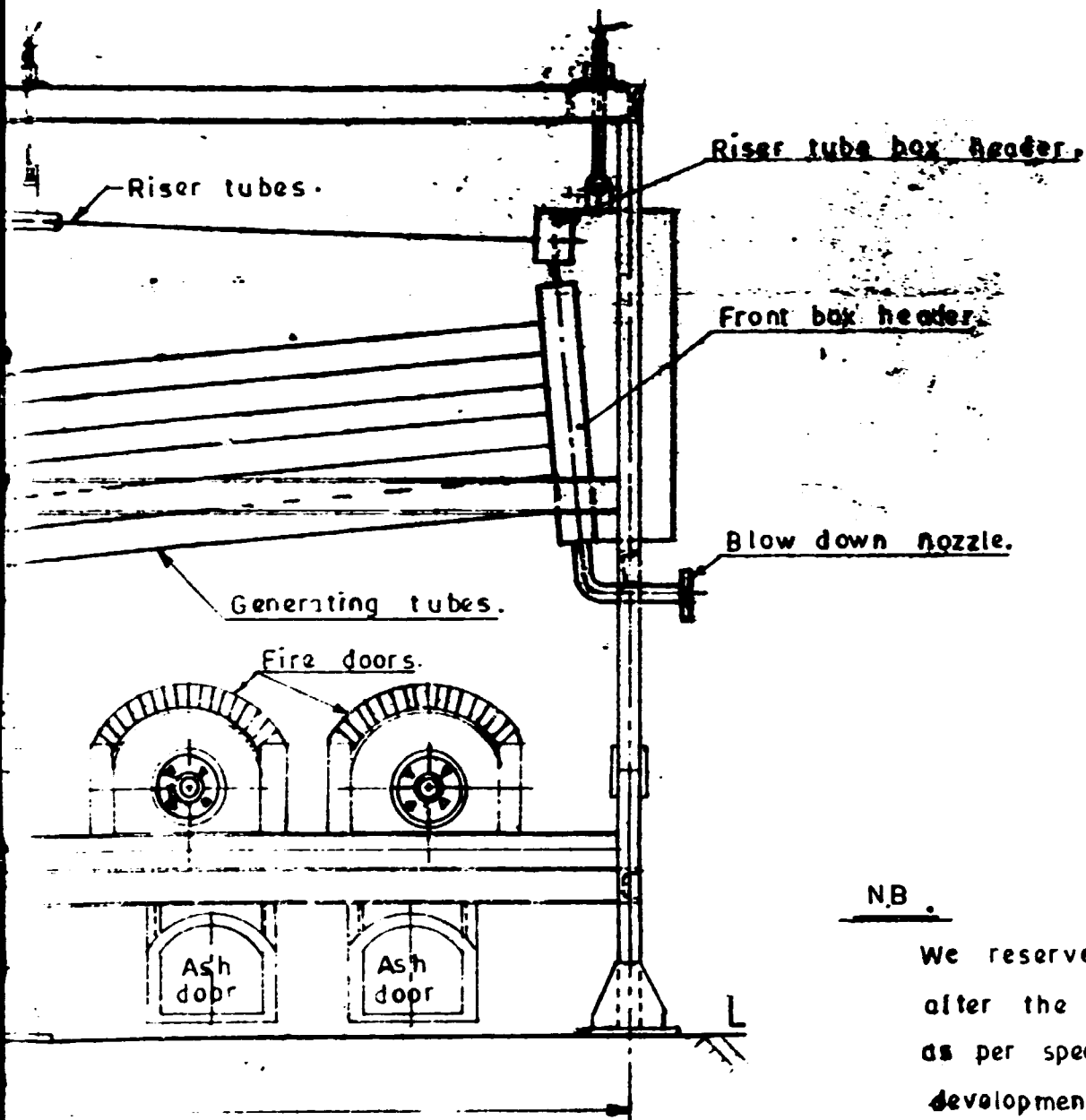
Raw Materials  
Storage

DATE: 15 Nov 1970  
PLAN: SI (90/90) - 03  
DRAWN: (initials)  
SCALE: 1:250

SECTION 6



Fuel consumption									
1. Coal 4900 kcal/kg	220 Kg.	330 Kg.	440 Kg.	550 Kg.	660 Kg.	770 Kg.	880 Kg.	990 Kg.	1575
2. Husk 2700 kcal/kg	350 Kg.	525 Kg.	700 Kg.	875 Kg.	1050 Kg.	1225 Kg.	1400 Kg.		
Overall width (mm)	2600	2600	2600	3100	3500	4000	4000	4000	40
Overall height (B) (mm)	4000	4500	4800	4800	4800	6000	6000	6000	58
Overall length (A) (mm)	5000	7200	7550	8000	8000	8000	8500	8500	90



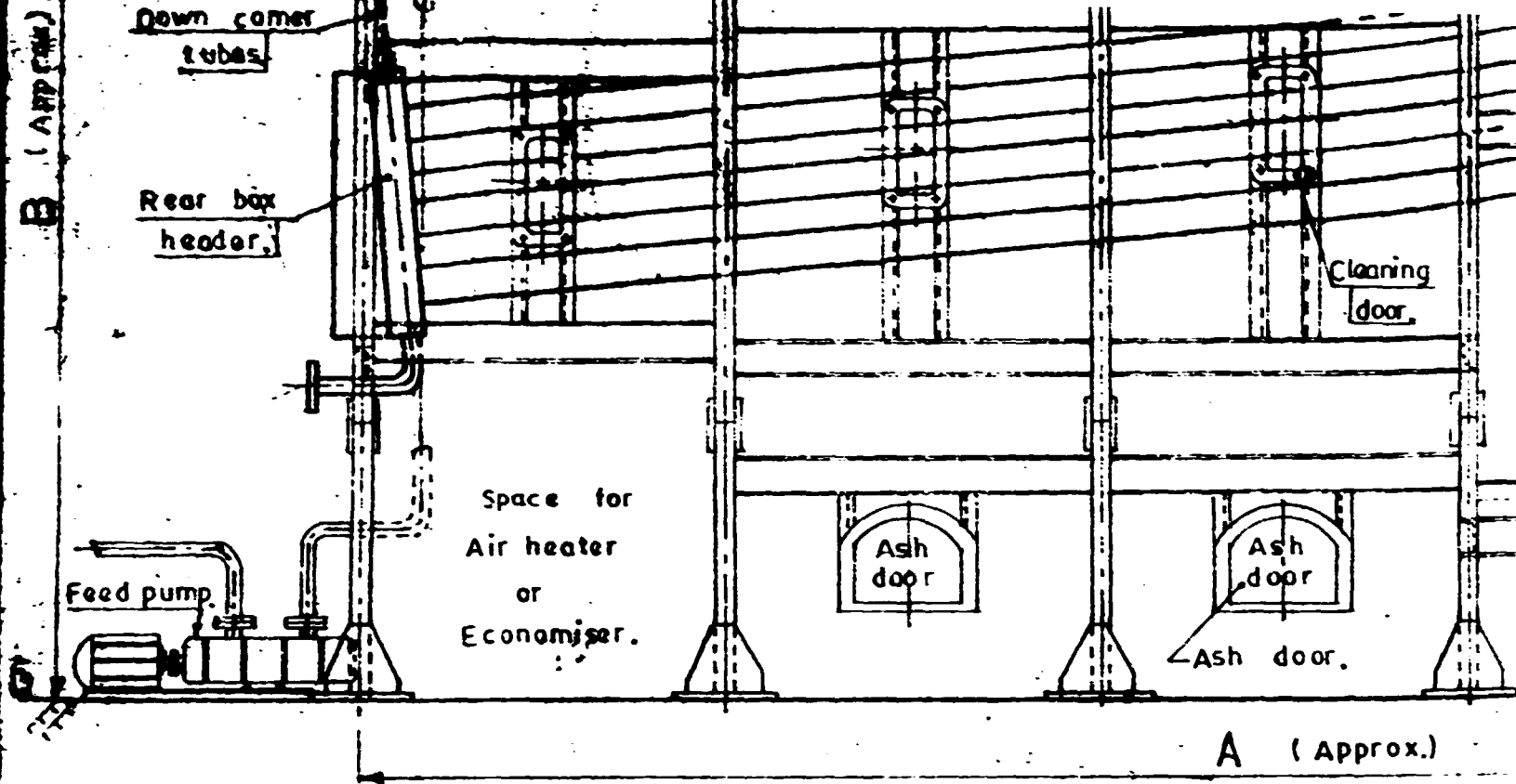
N.B.

We reserve our right to change/  
after the design dimensions/parameters  
as per specific requirements / design  
development.

	1100 Kg.	1320 Kg.	105 Kg/cm <sup>2</sup> to 17.5 Kg/cm <sup>2</sup> g.
	1750 Kg.	2100 Kg.	
	4100	4700	
	6000	7000	
	9100	11600	
	2900	3000	
	720	288	

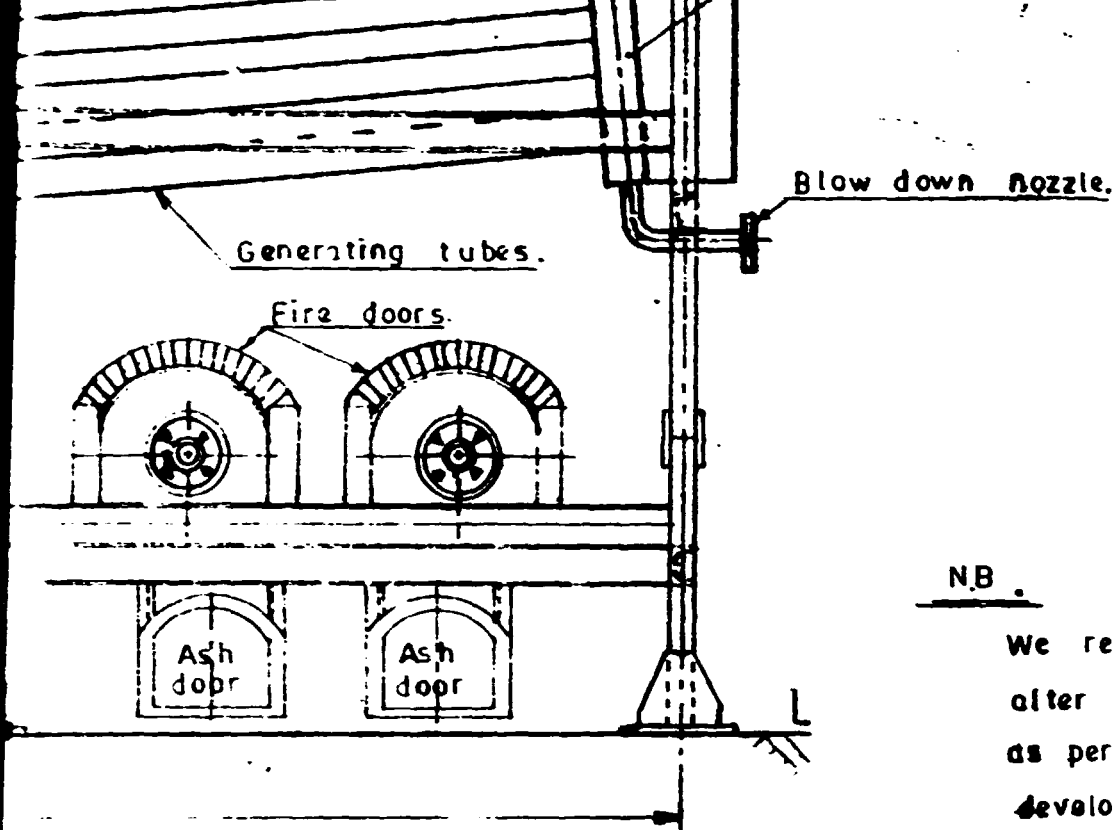
**PRESELS PVT. LTD.**

Single drum water tube boiler.



Fuel consumption 1. Coal 4500 Kcal/Kg. 2. Husk 2700 Kcal/Kg.	220 Kg- 350 Kg.	330kg- 525 Kg.	440Kg- 700 Kg.	550 Kg- 875 Kg.	660 Kg- 1050 Kg.	770 Kg- 1225 Kg.	880 Kg- 1400 Kg.	990 Kg- 1575 Kg.
Overall width. mm.	2600	2600	2600	3100	3500	4000	4000	4000
Overall height(B). mm.	4000	4500	4800	4800	4800	6000	6000	6500
Overall length(A). mm.	5000	7200	7550	8000	8000	8000	8500	9100
Drum size 1200 dia. Shell length mm.	1800	1800	1800	2400	2500	2500	2900	2900
Heating surface M <sup>2</sup> 1-Boiler. 2-Economiser 3-Air heater	48 12 16	72 15 16	96 20 35	120 25 45	144 30 60	170 30 65	192 35 75	216 35 80
Evaporation. kgs/hr.	1000	1500	2000	2500	3000	3500	4000	4500
MODEL	WT/SD-100	WT/SD-150	WT/SD-200	WT/SD-250	WT/SD-300	WT/SD-350	WT/SD-400	WT/SD-450

SECTION 3



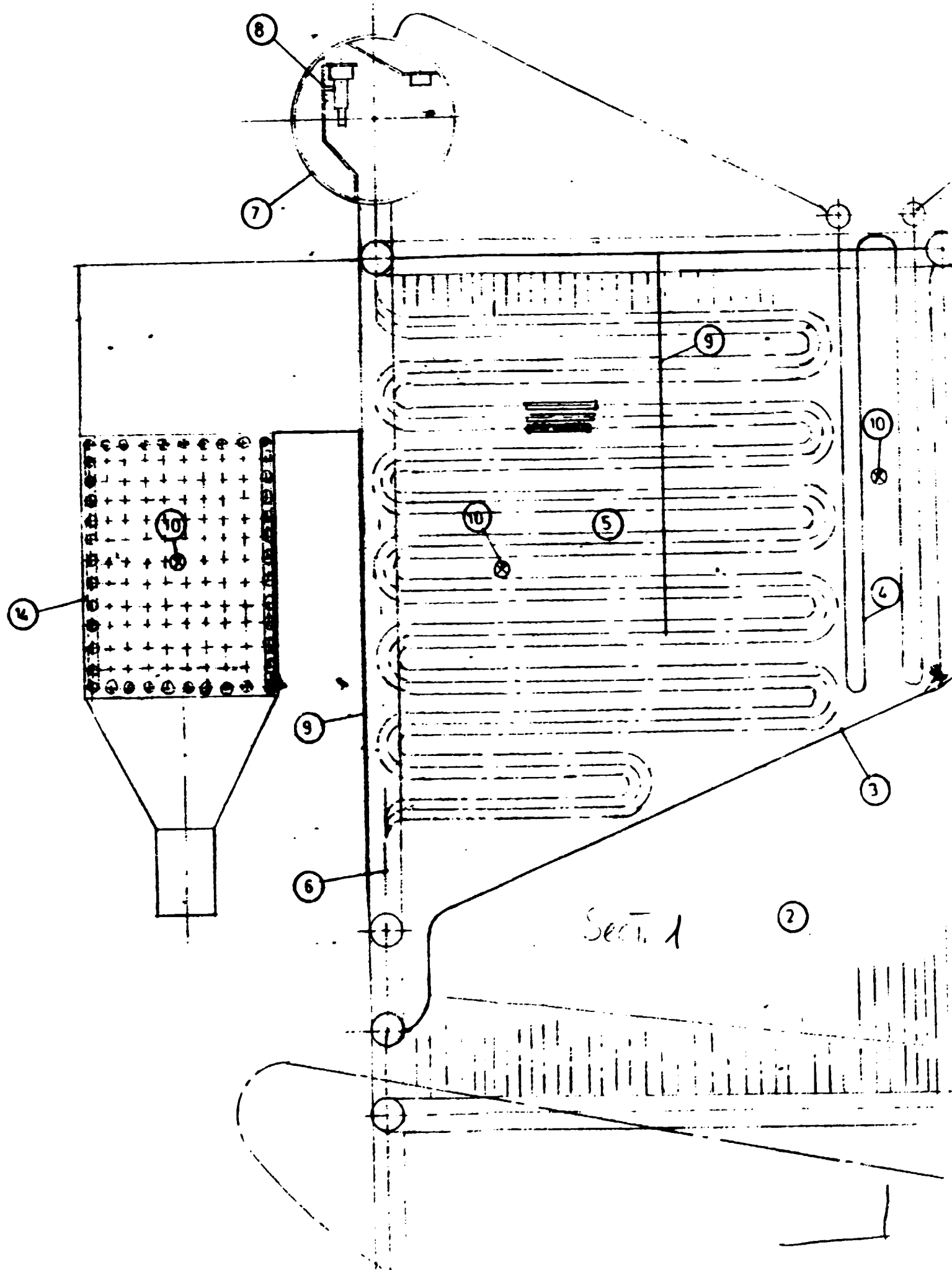
N.B.

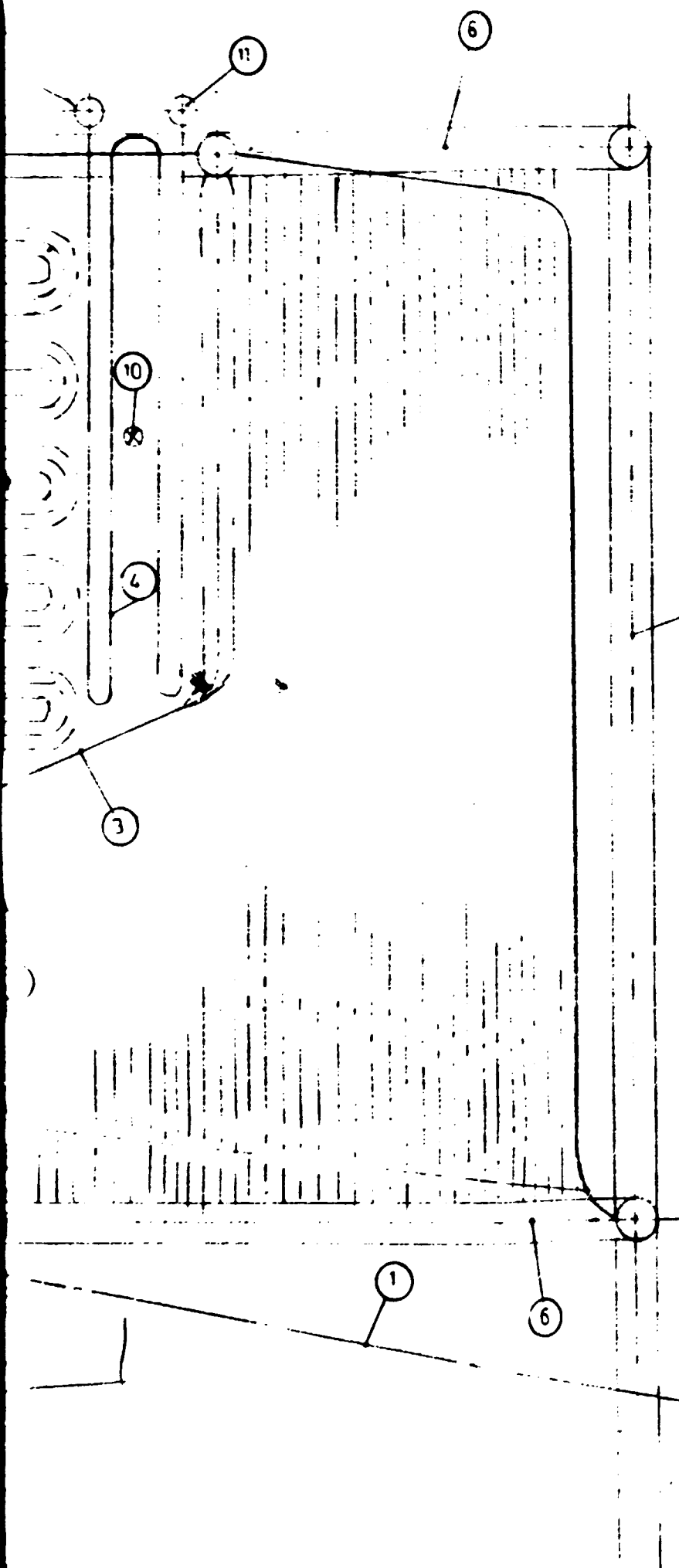
We reserve our right to change/alter the design dimensions/parameters as per specific requirements / design development.

	1100 Kg.	1320 Kg.	Working pressure 10.5 Kg/cm <sup>2</sup> g. to 17.5 Kg/cm <sup>2</sup> g.
	1750 Kg.	2100 Kg.	
	4100	4100	
	6800	7000	
	9100	11600	
	2900	3000	
	240	288	
	40	50	
	95	115	
	5000	6000	
	WT/SD-500	WT/SD-600	

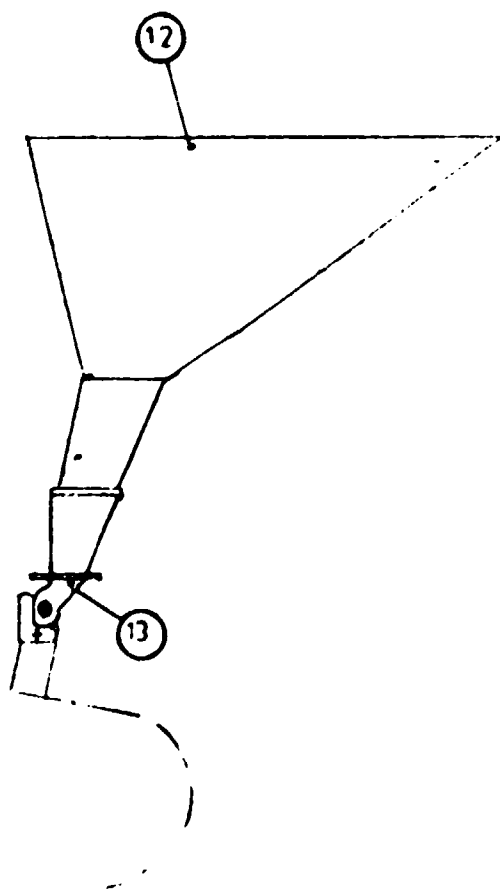
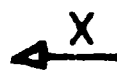
<b>PRESELS PVT. LTD.</b>		
Single drum water tube boiler.		
DRAWN <i>Adash</i>	Drg. no.	Rev.
CHECKED <i>Radom</i>		
DATE - 21.3.85	SMT. - 119	1
SCALE		

**SECTION 4**

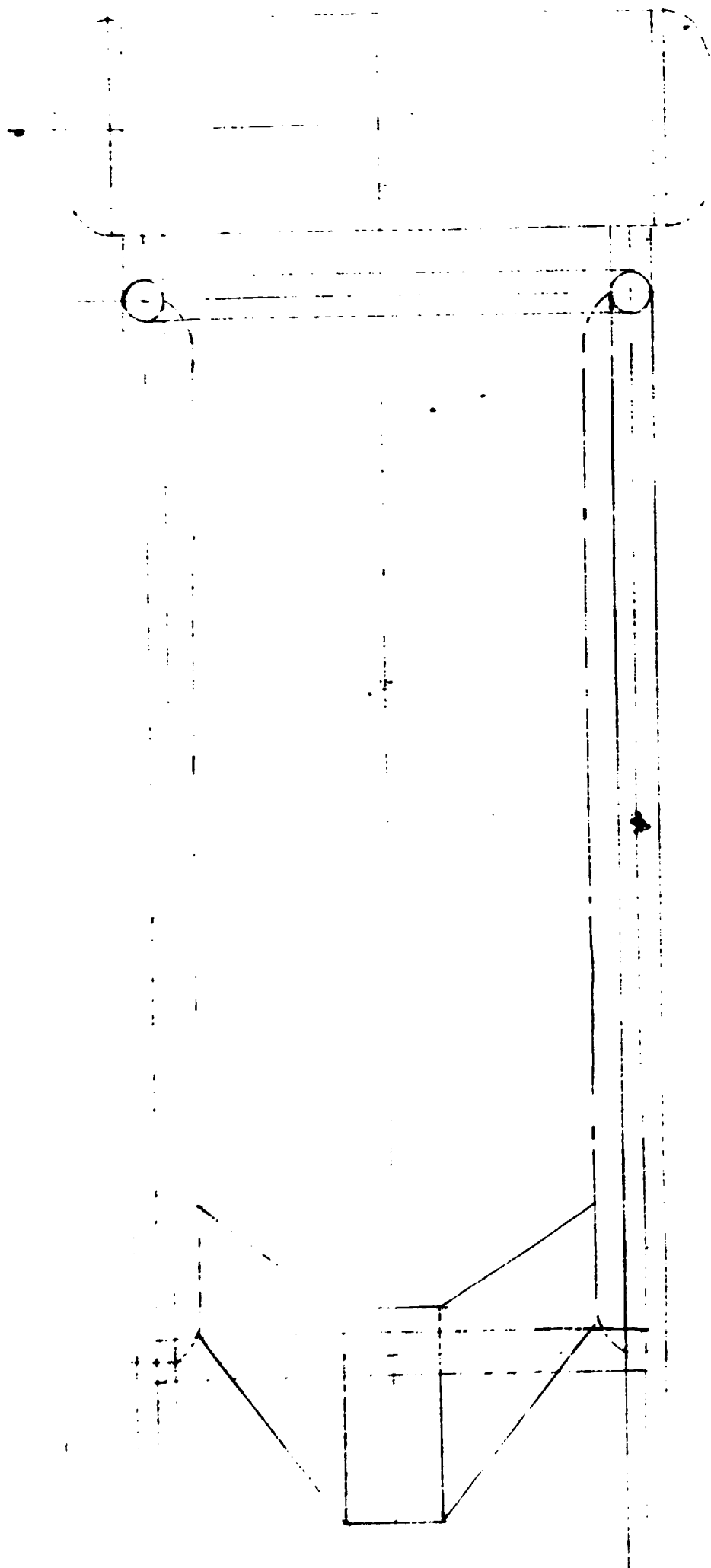




SECT 2



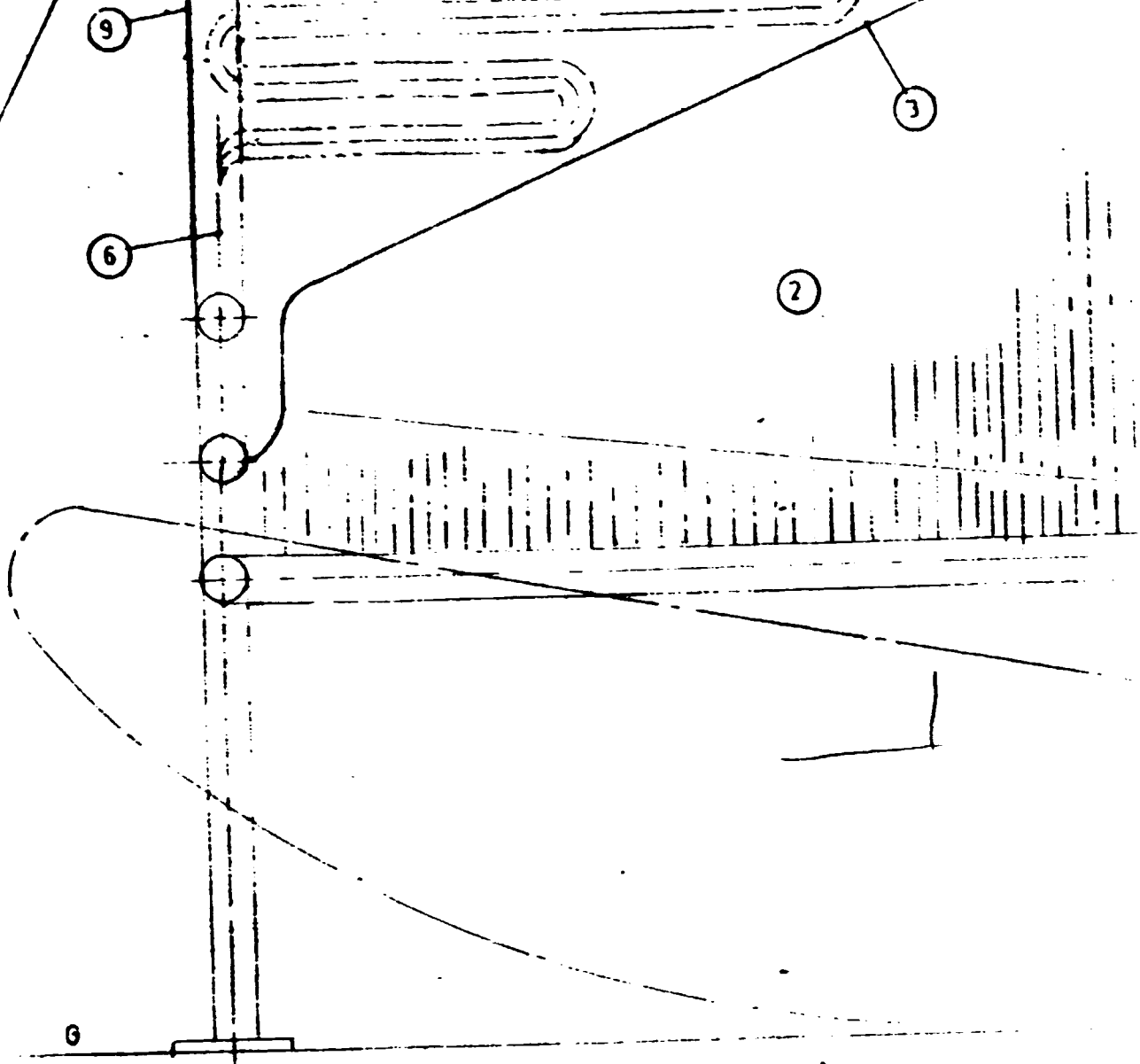
X



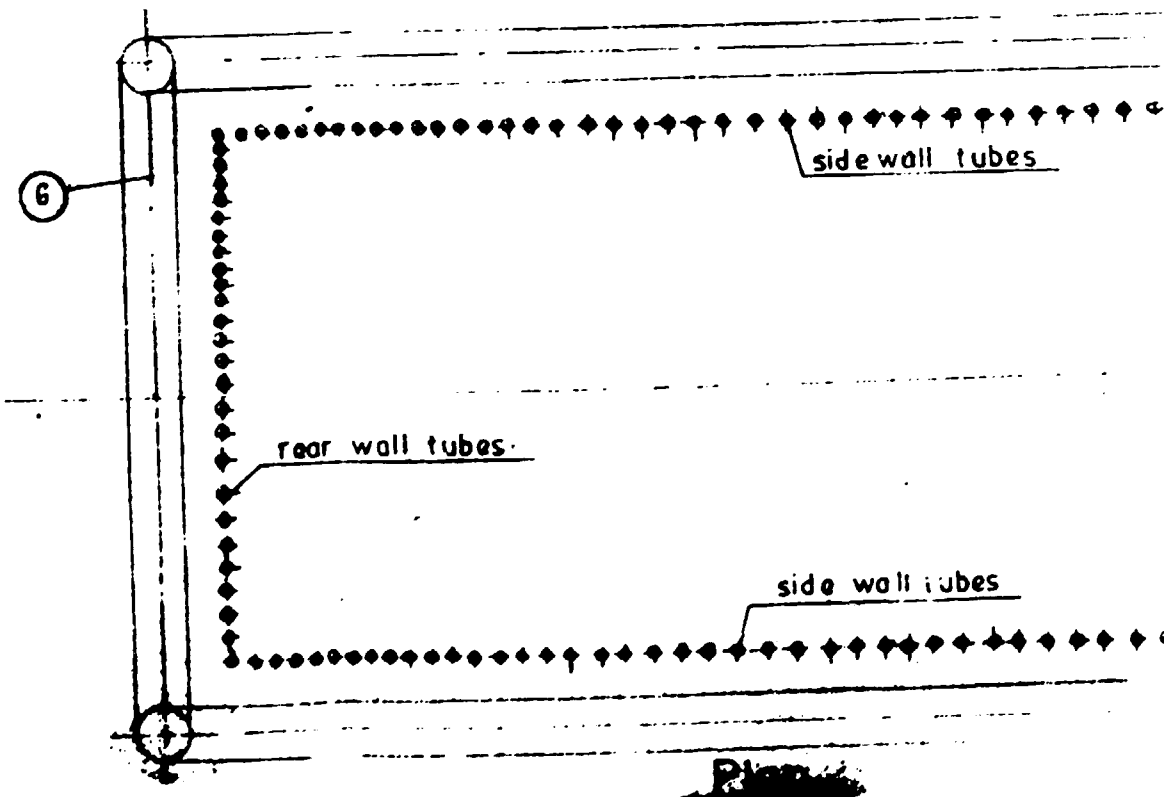
SECTION 3



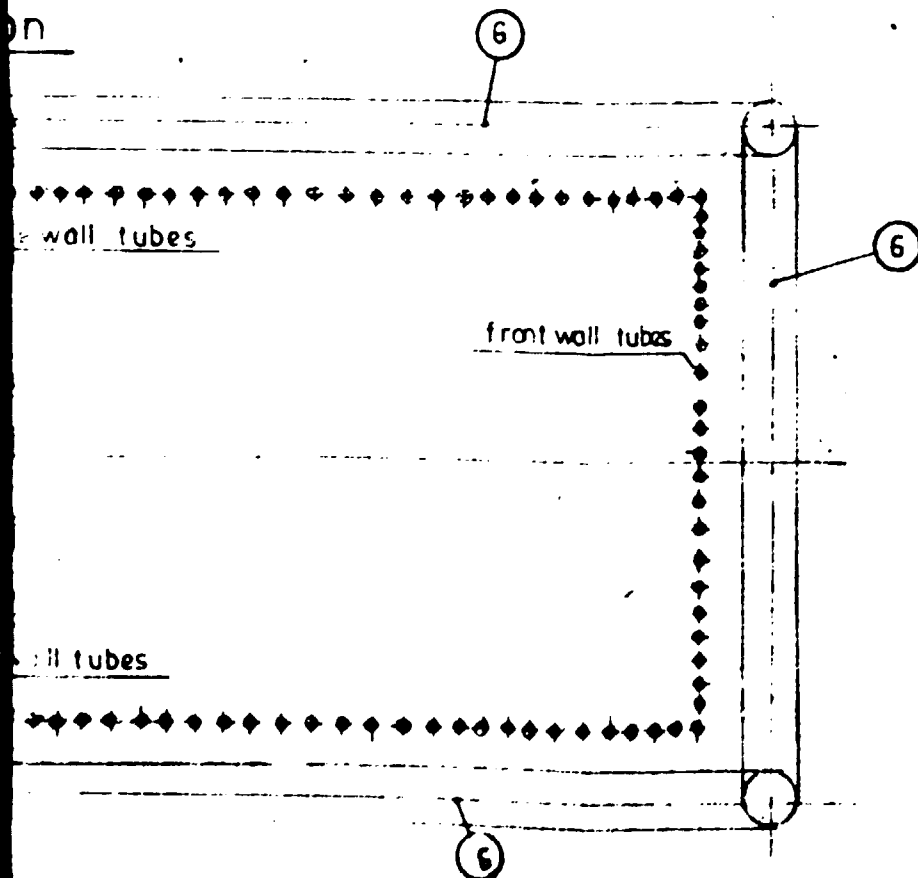
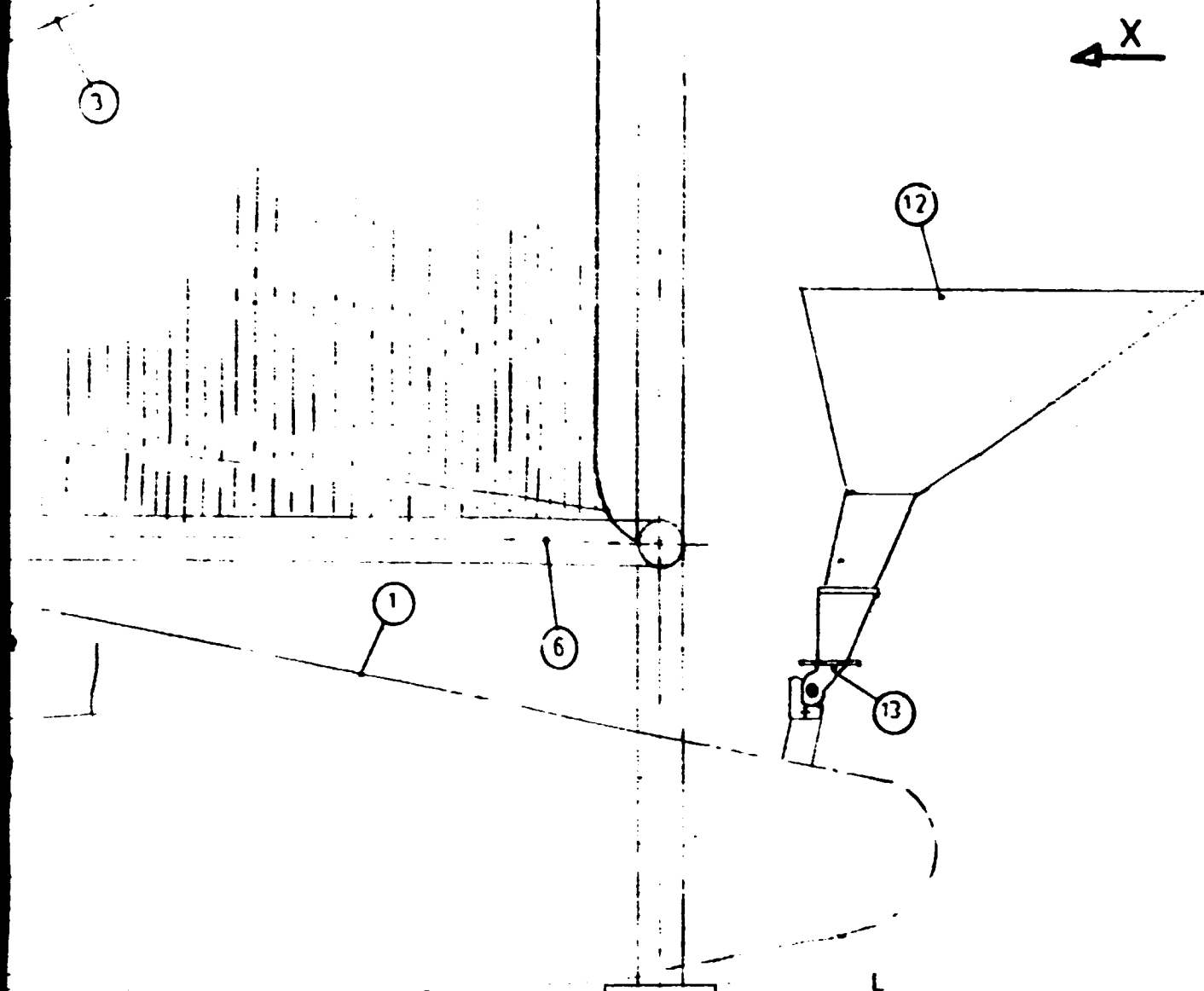
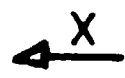
SECTION 4



Elevation



Plan



SECTION 5

( For

14	ECOMMER		
13	COAL FEEDER		
12	COAL BUNKER		
11	SUPER HEATER OUTLET HEADER		
10	SOOT BLOWERS		
9	BAFFLES		
8	DRUM INTERNAL		
7	DRUM		
6	HEADER		
5	CONVECTION SURFACE		
4	SUPER HEATER		
3	REAR WALL		
2	FURNACE		
1	CHAIN GRATE		
S.No.	Description		

PRE

Sinc

DRAWN

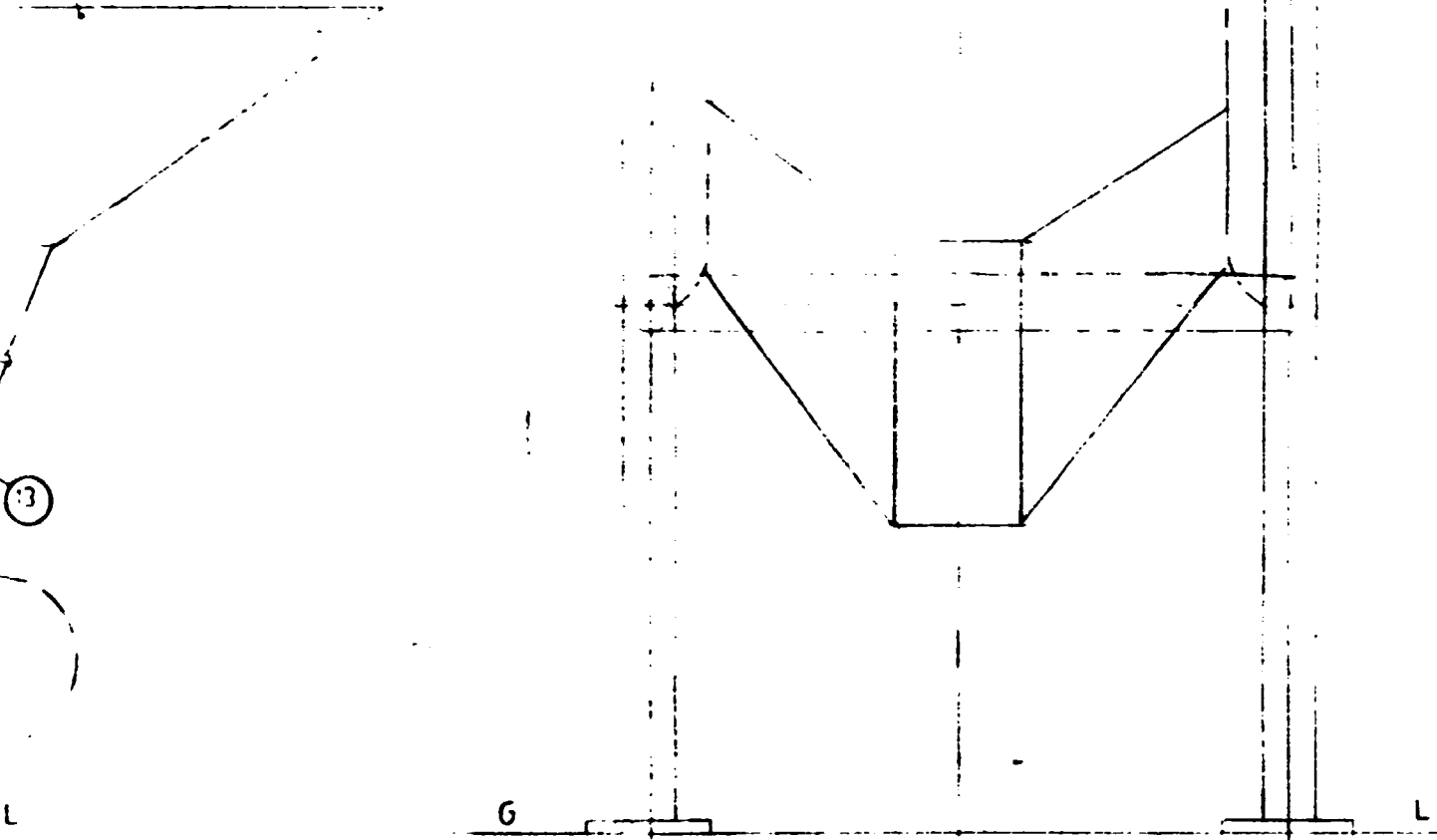
CHECKED

DATE

SCALE

X

12



View - 'X'

( For quotation purposes only )

CONDENSER		<b>PRESSELS PRIVATE LIMITED.</b>			
COAL FEEDER					
COAL BUNKER		<u>Single drum water tube boiler.</u>			
SUPER HEATER OUTLET HEADER					
SOOT BLOWERS		DRAWN	A. Panda.	DRG. NO. -	REV.
BAFFLES		CHECKED		SKT-214	0
DRUM INTERNAL		DATE	8-1-91.		
DRUM		SCALE	NIS.		
HEADER		Description			
CONVECTION SURFACE					
SUPER HEATER					
REAR WALL					
FURNACE					
CHAIN GRATE					

SECTION 6