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Vienna International Centre, P.O. Box 300, 1400 Vienna, Austria
Tel: (+43-1) 26026-0 · www.unido.org · unido@unido.org

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DEVELOPMENT CENTRE FOR LEATHER TECHNOLGY (DCLT)

DP/BUR/82/007

BURMA

Technical Report: On the Viability of Establishing a Leather Development Centre in Burma*

Prepared for the Government of
the Socialist Republic of the Union of Burma
by the United Nations Industrial Development Organization,
acting as executing agency for the United Nations Development Programme

Based on the work of
Mr. M.G. Haecker, Leather Technologist, and
Mr. P.B. Buit, Leather Marketing Expert

United Nations Industrial Development Organization
Vienna

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2. ABSTRACT

The purpose of the preparatory assistance is to provide support to a possible establishment of the Development Centre for Leather Technology (DCLT) in Burma. This assignment, included evaluation of the present situation in the Leather and Leather Products field with a survey of local and international markets in view to identify resource development strategies for a long-term development of Leather and Leather Products Industries in Burma. To be able to carry out a uniform appreciation, this report covers the Marketing Expert's extensive work with a number of related activities during the period between 24th July 1985 and 9th October 1985.

Burma has his own raw hides and skins resources. The availability of raw hides and skins is in excess to the production capacity of the Tanning Industry.

The preservation/flaying especially in the rural area is in need of improvement to save the National value of this high valuable raw materials.

The Government owned Leather Industry in Burma is processing approx. 33% of available Cattle - Buffalo hides and approx. 50% Goat - Sheep skins in four factories.

The renovation in the two leather factories in Rangoon and now also at Mandalay is completed and the equipment for a up-to-date process technology has been installed.

The Leather Products Industry, with one Shoe Factory at Indaing and one well equipped Leather Goods Factory at Rangoon are still not receiving the leather quality required for the production of quality Shoe and various Leather Goods Items.

The leather quality for the local and export market is below standard and not according to international specifications and demands.

To improve the situation in all the production plants, DCLT is being planned to play an important part in the development of the Burmese Leather and Leather Products Industry.

It is considered that the DCLT is economically viable. Designs have been made of : site layout, pilot tannery, footwear and leather goods centre, laboratory, lecture rooms, offices and workshop which includes detailed lists of the necessary machines and equipment. Estimates for building, equipment, auxiliaries, staff and also the operation budget for the first years are included.

Extension - Supporting and Training Services are planned in a scheme for the beginning years of DCLT existence; the total activities of DCLT are estimated to : -

- Extension Services ... 40%
- Supporting Services .. 40%
- Training Services ... 20%

3. RECOMMENDATIONS

Based on the Expert's findings and concluding remarks, following recommendations are made : -

(A) Marketing Aspects :

A detailed report referring the Marketing aspects of the project is covered in the terminal report separately prepared by the Leather Marketing Expert and the recommendations are provided in his terminal report are as follows : -

1. Consider livestock, raw hides and skins improvement for a wider rehabilitation action programme for the development of the leather footwear and leather products industry in Burma. A possible assistance from UN Agencies to identify in actual needs for a suitable actions to be taken may be considered.

2. Formulation as well as implementation of quality standards related to raw hides and skins, semi-processed and finished leather and extremely important which should also include specifications related to sizing and substance ranges, where applicable.

3. Training of higher level technicians leading to a suitably acceptable qualifications in the Leather, Footwear, Leather Products Technologies, Chemistry, and Designing should be considered as prerequisites for this development of this sector. Suitable training courses and institutions are identified in the project document and techno-economic study for the establishment of DCLT.

4. The tanneries should have reasonably free access to imported component such as chemicals and other consumables. Any changes in the production processing formulations should be made only through successful trials and development work with consideration to economic factors of price, returns in terms of output grades and yields factors. If tanneries do not have technically viable and economical access to such inputs, they will suffer on quality, inconsistancy and often, in a production loss, a handicap for marketing which will be difficult to overcome. Chemicals inputs with some sensitive and important items are listed in Annex 1 where technical evaluation is of extreme importance.

5. The Expert is of the opinion that the Government may consider implementing "revolving fund", whereby the exports of the leather and leather products sector should be directly related to the allocation of funds for imported inputs, which would also act as an additional incentive for the sector in their efforts to

achieving export targets.

6. The establishment of DCLT is of importance. Its objectives, functions are identified and elaborated in other reports. Inputs and size of the DCLT's operation should, however be carefully evaluated based on the actual needs and scale of this sector in the country. If some of the inputs are of production scale consideration should be given for its full utilization as a pilot production cum development centre.

7. Information feed-back from GIC's marketing operations and within the production units needs a very careful formulation and urgent attention. Assistance from UNIDO may be considered as a forerunner to the proposed long-term project to strengthen and improve overall marketing and production performance of the existing plants (See Annex 2 for objetives and terms of reference). Certain physical controls are essential at PFF where, consumption of items in particular to leather, is very high.

8. Tanneries should concentrate their efforts towards the establishment of a regular export business for semi-processed leather such as wet-blue chrome, crust and ready-to-finished leathers. Development of finished leather exports should be carried out in gradual phases, which requires expensive chemical inputs and added skills.

9. Prior to going into footwear and leather goods manufacturing, both for domestic and export needs, tanneries should establish their quality of finished leather at an acceptable international standards; train senior technical staff through fellowship; identify proper product-mix based on the availability of raw material in the country including outlets for the manufactured goods with an intention to suitably design such an operation.

   For achieving such desired results for the above recommendations, 8 and 9, DCLT's services will be very valuable.

10. It is desirable that marketing personnel make as many visits to the production units as is economically possible. It is suggested that each plant is visited at least once a month so that the centralized marketing at the GIC level can successfully monitor the production/marketing activities. The production units should speedily advise GIC marketing or procurement of any extraneous problems which although not related to production difficulties, could effect export performance.

11. Establish a sound and long-term contacts with selected buyers abroad rather than contacting too many for a limited scale leather production in Burma. This will help in establishing reputation for the tanneries as a reliable source of supply. Once this is achieved, buyers will turn to you rather than yourself looking for outlets. Conventional channels of trade have distinct advantages of providing informations related to price, quality level, styling to the suppliers and therefore part of the responsibilities in export marketing is taken over by them. Conditions of offer terms and delivery schedules should be strictly adhered to.

12. The tanneries and shoe units should continue their product-mix to a limited range at this stage to simplify towards planning, production and marketing operations.

13. Every effort should be made to encourage the financing of marketing and technical study tours not just to visit established leather sector customers, but to determine what are the sales possibilities for the footwear and leather goods sectors. Such visits should be used, to verify what quality and price areas should be targetted for the level of merchandise, the sector in Burma is capable of producing. A specific reference is made to the important trade fairs at Paris held every year during September. Financial and organizational assistance for such a participation is provided by the EEC office in Brussels to a number of developing countries, for which the Government may be entitled for. Additional regional fairs are held at Hongkong, Singapore with a specific reference to the forthcoming fair at Bangkok between 7-10 November 1985 is highly recommended for Burmese participation as observers.

14. The production of a colour promotional brochure is important for the export marketing.

15. A survey related to the Asian Leather Industry is planned for publication of the International Leather Journal of England. A suitable write-up along with photographs from the tanneries should be sent for inclusion in this survey. This will provide a useful information for the world-wide leather trade, about the Burmese Leather Industry.

16. The Government may consider establishing a task force to implement possible recommendations made by the Expert. Counterpart staff presently attached to this project, may be considered for such an assignments.

(B). TECHNICAL ASPECTS:

1. Burma has its own raw material, raw hides and skins, resources and is not depending on supplies-imports-from other countries. These resources are of very high national and should be fully utilized.

2. Priority should be given to improve the flaying-preservation-and the collection of raw hides and skins all over the country. All these proper preserved raw materials must reach the tanning industry for further processing into higher valuable items of leather or leather products.

3. The availability of raw hides and skins is much in excess compared to the production capacity of the tanning industry. The expansion of the as well as the leather products industry should be planned issue and in proportion to the increasing availability of raw hides and skins. One or two new leather factories sill be required during the next 3-5 years.

4. Quality improvement in the tanning industry by implementation of strict process and quality control for the production of various types of leather upto the international standard and specifications should be followed. The improved leather quality is urgantly required in the Footwear and Leather Products Industry for the production of quality leather items for the export and local market.

5. To reach the above target for all round improvement in the trainingof manpower in all the leather and leather products industry is very essential. Priority should be given for training higher level technicians.

6. The establishment of the DCLT is already over due for several years. DCLT as a "National Centre" is very important to engage in quality - development - extension - supporting and training services in close co-operation with the production plants and marketing. DCLT will be well equipped with up-to-date machinery and equipment for any kind of R&D Work. DCLT should operate on non profit making basis, allowing the related industry to take full use of the centre.

7. DCLT should be at least during the beginning years of operation a Centre according to its name "Development Centre for Leather Technology". earlier or later it may be used also as a "Pilot Production Centre" utilizing the available machines. Any production however should not interferr or reduce the quality of R&D or actual activity of DCLT.

8. The DCLT planned as an independant operation centre, as requested by the Government of Burma, is based on the actual needs and size of the related industry in Burma for the future.

9. Qualified and well trained technical staff should be available to operate DCLT successfully at the time of initial functioning in August- September 1988.

10. Finally, the aim of the DCLT should be to reach the all round improvement target in the leather and leather goods industry after 5 years of operation and the final goal after another 3-5 years.

11. Exhibition of Leather-Leather Products at International Fairs should be organized in the similar way as for the first time included at the 40th UN Anniversary Exhibition at Rangoon in October 1985.

CHAPTER - 1

MARKET STUDY

1. Existing Situation

1.1. Brief Introduction and Raw Material Availability

Prior to going into some details regarding the marketing aspects, findings related to the availability of raw hides and skins based on the livestock population is considered important as a basis for the development of Leather and Leather Products Industries in Burma.

Livestock population in Burma is estimated at (1983/84) is as follows : -

Cattle	...	9.1 million heads
Buffalo	...	2.0 " "
Goat/Sheep	...	1.0 " "

Based on average collection is estimated at (1973/84) is as follows : -

Cattle/Buffalo hides	...	341,600 pieces
Goat/Sheep skins	...	511,000 "

Off-take rates as provided by livestock authorities for Cattle/Buffalo and Goat/Sheep are at 7.1 and 20.1 per cent respectively with no breakdown shown for the various types of animals. Growth rate for hides and skins, based on the actual performance, is noted at 2 per cent per annum, providing additional qualities of raw hides and skins, for the Leather and Leather Products Industries in future. To quantify this following picture which can be drawn until the year 2000 : -

Cattle/Buffalo hides	...	404,000 pieces
Goat/Sheep skins	...	807,000 "

It should be reasonable to achieve the above targets through improvement in quality and collection/commercialization of hides and skins to be able to support the development of the Leather and Leather Products Industries in Burma.

Existing price structure for the available raw hides and skins is low compared to hides and skins of similar origin i.e. Bangladesh, Thailand etc. including that of export earnings received for the country from this sector. Major problems can be identified for this comparatively reduced earnings are: man-made damages such as: flay cuts, inadequate

curing and certain damages due to improper shortage and handling. In addition, variety of animal husbandary practices and post slaughter treatment reflect on the quality of hides and skins produced. To remedy these problems, there is a need for training of field personnel in addition to have a close linkage of the hides and skins sector to that of animal husbandary and livestock authorities in general and finally with the aim for Development of Leather and Leather Products Industry in Burma.

1.2. Existing Situation, Leather, Footwear and Leather Products Industry

Not all concerned are always familiar with the infinite variety, diversity and unpredictability of the raw material from which leather is made. In Burma, no information concerning pattern of production, technology, trade statistics, pricing on similar international commodities is available and therefore it defies the application of normal economic key factor for such a research.

Realizing the importance and possible impact on the national economic level, Government of Burma has made a substantial investments in modernizing two tanneries, implementation of leather board and industrial glove production units in Burma. Production of footwear is limited to People's Footwear Factory at Indaing and rubber slipper output at Rubber Factory II. All these plants are operated under a direct control of General Industries Corporation of Ministry of Industries No.1. Their installed capacity and performance and people engaged in the sector is provided in table I.

TABLE I : LEATHER, FOOTWEAR AND LEATHER PRODUCTS INDUSTRY IN BURMA

	Name of Plant and(Location)	No. of People Engaged	Installed Capacity and (Product-Mix)	Capacity Utilization Based on 83-84 Performance
1.(A).	Rangoon Leather Factory I (Rangoon)	- 200	80,000 pcs hides/annum. 100,000 pcs goat skins/annum (fully-finished).	40% total capacity only.
(B).	Rangoon Leather Factory II (Rangoon)		70,000 lbs/annum sole leather. 400,000 sq.ft/annum splits from WBC for gloves.	50% of finished sole and split glove leather production.
(C).	Rangoon Leather Factory III (Bassein)		30,000 lbs/annum sole leather.	80% of sole leather.
(D).	Rangoon Leather Board Factory (Rangoon)		400 tons of finished leather board/annum.	50% total capacity utilization.

TABLE I : (Contd.)

Name of Plant and (Location)	No. of People Engaged	Installed Capacity and (Product-Mix)	Capacity Utilization Based on 83-84 Performance
2. Mandalay Leather Factory I (Mandalay)	180	80,000 pcs hides/ annum	30% total capacity utilization only partially finished
		100,000 pcs goat or sheep skin/annum fully finished.	
		20,000 pcs hides/ annum sole leather.	
		400,000 sq.ft. splits.	
3. People's Footwear Factory (Indaing)	469	524,000 pairs/annum	84% total capacity utilization.
4. Rangoon Leather Products Factory (Rangoon)	80	240,000 pairs industrial gloves/ annum.	50% Total capacity utilization.
5. Rubber Factory II (Rangoon)	25	55,994 pairs rubber slippers.	-

Two Government tanneries are designed to produce fully finished leather. However, approximate capacity utilization in terms of production and processing is far lower and can be summarised as below : -

1. Wet Blue Chrome ... 50 per cent
2. Crust/Ready-to-finished ... 20 " "
3. Finished ... 30 " "

In other words, reduced capacity utilization of the tanneries indicated in table III, is further decreased due to lower output of finished leather, which could be easily achieved through an adequate back-up of trained man-power and know-how.

There are a number of small private/co-operatives producing leather, footwear and to a small scale, leather goods in Burma. Such tanneries produce mainly sole leather or light weight leather using locally available tanning material, while most of the small scale footwear manufacturers produce slippers, which is the type of footwear widely used in Burma. Leather products for different uses are made of locally produced genuine leather with decorations, carvings and motifs of folk-art origin and have for a long time been traditionally produced in small-scale workshops and sold throughout the country. There is a need to upgrade the existing output of such items through supply of improved and more durable type of leather. There is no statistical data or information available covering this small-scale sector.

Additional shoe factory is planned to produce Footwear with the intention to satisfy the domestic and export market needs. One small tannery unit is expected to go into production of wet blue tanned skins in Rakhine State.

Operational difficulties due to inadequate technical and commercially applied know-how has resulted in inconsistent quality output of various types of product-mix. In addition, the reasons for low utilization levels of both the leather and leather products industries in Burma are numerous, such as insufficient suitably trained and qualified staff, lack of chemicals and spare parts etc. It is estimated that state-owned tanneries together process about one-third of the cattle and buffalo hides and one-half of the goat and sheep skins. Remaining hides and skins are consumed by the rural tanneries or are unaccounted for.

Regarding the Footwear output at the PFF, quality is of low standard, due to old machinery and equipment. With the existing equipment and facilities available, it will be difficult for PFF to produce improved quality footwear. Present consumption of leather in combat boots (6 sq.ft/ pair) and in case of foam rubber shoes (4.05 sq.ft and 0.65 lbs) is considered to be very high and constitutes 51 and 65 per cent inputs in total production cost respectively. Above difficulties are mainly due to lack of proper know-how application and suitably trained man-power availability.

Leather goods factory produces industrial gloves for the export market and quality standards are good. Leather board plant at the time of the expert's visit, was not in operation due to shortage of latex. This factory produces limited range of product-mix and quality inspected is of good standard which could be exported. However, a serious bottle-neck remains in the grinding of raw material from the tannery waste which limits, to a certain degree, output as well as quality level of leather boards produced.

1.3. Domestic and Export Market Performance

Export performance in this sector has been limited to raw hides and skins and only processed material upto wet-blue chrome stage. Export performance may be summarised as below between period 1976-84 : -

YEAR	WET BLUE CHROME Ox/Cow/Buffalo Hides (pcs)	Goat/Sheep Skins (pcs)	Vegetable Tanned Goat/Sheep Skins (pcs)	Dry Salted Goat Skins (pcs)
1976-84 Average	42,763	91,612	16,150	52,212

Above exports in relation to an estimated national hides and skins output is indicated as follows :-

Cow/Buffalo hides	...	12.5 per cent
Goat/Sheep skins	...	31.1 " "

Domestic requirements of finished leather from two Government tanneries is mainly restricted to PFF which is indicated below as their actual consumption between 69/85 : -

Shoe upper & lining leather	...	1,065,542 sq.ft.
Sole leather	...	140,000 lbs.
Insole as leather	...	159,811 lbs.

Based on the above utilization the following quantities remain either surplus for the exports or partially available for other domestic market consumption if two government tannerie's capacities is fully achieved : -

Shoe upper and lining leather	...	3,209,658 sq.ft.
Sole leather	...	259,682 lbs.
Insole leather	...	720,189 lbs.

The above analysis will provide a useful guide related to the available quantities of leather and for possible exports. Additional quantities of splits output for industrial gloves is estimated at about 350,000 sq.ft. representing 44 per cent capacity utilization. Requirement of splits in the country for glove production at the Leather Goods Factory at Rangoon is estimated at 700,000 sq.ft.

1.4. Pricing and Production Costs - Leather Industry

It is important to analyse the pricing and production costs, mainly of leather produced at various processing stages which closely reflects on marketing aspects.

Prices obtained for finished leather in domestic market is of acceptable level covering the costs of production with a marginal profits. However, limited quantities of export of semi-processed leather, hides and skins in wet blue and crust stage are selling below the cost of production. Prices offered by the Importers are low due to Burmese leather Industry is new entrant to the export market and Buyers concern about reliability from this end in terms of acceptability for quality standards and timely delivery which is not fully achieved. It must be stated that whatever the world market price of raw stock reaches, it can never exceed that of prices for semi processed and finished leather.

Pricing is related to the cost of processing and production in general. Although physical usages of inputs i.e. raw material, chemicals, and other consumables and their value are important in reducing costs, quality aspects to include out term grades (in percentage), yields are equally important to reduce unit costs.

Following table II will show a comparative raw and chemical cost of producing leather from cattle hides from Mandalay Tannery at three different stages i.e. wet blue, crust and finished stage. As these two inputs are major variable components, no other factors are included for this exercise. The tannery uses two seperate formulations, one for leather produced for exports and another for domestic needs.

TABLE II : Comparative Raw/Chemical Costs, Hides Processing (Mandalay Tannery)

Items + (Stage of Processing)	For Domestic Sale (Kyats) per sq.ft.	% Contribution	For Export Sale (Kyats) per sq.ft.	% Contribution
Raw	0.58	17.74	0.85	12.36
Chemicals	0.74	17.92	0.75	10.53
(Wet Blue Stage)	1.62	32.65	1.63	22.89
Add Chemicals	1.27	25.60	2.12	29.77
(Crust Stage)	2.89	58.25	3.75	52.66
Add Chemicals	2.07	41.73	3.37	47.34
(Finished Stage)	4.96	100.00	7.12	100.00

Most of the tanning chemicals are imported into Burma with the exception of lime, salt, sulphuric acid as well as vegetable tanning bark which is used by rural tanners only. It is very interesting to note, high costs of chemical inputs, which is entirely imported, needed to produce finished leather. Export marketing of finished leather is highly sensitive towards colour feel and other fashion related trends and unless, Burma is able to achieve quality standards and quicker delivery, tanneries should concentrate exporting semi-processed leather only.

Furthermore, cost reduction, with the existing situation in the industry needs to be effectively controlled through various interoperation technical and physical controls to be able to obtain improved grades, yields as well as usages of various inputs. Effects of value added factor will only be achieved through a proper technological and commercially applied practices in the leather production.

1.5. Footwear and Leather Products Industry

Very little can be said at this stage regarding the footwear and leather products industry in Burma. Success of existing units and planned expansion in this field is closely related to the achievements of the leather factory. Regarding existing demand for footwear in Burma, large portion of the population is using slippers. Based on the field visits and discussions with the retail shops and consumers, the expert's findings reveal that major part of footwear demand and requirements are for slipper and sandal type of footwear rather than close type. However, limited scale of demand for the military and civil service officials exist for close type of footwear. In addition, younger generation, specially demand for the ladies fashion footwear is increasing. Similar observations are made regarding the possible increase in the consumption of footwear for children for schools, and casual wear of different style/design as well as sports shoes.

Average production of footwear at PFF between 78-85 period for both leather, rubber and canvas was 447,987 pairs per annum. As pointed out earlier, no data is available regarding the production of slippers and related type of footwear from small scale sector. It is estimated that the total production of combat and leather footwear is likely to grow to approx. 651,000 pairs per annum by 1992.

Due to non-availability of data, it is difficult to establish per capita footwear usage in Burma at this stage. However, it may be pointed out that per capita requirements for footwear in industrialized countries is estimated at 4.0 pair as compared to developing countries 1.0 pair per annum.

2. CONCLUSIONS AND PROSPECTS OF THE LEATHER AND LEATHER PRODUCTS SECTOR DEVELOPMENT AND MARKETING DEMAND

2.1. Livestock, Raw Hides and Skins Sector

A variety of animal husbandary practices as well as poor-slaughter treatment, adversely affects the suitability of the leather, footwear and leather products manufacture. These wide range of policy needs, which have an impact beyond leather andleather products sector, are of extreme importance in determining a potential for the development of leather and leather products industries sector in Burma. Based on the findings, a logical approach would be to include livestock, raw hides and skins improvement for a wider rehabilitation action programme for the development of leather footwear and leather products development in Burma. The appointed DCLT national staff should go ahead in co-operation with the appropriate authorities concerned for the preparation of most urgent needs of the sector with respect to possible extension, and support services related to the improvement of the hides and skins sector of the proposed DCLT plan. Based on the expected growth in the off-take, hides and skins output by year 2000 will be estimated at 599,000 pcs cattle/buffalo hides and 807,000 pcs goat/sheep skins. This will be achieved through improved collection network and pricing policies, to match the similar situation in other countries.

Assuming that a wider action to rehabilitate the leather and leather products industry including the improvement of hides and skins needs to be undertaken, strict quality control and improved collection concerning raw hides and skins is of great importance. Pricing policies should be carefully reviewed to be able to give premium for a properly flayed and cured raw material. There is a need to utilize news media to educate primary producers of the importance of this raw material including advise provided towards proper flaying and curing. Furthermore, activities should be extended to supervise and control on utilization and production of the leather from private/co-operative tanners to ensure that the hides and skins utilized are in accordance with the guideline policies and trade practices for this small-scale rural sector.

2.2. Leather and Leather Products Industries Development and Its Market Potential

The General consequential effects of economic, industrial and sociological development are increasingly felt with substantial public investments increased over a period as seen from table III. Substantial incurrence in the growth of Agriculture, Livestock, and Industry is noted. The Leather and Leather Product related Industries being agro-based should be able to contribute considerably if properly planned for its development. The Government of Burma, made substantial investments

TABLE III : SECTORIAL ALLOCATION OF PUBLIC INVESTMENT IN THE FOURTH FOUR YEAR PLAN (%)

(Kyats in Lakhs)

Sr. No.	Sector	1982-83	1983-84	1984-85	1985-86
1.	Agriculture, Livestock and Forestry.	18.3% (15,953)	20.7% (19,325)	21.5% (20,152)	23.5 (22,647)
	1. Agriculture	10.0% (8,717)	12.6% (11,750)	13.2% (12,377)	13.5% (13,058)
	2. Livestock & Fishery	5.0% (4,371)	4.0% (3,729)	3.9% (3,684)	5.2% (4,991)
	3. Forestry	3.3% (2,865)	4.1% (3,846)	4.4% (4,091)	4.8% (4,598)
2.	Mining	11.5% (9,973)	7.6% (7,108)	10.5% (9,793)	12.6% (12,236)
3.	Industry	37.1% (32,250)	33.1% (30,932)	28.5% (26,688)	22.7% (21,937)
4.	Power	5.9% (5,149)	7.5% (7,053)	7.6% (7,128)	7.4% (7,145)
5.	Construction	2.8% (2,460)	3.0% (2,834)	3.1% (2,930)	3.2% (3,044)
6.	Transport and Communication	10.2% (8,837)	11.4% (10,682)	11.5% (10,755	11.3% (10,888)
7.	Trade and Social Sectors	14.2% (12,332)	16.7% (76,733)	17.3% (16,343)	19.3% (18,847)
	Total	100% (86,954)	100% (93,567)	100% (93,789)	100% (96,744)

Source : Fourth-Four-Year-Plan target.

towards modernizing two tanneries. The unique combination of adverse operational conditions in leather and leather product manufacturing is dominantly complicated. Acquisition of knowledge on an industrial scale is of great importance. Through proper R&D, extension services and training of manpower in this specialized field.

Although, Burma has a limited output of hides and skins, table IV will show likely growth rates calculated based on effective output on full utilizations of capacity to an exportable type of semi-processed to finished leather. (See table IV).

To be able to quantify economic benefits as a result of overall efforts to develop the leather and leather products industries in Burma, following broad base picture could be drawn as value added component. Raw value is taken as 100 unit for the following analysis : -

	Raw	WBC	Crust	Finished
Cattle Hides : (Price basis US$)	100 (0.77/kg)	127 (0.65/ sq.ft.)	151 (0.78/ sq.ft.)	253 (1.30/ sq.ft.)
Buffalo Hides : (Price basis US$)	100 (0.37/kg)	169 (0.60/ sq.ft.)	197 (0.70/ sq.ft.)	337 (1.20/ sq.ft.)
Goat/Sheep Skins : (Price basis US$)	100 (17.10/doz)	155 (0.55/ sq.ft.)	191 (0.68/ sq.ft.)	365 (1.30/ s1.ft.)

As a guide current market prices are indicated in the above analysis. In absence of separate data for cattle and buffalo hides output estimates are prepared in relation to the population of livestock in the country.

Table VI which forms an indicator, will show the revenue based on the same approach if all available raw hides and skins are converted for export. It is seen clearly the importance of value added as increased processing stages are attained where technical inputs added with manpower is essential.

Table V gives world output which also indicates, major trading nations in footwear. It is interesting to note a large share for a relative output of shoes in Asia and Middle East. Large portion of shoes produced in countries like Taiwan, India, Korea are exported to various countries in Europe and America. However, recent experiences of lowering import barrier for footwear from United States caused considerable concern to the producing countries in Asia. Such developments should caution the possibilities for putting up footwear unit entirely to cater the export needs. For domestic requirements in Burma, need to design a suitable product-mix, therefore will be of great importance which could have easily retail outlets.

TABLE IV : ESTIMATED VALUE ADDED ANALYSIS BASED ON FULL UTILIZATION OF EXISTING TANNING CAPACITY AND NATIONAL RAW STOCK OF RAW HIDES AND SKINS IF CONVERTED IN EXPORT QUALITY LEATHER

ESTIMATED REVENUE IN US$ (KYAT) AT FULLY PROCESSED STAGES.

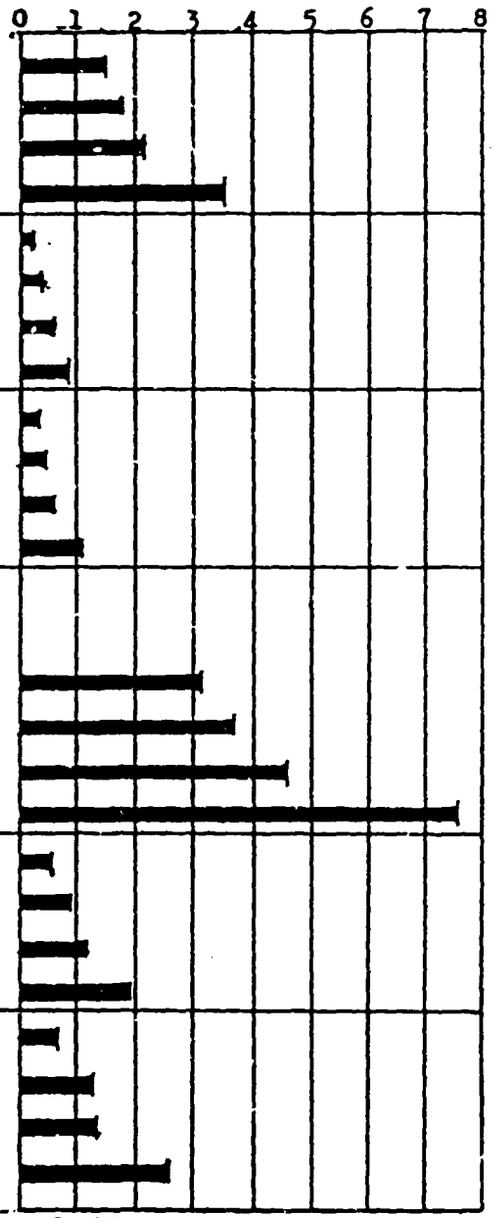
Interoperation Data		PRESENT TANNING CAPACITIES (RANGOON/MANDALAY)			NATIONAL RAW STOCK IF CONVERTED IN LEATHER		
STAGES OF PROCESSING		CATTLE HIDES	BUFFALO HIDES	GOAT/SHEEP SKINS	CATTLE HIDES	BUFFALO HIDES	GOAT/SHEEP SKINS
RAW PCS		131,200	28,800	200,000	280,112	61,488	511,000
RAW WEIGHT.		1,836,800	691,200	400,000	3,921,568	1,475,712	1,220,000
AREA SQ. FT.		2,755,200	720,000	800,000	5,882,353	1,537,200	2,044,000
	RAW	1,414,336 (12,304,723)	255,744 (2,224,973)	285,000 (2,479,501)	3,019,607 (26,270,580)	546,013 (4,750,313)	728,175 (6,335,123)
	WBC	1,790,880 (15,580,656)	432,000 (3,758,400)	444,000 (3,828,000)	3,823,529 (33,264,700)	922,320 (8,024,184)	1,124,200 (9,780,540)
	CRUST	2,149,056 (18,696,787)	504,000 (4,384,800)	544,000 (4,732,800)	4,588,234 (39,917,635)	1,076,040 (9,361,548)	1,389,920 (12,092,304)
	FINISHED	3,581,760 (31,161,312)	864,000 (7,516,800)	1,040,000 (9,048,000)	7,647,058 (66,529,404)	1,844,640 (16,048,368)	2,657,200 (23,117,640)

NOTE : - Raw Prices are based on the actual value obtained in Burma for Exports.
- WBC, Crust and Finished Leather prices are based on current export market prices of similar raw material origin of established export quality standards.

BAR-CHART ESTIMATED REVENUE IN US$ AT FULLY PROCESSED STAGES.

US$ in Millions

Present Tanning Capacity		Revenue	
(a)Cattle Hides (131200)	RAW	US$	1414336
	WBC	US$	1790880
	CRUST	US$	2149056
	FINISHED	US$	3581760
(b)Buffalo Hides (28800)	RAW	US$	255744
	WBC	US$	432000
	CRUST	US$	504000
	FINISHED	US$	864000
(c)Goat/Sheep (200000)	RAW	US$	285000
	WBC	US$	444000
	CRUST	US$	544000
	FINISHED	US$	1040000
National Raw Stock if Converted in Leather		Revenue	
(a)Cattle Hides (280112)	RAW	US$	3019607
	WBC	US$	3823529
	CRUST	US$	4588234
	FINISHED	US$	7647058
(b)Buffalo Hides (61488)	RAW	US$	546013
	WBC	US$	922320
	CRUST	US$	1076040
	FINISHED	US$	1844640
(c)Goat/Sheep (511000)	RAW	US$	728175
	WBC	US$	1124200
	CRUST	US$	1389920
	FINISHED	US$	2657200



Notes:-Raw Prices are based on the actual value in Burma for Exports.

-WBC, CRUST and FINISHED leather prices are based on current export market prices of similar raw material origin of established export quality Standards.

TABLE V : WORLD OUTPUT AND MAJOR TRADING NATIONS IN FOOTWEAR

LEADING TRADERS

	Production (m pairs)		Exporters (m pairs)		Importers (m pairs)	
1.	USSR	956	Taiwan	399	USA	516
2.	China	895*	Italy	338	W. Germany	190
3.	Japan	485*	South Korea	202*	UK	129
4.	USA	464	Hong Kong	133	France	125
5.	Italy	445	China	97*	USSR	121
6.	Taiwan	430	Spain	71	Japan	69
7.	Brazil	422	Czechoslovakia	59*	Hong Kong	63+
8.	India	346*	France	56	Canada	57
9.	South Korea	279	Brazil	49	Netherlands	52
10.	Mexico	215*	Poland	33*	Belgium	44

Relative shares of 1981 output were (%) :

Asia & Middle East	41.3
Eastern Europe	20.4
Western Europe	15.1
North & Central America	10.0
South America	8.8
Africa	3.6
Australia	0.5

WORLD OUTPUT*

	Output (m pairs)	Population* (millions)
1981	7 835	4 495
2000	11 160	6 200

+ presumably mainly for re-exports
* Estimates

Source: SATRA, World Footwear Markets 1983.

It may be pointed out that the establishment of any new footwear leather and leather products industry in Burma will require a detailed feasibility study to cover aspects of design, product-mix as well as suitable facilities to carry out a development work for this purpose.

Table V shows world-wide production of footwear and its output forecasts. Production share from the developed countries both for the leather and leather products are reducing due to high cost of production and pollution problems. These countries have to increasingly depend upon the developing countries for such a supply. Substantial growth is noted in countries such as Taiwan, China, Korea, India in this region, who have also become importers of raw hides and skins to satisfy international demand for leather and leather products world-wide.

Table VI presents some data related to exports of Leather from small group of developing countries. Most of these countries, developed their industry in phases, firstly, with the introduction of semi-processed leather and over a period of last 15 to 20 years, improved their know-how, and marketing contacts, to be able to maximize on foreign exchange earnings through presently export of mainly finished leather, footwear and leather products. Although, semi-processing stages bring comparatively low economic returns as seen from the earlier analysis, Burma will require considerable expertise for a gradual shifting towards higher value added stages of processing where suitable manpower development and R&D facilities will play an important role in the overall development of this sector. Such a situation will sufficiently prove market potential for the Burmese leather and leather products industries. This will further encourage the authorities concerned towards putting added efforts to attain quality levels desired and design its technological strategic planning accordingly. Although buyers may provide information related to price, quality level, styling, major part of the responsibilities related to quality requirements, will have to be met by the tanneries or Leather producing units in Burma, where R&D inputs within the country will be very valuable.

3.1. Needs of the Industry and the Establishment of R&D Facilities

Two distinct issues emerges from the above background information to enable Burma to achieve desired objectives to market Leather and Leather Products : -

(1) A large quantity of exportable or otherwise utilizable hides and skins in Burma remains unaccounted for, depriving the country of a possible foreign exchange earnings through a systematic development of leather and leather products industries and its market potential.

TABLE VI : EARNINGS FROM EXPORTS OF LEATHER FROM SELECTED DEVELOPING COUNTRIES

(In Million US Dollars)

REGION Country	AVERAGE 1975-77	1978	1979	1980	1981
ASIA					
India	237.8	233.0	458.8	325.3	294.9
Pakistan	52.6	56.6	125.3	127.7	90.0
AFRICA					
Kenya	3.1	5.3	10.6	12.0	10.0
Nigeria	13.4	16.5	30.2	40.0	35.0
LATIN AMERICA					
Argentina	124.9	253.2	418.6	307.8	325.0
Brazil	61.3	84.1	141.9	87.7	70.0
GRAND TOTAL :	493.1	648.7	1,185.4	900.5	824.9

Source :- FAO, Commodity Review and Outlook, Selected Issues.

(2) The existing production units are under-utilized and available raw materials are not processed to a desired stage of processing due to lack of trained and suitably qualified manpower as well as adequate know-how facilities.

To elaborate the above, given the marked difference in value added components of raw hides and skins and those of semi-processed, finished leather and leather products, the choice should be wherever possible in favour of trading in leather and leather products. This would on a long run benefit the economy of Burma, not only in the form of foreign exchange, but would also contribut to the export diversification programme. It is to be noted that the hides and skins, leather and leather products sector, which is a domestically agro-based, available raw material can contribute for the country's economic growth, if properly exploited. Based on findings of the expert, tanneries in Burma should concentrate towards establishing a sound base for the export of semi-processed leather and at the same time as a long-term policies carry out necessary development work to achieving through R&D facilities, the production and marketing of finished leather and leather products.

There is an urgent need for adequately trained specialists in providing a required know-how and services to the entire leather, and leather products manufacturing sector. This will enable the industrial plants established, to operate efficiently and to contribute significantly to the overall development of this sector. In order to realize several development aspects, such as processing technology, production methods, control of the quality of leather and leather products, monitoring of the performance of the plants at the Ministry/GIC level, improve trade and export marketing practices, as well as up-grading of skills of personnels at different levels, it is essential to establish a suitably staffed and equipped pilot plants and laboratory in Burma. This will ensure the best possible implementation of the actions needed to obtain the improvements required in the different aspects of the activities of the entire leather sector. This will create long lasting support facilities within the country to be able to satisfy the marketing needs for the sector.

Such a pilot plant-DCLT, will carry out the extension services including conducting basic and applied research and development work badly needed in the existing factories as well as provide know-how and manpower training for the whole of leather and leather products industries in Burma. It will advise and assist in the selection of plant - equipment and its maintenance, requirements of chemicals and other consumption materials. It will provide the necessary services regarding the manufacture of good quality leather as a base for the further developing into the production of quality footwear and leather products of various kinds.

Technical inputs such as machinery and equipment and scale of operation are being evaluated by the Leather Technologist (CTA) of the project.

While designing the scale of DCLT's operations, it is extremely important to consider its scope and costs for R&D of techniques and operations in relation to the size of industry of Burma. Although economics of leather and leather products processing favours continued inputs on applied R&D activities, economic scale of such needs will have to be carefully evaluated and justified. Large inputs in terms of machinery and equipments on such an applied research will aggrevate the cost of production, making it further difficult to such policies aimed at altering the specific circumstances, and will add to the costs, thus creating handicap.

Possibilities of operating DCLT on a small production scale may be considered as some of the machinery inputs of a commercial size are included in the plan. Such an operation will not only become self supporting, but will provide a good practical applied development and training centre.

To summarize, the Leather and Leather Products Industry in Burma has very significant potential but many accumulated problems as well. A very wide and co-ordinated action is needed for a larger-scale positive effect to be obtained including that of the establishment of DCLT.

Introduction of new technology through R&D work in manufacturing processes on an industrial scale involves heavy financial investment and manpower resources, which is not possible for the individual tannery plants existing in Burma. DCLT's establishment, therefore, is of importance and will prove to be a very valuable tool (instrument) in the rehabilitation, performance and overall development of this important sector. Based on the conservative increased availability of hides and skins, esti[illegible] at 4 per cent and additional 8 per cent due to impr[illegible] echnology resulting in added yield, a total growth in the [illegible]bility of national raw stock of hides and skins by year 20[illegible]s likely to reach to an equivalent of 17.5 million sq.ft to present 9.4 creating added raw material inputs to the Leather and Leather Products Industries in Burma.

In addition to R&D work, a detailed marketing research work will have to be carried through sampling, pricing, intelligence, establishment of international contacts through the participations in the international fairs, etc. The experiences gained from the similar situation from the other developing countries, should be reasonable to expect that Burmese Leather and Leather Products Industry, will be in a position to develop required international reputation, standards possibly in about 5-10 years with the action programme recommended for implementation.

CHAPTER - 2

DEVELOPMENT REQUIREMENTS

1. PRESENT SITUATION

1.1. Raw Materials

For a long-term industrial development programme in the Burmese Leather and Leather Products Industry, the livestock population and every year output is the most important foundation. The livestock figures have very much increased during the last 10 years, like : -

(In thousand pieces)

YEAR	POPULATION				HIDES & SKINS OUTPUT	
	HIDES		SKINS		HIDES	SKINS
	Cattle	Buffalo	Sheep	Goat	Cattle/Buffalo	Goat/Sheep
1974/75	7299	1690	187	512	310	440
1984/85	9495	2079	289	1124	388	776
	2196	+389	+102	+612	+78	+336
	(30%)	(23%)	(54.5%)	(119.5%)	(25.2%)	(76.36%)

According to this information, the output of raw hides and skins at present is showing average figures of : -

341 600 pieces Cattle/Buffalo hides
511 000 " Goat/Sheep skins per year

1.2. Collection of Raw Materials

The GIC is operating approx. 150 collecting places all over the country, but still not all the raw hides and skins are reaching the Tanning Industry, although domestic leather industries potential is much below the available quantities. A considerable amount of hides and skins are not accounted for, a small amount may be used by the existing private rural tanneries.

It is expected that the availability of Raw Hides and Skins will further increase during the next 10-20 years and the supplies to the existing tanneries will be very much in excess.

1.3. Future Planning

For future planning, another/or two Leather factories may be required during the next 5-10 years to absorb all the local available raw hides and skins for further processing into the higher valuable items of leather or leather products.

The expansion of the Leather and Leather Products Industry must take place in proportion to the availability of raw hides and skins. Burma has his own raw material, raw hides and skins, resources and is not depending on supplies (imports) from other countries. These resources, if fully utilized, will be of very high national value.

1.4. Production Facilities

1.4.1. Leather Industry

The Government owned four leather factories in Burma are processing at present approx.33% of the available Cattle/ Buffalo hides and approx.50% of Goat/Sheep skins.

The renovation in the two leather factories in Rangoon and now also at Mandalay is completed and the equipment for up-to-date process technology has been installed.

There is great need of qualified and trained manpower to run these factories efficiently. Also experience with up-to-date chemical and processing is insufficient. The technical staff has only local experience from cottage or rural production units. Even short time training periods outside Burma are insufficient and not effective.

The installed production capacity from the four Government Leather Factories/per year : -

- Cattle/Buffalo hides for Shoe Uppers from wet-blue to finished leather condition. ... 160 000 hides
- Cattle/Buffalo hides for Sole Leather ... 26 670 "
- Goat/Sheep skins in wet-blue or for various types of leather. ... 200 000 skins
- Chrome Tanned Splits ... 800 000 sq.ft.

The leather quality produced is of low standard and not according to the international specifications and demands. The export items are very small and are sold below the international market prices. Most of the leather are supplied to the People's Footwear Factory (Indaing) for the production of combat shoes and some other leather shoes.

1.4.2. Shoe Industry

The only shoe factory in the country is the People's Footwear Factory at Indaing. This factory is using very old out-dated machinery. Annual production of Leather Shoes (Pairs) : -

	Actual Production		Estimated Production	
	1980	1984	1988	1892
- Combat Shoes	194 493	257 701	262 153	302 315
- Leather Footwear	32 839	4 452	+ 40 162	+ 46 315
TOTAL ...	227 332	262 153	302 315	348 630
		+34 821		
		+(15.32%)	+(15.32%)	+(15.32%)

The demand for Leather Shoes is increasing every year. As the quality of the shoes is below the standard, the Shoe Factory is calculating 6 months wearing time only for one pair of shoes. The production figures show that the army (Govt.) is the biggest customer.

According to informations, a new shoe factory is in the planning stage at General Industries Corporation, but no further details are available.

1.4.3. Leather Goods Factory

There is only one factory at Rangoon, well equipped, with the annual production of approximately 240 000 pairs of Industrial gloves, made from chrome tanned splits and textile. This factory has been renovated only approximately four years ago and new modern machines have been installed.

The production is much below the installed capacity as the required leather quality is not available for the production of other leather goods.

The quality of the produced industrial gloves is fairly good and accepted in the export markets of Hongkong and Singapore.

2. DEVELOPMENT POTENTIAL

2.1. Government's Development Strategy

The Government established a Pharmaceutical Development

Centre which is operating very successfully. Similar Centre have been programmed thereafter for foodstuff, rubber and leather. There is no special strategy,but the above examples to follow in other industries too.

2.2. Prospects for Raw Materials

The availability of raw materials, hides and skins, is increasing every year as mentioned. Improvements are expected in flaying-preservation and collection all over the country which will lead to bigger quantities and improved quality in the leather production.

(See also marketing)

2.3. Production Facilities

Production facilities are already below the availability of raw hides and skins in the country. New production facilities are required for the Leather and the Shoes Industry. The new production plants should be developed and planned as based on the utilization of available raw material and market demands.

3. DEVELOPMENT PROBLEMS

3.1. Raw Material, Collection and Preservation

There are approximately 150 raw hides/skins collecting places all over the country directed by GIC.

Flaying, preservation and collecting all the raw materials is still a great problem.

In the tropical climate of Burma, raw hides and skins must be preserved immediately and effectively after slaughtering.

Only proper preserved hides/skins can be produced into a good quality of leather acceptable in the local and export markets.

3.2. Trained Manpower

Persons with some industrial experience should be send for training immediately and made available of the time DCLT is starting operating (approx. in August/September 1988). Without qualified and well trained persons the DCLT will never be successful. Up-to-date technical information and technology are very important, therefore "training of persons" should be considered every year.

Also training of the "young generation" should be started as soon as possible to secure qualified technical staff for the future leading to suitable qualification in the field of Leather and Leather Products Technology.

4. TECHNICAL SERVICES

4.1. Technical Assistance Support

Technical assistance is urgently required. The main items are mentioned separate for each industry which needs improvement.

4.2. Leather Development Section :

1. Better utilization of raw hides and skins.
2. Flaying, preserving, collection to be improved.
3. Improvement of the leather quality for many types of leather.
4. Higher output with better quality.
5. Improved technology.
6. Process control.
7. Quality control.
8. Economical production processes for many types of leather/leather products.
9. Stop the production of low quality Leather/Products which have little value.
10. Aim for more and better quality export items to achieve highest possible foreign exchange earnings, entering the international market.
11. Manpower qualification/training.
12. Establish quality specification in accordance with international standards.
13. Prepare test report with calculation details and finally transfer the results to theleather factories for large scale production, through qualified technicians.

4.3. Shoe Development Section :

1. Design new types of shoes.
2. Produce various types of shoes according to appropriate methods.
3. Availability of machines are essential to produce samples required by marketing, both for the domestic and export needs.
4. Training at various stages of operation.

4.4. Leather Goods Development Section :

1. Design of many types of leather goods, with priority as required by marketing.
2. Availability of machines are essential to produce various types of leather goods items for the local and export market.
3. Training at various stages of operation.

4.5. Laboratory :

1. All physical and analytical tests required for leather, chemicals, effluent etc. should be necessary.
2. Records should be kept for all tests carried-out.
3. Quality testing of chemicals.
4. Regular testing of leathers produced at the leather factories/tanneries should be carried-out at certain intervals.
5. After test results are known advise should be given for immediate improvements to the production plants.
6. Training on various test methods.
7. In addition, many ways of development on other available products are possible like : -
   - Local vegetable tanning agents, ngu, byu and hta naung barks.
   - Local vegetable oils, castor oil etc.
   - Self-reduction of chrome liquors from sodium bichromate, (available in neighbouring countries like India).
   - Assist in developing the by-products industry, like glue, leather board, animal feed etc.

4.6. Research and Development Work (R&D)

Should be carried out in co-operation with the related industry, marketing or according to any required priority demands. The R&D must also take care of the small production units to help up-grading, further developing of their products.

5. DELIVERY OF TECHNICAL SERVICES

5.1. Possible Option and Costs/Benefits

Possible option are the DCLT as a permanent National Institute with long-term benefits.

Another possible option would be external assistance by consulting companies over a period of 5 - 10 years. Such approach is not commonly practised in the Leather and Leather Products Industry. Few organizations offer expertise without any equipment or material support , which in case of Burma is essential.

For both, the costing it is mentioned in detail. (See item 5.2. and 5.3 below).

5.2. Justification of DCLT as Optimal Solution

Burma's Leather and Leather Products Industry needs urgent improvements/development from the raw hides/skins collection upto the final leather products, shoes/leather goods, especially in product development, applied research, quality control and training of manpower.

The actual need for such a development is already over due. Possibly such action should have been taken 10 - 15 years ago to match the parallel development with similar situation of Leather and Leather Products Industries in countries like India, Korea, Taiwan, Thailand, Bangladesh, etc.

The Government of Burma wishes to build the DCLT as a national institution centre which should operate independently covering all the departments of leather, footwear and leather goods and the laboratory.

The final calculated cost for such a centre would be as follows : -

A) Site area : LF(R)1	UN Inputs US $ (C.I.F)	Govt.Inputs Kyats
1. Equipments/Auxiliaries Transport	942,100	1,085,000
2. Additional Costs - Building, Installations,etc.	-	8,292,800
3. Expert's facilities,Training Study Tour, etc.	1,484,350	146,500
TOTAL	2,426,450	9,524,300

(Rate of Exchange US $ 1 - K 8.7)

UN Inputs + Govt. Inputs in US $ 3,521,197

UN Inputs + Govt. Inputs in Kyats 30,634,415

B) Site area: Independent	UN Inputs US $ (C.I.F)	Govt.Inputs Kyats
1. Equipments/Auxiliaries Transport	1,392,700	464,100
2. Additional Costs - Building,Installations,etc.	-	10,901,500
3. Expert's facilities,Training Study Tour, etc.	1,484,350	146,500
TOTAL	2,877,050	11,512,100

(Rate of Exchange US $ 1 - K 8.7)

UN Inputs + Govt. Inputs in US $ 4,200,280

UN Inputs + Govt. Inputs in Kyats 36,542,435

In addition, there will be operational costs of the DCLT, in average per year of Kyats 761.012 during the first four years. (See Annex 12).

Difference in final costings :

1. UN + Govt.Inputs	Final Total in US $
B - Site area Independent	4,200,280
A - Site area LF (R) 1	3,521,197
Difference US $ +	679,083

2. UN + Govt Inputs	Final Total in Kyat
B - Site area Independent	36,542,435
A - Site area LF (R) 1	30,634,415
Difference Kyat +	5,908,020

5.3. Alternative to DCLT

As pointed out earlier, it will be difficult for an outside consulting organization to provide independent and integrated development assistance to the Leather and Leather Products Industries Development as is presently planned through the UNDP/UNIDO assistance. Based on the experience from a very limited such cases, cost of similar alternative assistance will be expensive possibly without the extent and quality of material, training and technical assistance services identified through the possible planned UNDP/UNIDO assistance programme. Just as a guide following comparative cost, advantages and disadvantages is prepared.

Estimated costs if sub-contracted to private firms : -	US $
- 4 Expert/Consultants for a period of 5 years in Burma.	3,600,000
- Local Expenses	1,200,000
Required machines, equipment and auxiliaries for : -	
- Shoe Sector : - imported	203,300
- local	1,400
- Laboratory : - imported	45,000
- local	7,300
- Information/Library : - imported	5,000
- local	1,000
- Other Expenses for Tannery Laboratory	20,000
Estimated Total in US Dollars	5,083,000
Estimated Total in Kyats	44,222,100

(Rate of Exchange US$ 1 = K 8.7)

Estimated Cost for 4 Experts consulting for : -

		US $	(Or)	Kyats
1 Year	=	960,000		8,352,000
2 Years	=	1,920,000		16,704,000
3 "	=	2,880,000		25,056,000
4 "	=	3,840,000		33,408,000
5 "	=	4,800,000		41,760,000

Remarks : - This cost is estimated and may be different for various consulting companies.

Consulting may be splitted into a different timing, with different experts.

6. RECOMMENDATIONS

Comparing the establishment of the DCLT with the alternative of consulting, following conclusions can be drawn ; DCLT will definitely have the advantage through UNDP/UNIDO assistance : -

1. As National Institutions established to assist and develop the industry as a long-term solution with facilities made available in Burma.
2. In case of need, DCLT may be a pilot production centre.
3. Regular service to the industry without any intervals.
4. Lower costs for such assistance as commercial consulting organization will have objectives to gain profits compared to UNDP/UNIDO's Inputs leading to technical assistance support.
5. In economical terms, UNDP/UNIDO share will be based on the priority sectors identified for development of Leather and Leather Products Industry, with no financial costs to the Government, while the consulting firm will have to be paid through the foreign exchange components by Burma.

CHAPTER - 3

1. PROJECT INPUTS

(a) Government Inputs

(i) Premises

Appropriate building area presently estimated at 25,450 sq.ft. will be provided as shown in the site plan enclosed as appendix 9. Machinery layout for various sections is also shown in the appendix 9 which indicates tentative plan, subject to final modification to suit the site conditions and architectural plan as well as desired technical specifications for the installation of machinery and equipment.

(ii) Recurrent and Capital Expenses

The Government's recurrent and capital budget will provide for the counterpart personnel, support staff, office supplies, necessary services and suitable premises for the experts.

The Government inputs estimated in (i) and (ii) are estimated at

A.	Site Area LF(R)1	Kyat 11,595,900
B.	Site Area Independent	13,583,700

(iii) National Counterpart Personnel

Ministry of No.1 Industry through GIC will assign the Director of DCLT as NPD and as a direct counterpart to UNIDO CTA. In close co-operation they will co-ordinate and direct the implementation of the Project. The GIC will also make available technical staff for training abroad to be agreed and planned as indicated in Part II.E. Some of these personnel along with other assigned technical staff will form a direct counterparts to the international experts and will provide all the necessary administrative services for the project.

The national counterpart staff will be composed of the following : -

1. Director of DCLT (one)
2. Project Assistant (one)
3. Senior Leather Technologist (one)
4. Senior Footwear and Leather Goods Technologist (two)
5. Engineer (one)
6. Laboratory Chemist (one)
7. Junior Leather Technologists (one)
8. Junior Footwear Technologist (one)
9. Junior Leather Product Technologist (one)
10. Junior Footwear/Leather Products Designer/Pattern Cutter (one).
11. Junior Laboratory Chemist (one)
12. Attendants (three)
13. Administrative and Information Officer (two)
14. Support staff as agreed and planned in the operation budget as a Government Input (twelve).

The Government schedule of expenses is provided in Annex 2

(iv) Transportation and Miscellaneous

The Government will provide petrol and maintenance of project cars for local transportation of international experts and consultants as required by project activities, and suitable office equipment and supplies for the operation of the pilot plants, laboratory and training facilities.

(v) National Seminar/Exhibition

The Government will bear the local costs of organizing a national seminar and exhibition.

UNDP Inputs

		Duration and Cost
11.	Personnel	
11.01	Chief Technical Advisor Leather and/or Leather Products Industry Expert.	54 m/m US$ 420,900

The CTA should have extensive experience in the Leather and/or Leather products industry field, including institutional experience from a leather and/or leather products development, research and/or training institute. Industrial experience in quality control, product development with knowledge of know-how transfer are desirable.

The CTA will assist in co-ordination and direct the project activities in close co-operation withthe NPD. He will be responsible for preparing the project workplan, periodic and final reports, as well as project evaluation reports (PER). He is expected to co-ordinate overall activities of DCLT, counterpart and international personnel and participate actively in the direct implementation of the project activities. The CTA will provide technical and organizational aid and guidance in the field, in connection with DCLT services. For Job Descriptions, please see Appendix 4.

	Duration and Cost
11.02 Leather Industry Expert	
The Leather Industry Expert should have extensive industrial experience in Leather Production including institutional experience from a Leather and Leather products development, applied research as well as training of field personnel. The Leather Industry Expert will carry-out work in the establishment and start-up of DCLT, undertake extensive research and development work for the improvement of quality of leather produced in accordance with the requirements of domestic and export needs. He will also undertake a national survey as a part of the investigation of quality and collection of raw hides and skins supply problems and suggestions of remedial measures and guidance for its long-term development plans including the possible establishment of by-products industries. His activities will be closely associated to the needs and development of footwear and leather products industries in Burma. He will train his counterparts and actively participate in all extension/support services and training functions of DCLT. He will be expected to prepare periodic and terminal report to cover his assignment. For Job Description please see Appendix 4.	28 m/m US$ 236,200
11.03 Leather Footwear Expert	
The Leather Footwear Expert should have extensive industrial experience in the production of Leather Footwear including institutional experience of applied R&D as well as training of field personnel. The Footwear Expert will carry-out work related to R&D to implement the production of prefabricated footwear components and footwear made thereof, as well as train national counterparts. He will also provide guidance for the long-term development plan including appropriate range building of footwear based on the locally available leather for the domestic and export	12 m/m US$ 98,400

		Duration and Cost	
	needs. For Job Description, please see Appendix 4.		
11.05	Consultants Special Consultants in the field of specialized services will be formulated by the CTA/NPD as may be required and requested. Identification of such possible consultant component is included in Appendix 4.	21 m/m	US$ 168,150
13.00	Administrative Support Staff Secretary - (one) Driver - (one)	90 m/m	US$ 10,350
15.00	Project Travel Cost of CTA, Leather Industry Expert and Consultant's per diem and similar costs during extension service and survey visits are calculated at $ 150 per month.		US$ 16,950
16.00	Other Personnel Costs Staff member travel and per diem costs during combined mid-term review and substantive backstopping and the final evaluation mission scheduled as specified under Part II.I.		US$ 8,000
31.00	Training and Study Tours The individual international Fellowship Training will be carried-out as specified in Appendix 6.		US$ 465,900
32.00	Study Tour A Study Tour of the NPD, Marketing Counterpart from GIC is foreseen to the International Leather Trade Fairs in France and Italy and Singapore/Hongkong to be able to encourage international contacts for the development of export market of leather and leather products from Burma.		US$ 40,000

		Duration and Cost
35.00	In order to encourage integrated development and to promote marketing of the hides and skins, leather and leather products in Burma, a national seminar and exhibition is scheduled to be organized during the concluding phase of the project. Participants from affiliated industries, government and related institutions will be invited for the event which will also highlight the role of DCLT andits achievements in the overall development of Leather Products Industries in Burma. A limited funds allocated are expected to cover only foreign exchange part needed for the organization of this seminar/exhibition to be decided by CTA/NPD.	US$ 3,500

A. Site Area LF(R) 1		Estimated Cost,(CIF) US$
41.00	Equipment - Expendable	
	1. Technical Documentation - information.	5,100
	2. Spare parts for existing machines and equipment, laboratory reagents and special water treatment agents.	22,000
		27,100
42.00	Equipment - Non-Expendable	
	1. Tannery Pilot Plant	364,400
	2. Footwear/Leather Goods Pilot Plants	253,500
	3. Laboratory Equipment	20,300
	4. Service and Training Aids	21,600
	5. Auxiliary Equipment	164,200
	6. Effluent Treatment Plant	51,000
	7. Project vehicles (three)	40,000
		915,000

B. Site Area Independent	Estimated Costs, (CIF) US$
41.00 Equipment - Expendable	
1. Technical documentation - information.	5,100
2. Spare parts for existing machines and equipment, laboratory reagents and special water treatment agents	22,000
	27,100
42.00 Equipment - Non-Expendable	
1. Tannery pilot plant	560,500
2. Footwear/Leather goods pilot plant	253,500
3. Laboratory Equipment	50,200
4. Service and Training Aids	21,600
5. Auxiliary Equipment, including Effluent treatment plant.	428,500
6. Project Vehicles (four)	51,300
Total Equipment Component US$ (CIF)	1,365,600

(Tentative lists of the machinery and equipment, documentations are referred in Annex 4).

	Duration and Cost
50.00 Miscellaneous	
Editing and printing of Expert Reports, as well as unforeseen costs for small sundry items and materials which may be required and included in the budget as UNDP/UNIDO contribution.	US$ 16,000

At least during the beginning years of operating, the activities at the DCLT should be according to its name : "Development Centre for Leather Technology". Thereafter, earlier or later, a pilot production may be started in the Leather - Footwear and Leather Goods Departments to utilize the machines available. Any production should not interfer or reduce the quality of R&D or actual activity of DCLT.

No charges and fees for any work at the Centre will allow the industry to take full use of the DCLT. The linkage between the Centre and Industry should be well organized to transfer developments from the centre's small scale to the bulk production in the factories.

There may be possibilities at a later stage where DCLT will be able to cover approx. 20-40% of the operational cost. In case of need, the DCLT can also be changed fully into a pilot production centre and be able to recover all the operational cost.

2. TECHNOLOGY OF DCLT-OUTPUTS/CONTRIBUTION

2.1. Contribution/Output

The contribution of the centre services and activities is estimated to approximately : -

- extension services ... 40%
- supporting services ... 40%
- training services ... 20%

Output : -
1. Leather Technology Department
2. Footwear and Leather Products Department
3. Engineering
4. Laboratory
5. Information Unit/Library
6. Fellowship implementation and trained manpower.

2.2. Output 1 : Leather Technology Department Functions

- Extension Services :

Advise and assistance in solving problems at the production plants, improvements of process procedure, techniques, process control, proper use of chemicals, selecting suitable hides and skins material for the purpose, process data sheets with cost calculation, quality control,product control and immediate advise for necessary inprovements.

- Supporting Services :

Applied research and development in the pilot plants, transfer to production plant or bulk production, establish specifications/standards for leathers, chemicals or other consumption materials in use, any services for testing, certification etc., assist in new project studies and development in co-ordination with the international market and the marketing.

- Training Services :

Various courses at DCLT, on the job, seminars etc., estimated 20-40 people to be trained per year. Additional courses on priority training for Leather Technology and Laboratory - 4 courses per year (each course estimated approximately 12 weeks) : -

1. Quality Control + Standardization
2. Grading and Assortment
3. Machine Operation and Production Supervision
4. Tannery Related Topics - production, material, financial, technology, control, from management staff to foreman. (Approximately 30-45 trainees per year).

Additional training time or changes are possible, depending on the demand.

2.3. Output 2: Footwear and Leather Products Department Functions

- Extension Services

Advise and assistance in solving problems at the production plant, improvements on Footwear Process Techniques, Process Control Methods, Design and Pattern Making, Selection of suitable Leather for the purpose and proper use of materials.

Product control with immediate advise for necessary improvements.

- Supporting Services :

Applied Research and Development in the DCLT with pilot equipment, design, development, sample production, footwear standards, select leather products suitable for the purpose, other materials etc., testing and certification, assist in new projects studies and development in co-ordination with the international market and the marketing.

- Training Services :

Various courses at DCLT, on the job, seminars etc. estimated 20-30 people to be trained per year. Additional courses, priority training for footwear and leather products industry, 4 courses per year, total 13 weeks : -

1. Leather Cutting and Preparation, Stitching
2. Design, Pattern Cutting, Grading
3. Leather Products related topics, production, material, technology, financial, control, from management staff to foreman.
4. Refresher Course on demand, including for small scale industry. Approximately 20-25 trainees

Additional Training time or change are possible, depending on the demand.

2.4. OUT-PUT 3 : ENGINEERING FUNCTIONS

- Extension Services

Advise and assistance in solving problems at the production plants, improvement - preventive maintenance, machine outputs, proper and priority emergency maintenence, machinery up-keep, plant maintenance-methods, construction of local equipment required for development at the centre or production plants.

Several assignments per year.

- Supporting Services

Applied research and development in DCLT with pilot equipment. Many Engineering Aspects : repair, maintenance, planning of new projects, rehabilitation of existing plants, development of spares to substitute import items.

Several assignments per year.

- Training Services :

Regular priority courses : Engineering, maintenance, operation of machines and equipment in leather footwear and leather goods factories or in DCLT, approximately 6-8 trainees per year (including the machine operators)

Additional training time or changes depending on the demands.

2.5. OUT-PUT 4 : LABORATORY FUNCTIONS

- Physical and Analytical Testing :

The Physical and Analytical Testing of leathers, leathers products, chemicals, effluent, etc.

- Quality Control :

The quality control services for any type of leather/ leather goods in demand by the industry or DCLT according to national or international standards practices.

- Assistance in Development :

The assistance in development of new types of leather with the required specifications, according to DCLT and marketing.

- Training Services :

Process control, quality control, national and international standards, physical and analytical analysis, Water Effluent Tests, the use of laboratory machine equipment and evaluation of test results. Estimate of trainees : 25-30 per year. (including apprentice).

Additional training or changes according to the demands by DCLT or the industry.

2.6. OUT-PUT 5 : INFORMATION/LIBRARY

Up-to-date Information for : -

Materials - Chemicals
Machines
Technology
Fashion - Europe - USA - Far East Markets
Statistics
Technical Journals

Leather and leather products developments, international market informations

Full information on all leather-leather products and related allied industries.

Literature for leather Footwear and leather goods may be selected by UNIDO

2.7. Output 6 : Fellowship Implementation

- Training of Manpower :

Very important is the availability of a capable well trained staff, to operate the departments at DCLT successfully. Personnel with qualifications and experience as well as key personnel from the industry should be provided with specialized training courses.

Approximately 30 Trainees are involved for a duration of courses from 6 month to 2 years. In addition, a follow-up of long-term training of persons from the young generation should be planned to secure qualified and experienced staff for the future.

- Training in General

DCLT is able to train persons of various category personnel including technical management staff.

Training courses, according to the demands and in relation/co-ordination with the industry in various functions should be planned. DCLT, after functioning, shall offer also higher category training for technical management staff who in future may be trainers of the trainees - to secure that technical staffs is available and well trained also in future.

The training programme should be flexible, concentrated and effective, but not too much spread out including too many topics. The training of operators, foremen, technicians etc. will be fixed in the programme, carried out regularly or according to the requests by GIC or the industry.

2.8. Justification for Machinery/Equipment

For the establishment of DCLT which should operate independently required suitable machines have been selected. (See Annex 11).

2.8.1. Main Items for Pilot Tannery :

- 2 Drums (small size) for soaking and liming process
- 1 Fleshing machine, for fleshing hides and skins after the liming process.
- 1 Splitting machine, for splitting hides only after the liming process.
- 2 Drums (small size) for deliming - bating - pickling/pretanning - tanning washing - neutralization - retanning - dyeing - fatliquoring - fixation - washing.
- 1 Shaving machine for hides and skins, for final levelling of the leather thickness.
- 1 Sammying machine for dehydration of the wet-blue stock, preparing for shaving.

- 1 Sammying/Setting out machine for heavy sam/setting out operation before vacuum drying.
- 1 Plate Vacuum Dryer for final setting and predrying
- 1 Staking machine "Mollisa" softening the Leather from cattle and buffalo hides.
- 1 Staking machine "Schoedel" softening the Leather from goat and sheep skins.
- 1 Buffing machine for buffing grain side of hides and skins, or flesh side of skins.
- 1 Drying unit for toggling and pasting, drying of hides and skins.
- 1 Polishing machine for polishing the grain side of goat skins or hides.
- 1 Hydraulic ironing press for ironing and embossing of hides or skins.

2.8.2. Main Items for Footwear and Leather Products Department :

- 23 Machines have been selected to carry-out any development work. Some machines can be used for shoes as well as for leather products.

2.8.3. Main Items for Laboratory :

- 8 small size machines for the physical testing of leather have been selected.

2.8.4. Auxiliary Equipment/Costing :

- Additional equipment necessary to establish DCLT has been selected carefully by the CTA and Counterparts Planning Engineer. (See Annex 4).

2.8.5. Electrical Motors and Control System :

- All electrical equipment will be suited for the operation on the site condition. At temperature 45°C, all electrical equipment will be tropically insulated.

2.8.6. Costing for all Items :

- The costing for all the items has been taken from proforma invoices or latest telex offers for the items to be imported and for local equipment the present available prices supplied by the Counterparts. (See Annex 4).

2.8.7. Main Spare Parts :

- All the machines have been calculated with "Main Spare Parts" for 1-2 years by adding 10% of the cost.

2.8.8. Independency On Operation :

- Any expert coming to Burma should be able to do any development work in the Leather, Shoe or Leather Products Department on the machines available, independent and without interfering in the producting at the factories.

3. PERSONNEL AND ORGANIZATION

3.1. Staff

At the beginning the national counterpart staff will be lower, but gradually trained persons will be added : -

	Number
1. Director of DCLT	1
2. Project Assistant	1
3. Senior Leather Technologist	1
4. Senior Footwear and Leather Products Technologist	2
5. Engineer	1
6. Laboratory Chemist	1
7. Junior Leather Technologist	1
8. " Footwear "	1
9. " Leather Products Technologist	1
10. " Footwear/Leather Products Designer/Pattern Cutter	1
11. " Laboratory Chemist	1
12. Attendants	3
13. Administrative and Information Officer.	2
14. Support Staff (as per operation budget).	12
	29

4. SITE AND LOCATION OF DCLT

4.1. Natural Condition of Rangoon Area

Climate Conditions :

A) Temperature of the Rangoon area during 1971-1979 : -

Monthly Mean Temperature :
- Maximum 34.9°C (April 1974)
- Minimum 23.9°C (January 1971)

Mean - Daily Maximum Temperature :
38°C (April 1975)

Highest Maximum Recorded Temperature :
40.5°C (4 April 1979)

Mean - Daily Minimum Temperature :
14.1°C (January 1976)

Lowest Minimum Recorded Temperature :
10°C (January 1976)

B) Humidity :

Mean Daily Relative Humidity at 930 hours :
- Maximum 89% (August 1972)
- Minimum 60% (February 1977)

Mean Daily Relative Humidity at 1830 hours :
- Maximum 91% (August 1972)
- Minimum 47% (February 1971)

4.2. Draft Project Documents for 2 Different Site Areas

1st Plan : Site Areas inside the LF(R), compound, as origihally planned in the past. This location near the Leather Factory has many advantages regarding : -

Steam Connection
Water "
Electricity "
Effluent "

1st Plan (Contd.) :

Maintenance Support
Transport
Chemical
Raw Materials
Machines
General Investments
Use of machines for each other as stand-by

After the 1st Plan had been completed, the Government informed us that the above site ares under Plan 1 is not available any more and another location will be possible only outside Rangoon. No information has been received yet where the DCLT will be finally located.

4.3. 2nd Plan :

A second "project document" has been prepared with addi - tional machine-equipment-auxiliaries and increased costing.

4.4. Difference of Cost for the 1st and 2nd Plan :

	C.I.F. US $	GOVT. INPUT KYAT
2nd Plan : Buildings etc.	-	9,084,000
Other local expenses	-	1,817,500
Machinery/Equipment	1,392,700	464,100
(Independent: to be located as a separate institution)	1,392,700	11,365,600
1st Plan : Buildings etc.	-	7,063,400
Other local expenses	-	1,229,400
Machinery/Equipment	942,100	1,085,000
(Located in the premises of LF(R) 1)	942,100	9,377,800
Difference : Additional cost of implementing 2nd Plan	+ 450,600	+1,987,800

Cost of land and its development is not considered at this stage.

No further details can be given as the new site area is not known.

5. MATERIALS AND WASTE

5.1. Raw Hides and Skins

Raw Hides and Skins are available from LF(R) 1 according to the demand in small quantities at cost price.

Annual quantities required may be estimated upto 200-300 hides and 400-600 skins.

5.2. Chemicals

Chemicals are available from LF(R) 1 in small quantities at cost price. In addition there will be many free samples from the Chemical suppliers.

If additional products are required, requests for samples or small orders may be sent to the Planning Director at GIC.

5.3. Waste and Effluent

There will be very small quantities of waste which can easily be disposed without any extra cost.

Effluent is estimated to 20-30 gallons per day for which a mini size effluent treatment plant is being planned for demonstration and training purpose. The quantities of floccation or other chemicals to be used is very small, the same will be the cost.

6. UTILITIES

6.1. Water

The water required may be 1000-2000 gallons per day for the whole DCLT. One tubewell has been planned with a suitable overhead tank.

Cost involved after the installation are only electricity and maintenance.

6.2. Electricity

Total consumption for one year is estimated to : -

40,000 KWH for the machinery
11,250 " " lighting.

The estimated installed capacity will be 300 KW

Voltage AC 400 V, [illegible]Z, 3 Phase
" AC 220 V, [illegible], 1 Phase

7. SERVICES

7.1. Administrative Officer

One officer will be in charge of Administration, stores, transport and maintenance with final approval by the NPD.

7.2. Purchasing and Sales (Stores)

Purchasing and Sales (Stores) will be organized and hanled by the Financing Section according to the NPD Instructions.

Stores Keeper have to present stock lists every month to the NPD to arrange the purchases and also sales accordingly.

7.3. Transport

3 Cars and 1 "Pick-Up" type of car are required for the transportation of the Director, Experts and Staff. The same cars will also be used for other jobs. The pick-up to transport any products, raw materials, spares and other small quantities of products, and the other cars for visitors and peon work.

Inside the DCLT, one fork-lift truck, 2 hand operated pallet trucks and several horses on wheels will be required mainly for the Pilot Tannery. The fork-lift and pallet trucks for moving machines, repairs of machines and other heavy materials. The horses on wheels mainly for piling of hides and skins from soaking to finishing.

8. EQUIPMENT/AUXILIARIES

For the production in all the four departments, the office, lecturer rooms, workshop etc, many kinds of small equipment items are required. (See Annex 4).

9. BUILDINGS

9.1. Site Preparation

Uptil today, the site area is not yet known. For the preparation of land, GIC Engineers will be responsible to organize the operation.

9.2. General Layout Plan

The DCLT has been planned in 7 local type of one floor buildings, very near to each other : -

1. Building : Office
2. Building : Lecture Hall

3. Building : Leather Products (Shoes/Leather goods)
4. Building : Pilot Tannery (wet works)
5. Building : Pilot Tannery (dry works)
6. Building : Laboratory
7. Building : Workshop/Transformer House

(See Annex 3)

9.3. Technical Requirements :

- All buildings are single story.
- The ceiling heights for Tannery buildings are minimum 16 feet, the main door should be 9' W. x 12' H.
- All the windows should be the height of 3' upwards.
- For lecturer hall, windows fitted with drawable blackout curtains.
- Ceilings are required for all the buildings, except for the 1 pilot tannery buildings "wet section".
- The buffing room should be isolated.

9.4. Effluent

The quantity of effluent is very small, estimated to average 20-30 gallons per day. A small effluent treatment plant is planned for demonstration and training purpose. Advantage would be if the site area is located near a flowing river.

10. PLANT LAYOUT

See Annex 3

- DCLT - Site Layout Plan
- " Pilot Tannery, Wet Works
- " " " Dry "
- Shoes and Leather Products
- Laboratory
- Lecturer/Conference Hall
- Office

11. COST/BENEFIT

Table VII - A. SITE AREA LR(R) 1

11.1. Cost of Investment

S.No.	PARTICULARS	UN Inputs US $	Govt. Inputs Kyats
	Equipments:		
1.	Pilot Tannery	364,400	60,000
2.	Footwear and Leather Products	253,500	12,000
3.	Laboratory	20,300	57,200
4.	Information & Library	21,600	338,200
5.	Auxiliary Equipment:	164,200	200,000
6.	Effluent treatment plant	51,000	417,600
	1st Sub-Total ...	875,000	1,085,000
7.	Reference Books	5,100	--
8.	Laboratory Reagent and special water treatment agents	22,000	--
9.	Project Vehicles (three)	40,000	--
	2nd Sub-Total ...	942,100	1,085,000
10.	Clearance Transports & Bank charges for Equipment (15% of CIF)	--	1,229,400
11.	Building/ Engineering work		7,063,400
	Installation : Power Water, Steam and Lighting		
12.	Expert's facility	958,950	115,000
13.	Training	465,900	22,500
14.	Study Tour	43,500	9,000
15.	Sundries	16,000	
	GRAND TOTAL ...	2,426,450	9,524,300

Note : - Excluding its Cost for the Land and its Preparation.

Table VII - B. Site Area : Independent

11.2. Cost of Investment

Sr.No.	PARTICULARS	UN Inputs US $	Govt. Inputs Kyats
	Equipments :		
1.	Pilot Tannery	560,500	56,700
2.	Footwear and Leather Products	253,500	12,000
3.	Laboratory	50,200	57,200
4.	Information & Library	21,600	338,200
5.	Auxiliary Equipment :incl. Effluent Treatment plant	428,500	-
	1st Sub-Total ...	1,314,300	464,100
6.	Reference Books	5,100	-
7.	Laboratory Reagent and special water treatment agents	22,000	-
8.	Project Vehicles (Four)	51,300	-
	2nd Sub-Total ...	1,392,700	464,100
9.	Clearance Transports &(15%onCIF) Bank charges for Equipments	-	1,817,500
10.	Building	-	9,084,000
	Installation : Power	-	
	Water,Steam and Lighting		
11.	Expert's facility	958,950	115,000
12.	Training	465,900	31,500
13.	Study Tour	43,500	-
14.	Sundries	16,000	
	GRAND TOTAL ...	2,877,050	11,512,100

Note : - Excluding its Cost for the Land and its Preparation.

11.3. Revenues

Revenue items from the non-profit making DCLT are only some Leather-Shoes or Leather goods items which are saleable after development, experiment or demonstrations work is completed.

At a later stage, DCLT might start small pilot production in the 3 departments to increase the benefit.

There will be also some small earnings from the by-products.

12. Phasing

The present planning for the establishment of the DCLT is considered to be done in 1st Phase. The additional 2nd Phase may be added after the operation of 5 years.

The Planning of DCLT by a gradually 3 x 5 years phasing, dependent on the availability of funds, may also be possible. For this phasing priorities may be worked out from the present project document.

13. IMPLEMENTATION

13.1. Project Activities and Modalities of Implementation

The project activities are to be co-ordinated and supervised by the UNIDO Chief Technical Advisor (CTA) in co-operation with the National Project Director (NPD).
The main part of the UNIDO technical inputs will be procurement of machinery and equipment, assistance provided in for its installation to be subcontracted to the suppliers of such a machinery and equipment, the individual fellowships, are scheduled to be executed through sub-contract services. Draft terms of reference and job descriptions for the international experts is included in Annex 5.

The UNIDO CTA, the Leather Manufacturing Expert/Chemist and various Consultants will be attached to the General Industries Corporation under the Ministry of No.1 Industry, with the staff of the DCLT as Counterparts. The following specific activities will be carried out : -

13.1. **Project Activities and Modalities of Implementation (Contd.)**

Items	Planned Implementation Schedule	Responsibility
1. Budgetary appropriation and signature of project document.	Jan, 1986	UNDP/UNIDO -/IO/AGRO
2. Budgetary appropriation as Government inputs, preparation of architect, civil,electrical,drawing to be submitted to UNDP, UNIDO-IO/AGRO.	March,1986 to be completed before mid-April 1986.	Min.of No.1. Ind. GIC
3. Selection and fielding of CTA with split mission to Burma.	Fielding of CTA in Burma in July 1986 to end 1990.	UNIDO PPRS in co-operation with IO/AGRO
4. Selection of Counterpart team and Fellowship Programme to be agreed for implementation in phases beginning August 1986.	Selection beginning May 1986. with actual Fellowship implementation August 1986.	NPD/CTA/UNDP/AGRO/ Training Branch.
5. Preparation of workplan covering all aspects of project implementation, including selection/procurement of machinery and equipment, final evaluation of architect	Beginning assignment of preparatory work in May 1986 with completion by December 1986.	UNIDO/AGRO CTA/NPD

Items	Planned Implementation Schedule	Responsibility
design, civil, electrical and other work submitted by the government counterpart agency in Burma for DCLT., requirement and selection of Leather Mfg. Expert, Leather Footwear Technologist and Consultants.		
6. Civil works construction for DCLT, connection of electricity, water and necessary fittings.	To be completed by January,1988.	Min. of No.1.IND. GIC
7. Delivery of machinery and equipment at the site.	February, 1988	Suppliers and UNIDO IO/PAC
8. Allocation of counterpart team to CTA.	February, 1988	Min. of No.1. IND. GIC, NPD.
9. Clearing of machinery, equipment storage and installation.	Feb. - July,1988	Min. of No.1. IND. GIC And suppliers technician.
10. Identification of technical services and consultants, preparation of workplan for their assignments.	August, 1988	CTA UNIDO IO/AGRO, NPD.
11. Fielding of Leather Manufacturing Expert.	September,1988	UNIDO/AGRO CTA PPRS.
12. Fielding of Leather Footwear Expert.	January,1989 to December, 1989	UNIDO/AGRO CTA/PPRS.
13. Fielding of Consultants to be phased beginning of April 1988.	Beginning January 1989 throughout entire project duration.	UNIDO PPRS in cooperation with IO/AGRO.
14. Final preparation of training and retraining courses (see Appendix) selection of participants,conducting courses/seminars/inplant training activities.	Starting February 1989 throughout project duration.	International team

Items	Planned Implementation Schedule	Responsibility
15. Conducting consultancy services, research and product development activities (See Appendix 2).	Throughout entire project duration beginning January 1988.	International and national team.
16. Upgrading of selected counterparts through fellowships and on-job training.	Starting early 1989 to complete by August 1989.	CTA and NPD and other International staff.
17. Conducting study tour related to technical and marketing aspects.	September, 1989/ 1990.	CTA/NPD UNIDO Training in co-operation with IO/AGRO.
18. Mid-term review and substantative back stopping mission.	End 1988	UNIDO IO/AGRO in consultation with PC/DEV/ Evaluation Unit.
19. Conducting national seminar and exhibition.	Second half of 1990	GIC/DCLT/CTA and International staff.
20. End-Project Evaluation Mission.	End 1990	UNIDO

13.2. Institutions :

For Leather Technology : -

- NENE COLLEGE, NORTHAMPTON, UNITED KINGDOM.

For Shoe and Leathergoods : -

- CORDWAINERS, TECHNICAL COLLEGE, LONDON, UNITED KINGDOM

Detailed informations regarding timing of courses etc. have been received during the Study Tour and are known to the DCLT National Staff.

Course Programmes of two year duration is planned taking into consideration that the candidates available for fellowship have higher academic background compared to the desired requirements of Nene College. Three years courses, therefore can be completed in two years time.

13.3. Construction :
(Organization/responsibility schedule for detailed engineering supervision)

The GIC Planning Engineer will be responsible for the Construction and detailed engineering work. A temporary project office will be in the first constructed building or in a shed.

The total size of all buildings will be 29,240 sq.ft. and total land required 450' x 350'.

The time schedule as mentioned in prodoc should be respected and not be changed. End of Civil Work and Construction will be January 1988.

13.4. Delivery of Equipment:(Recommendations)

Import items, machinery and equipment should be at the site in February 1988 and finally the installation be completed in July 1988.

Also the local equipment should be available in time, as mentioned above.

All the supplies will be individual and should be addressed to Rangoon Harbour.

13.5. Schedule for Initial Operation of the DCLT

The expected full functioning of the DCLT will be during August - September 1988.

14. FINAL REMARKS

The aim of the DCLT is to reach the 1st target of Development and all-round improvement in the Leather-Footwear and Leather Goods Industry after 5 years of operation and the final goal after 8-10 years.

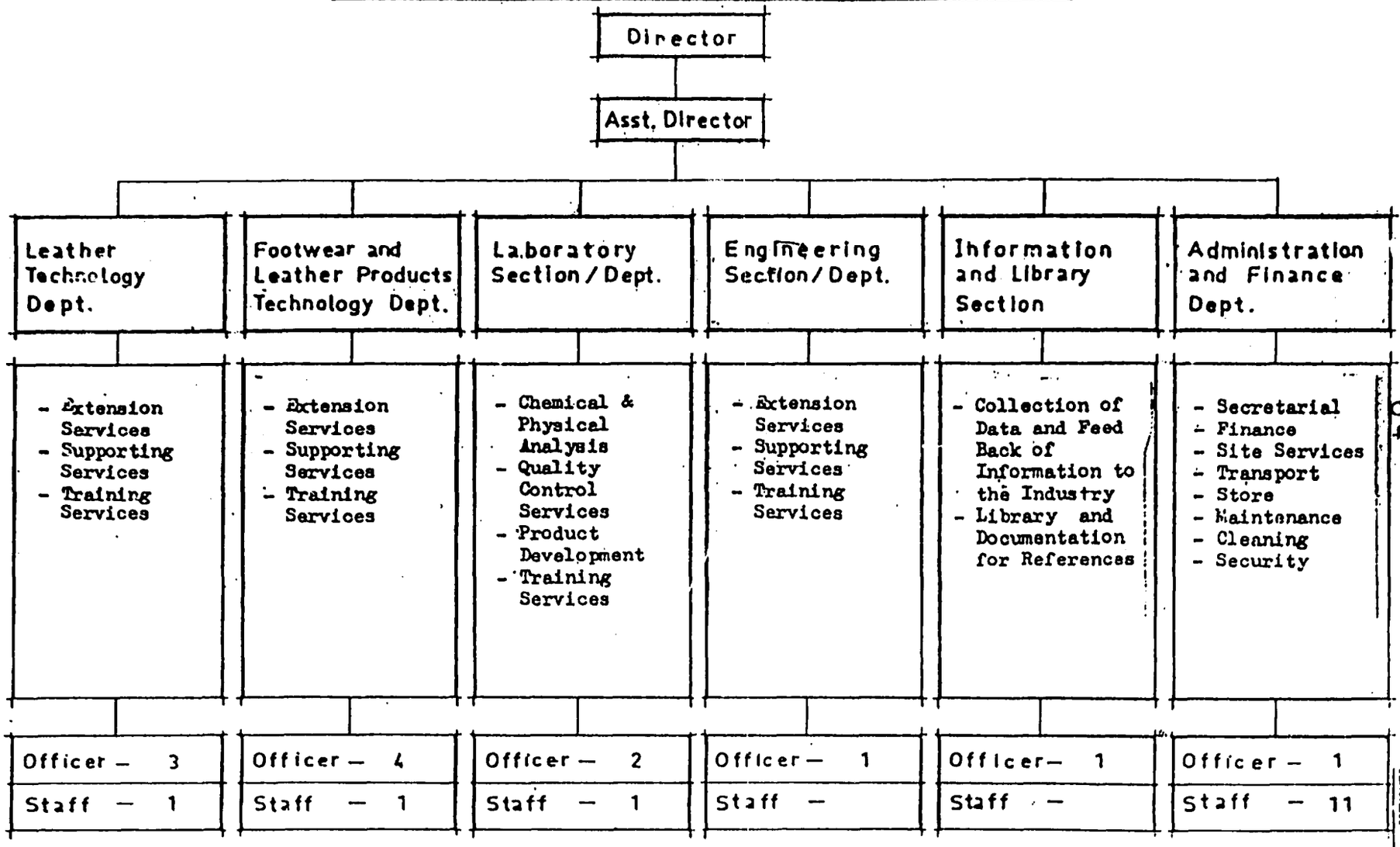
After 8-10 years of the DCLT's existance, the investment cost should be recovered more or less as benefit to the industry.

It is interesting to note that Leather and Leather Products will be exhibited at the 40th UN Anniversary Exhibition to be held at Rangoon indicating awareness and recognition of this Industry being exposed at such a scale for the first time.

15. FOLLOWING REPORTS ARE SUBMITTED BY THE PROJECT BUR/82/007 :

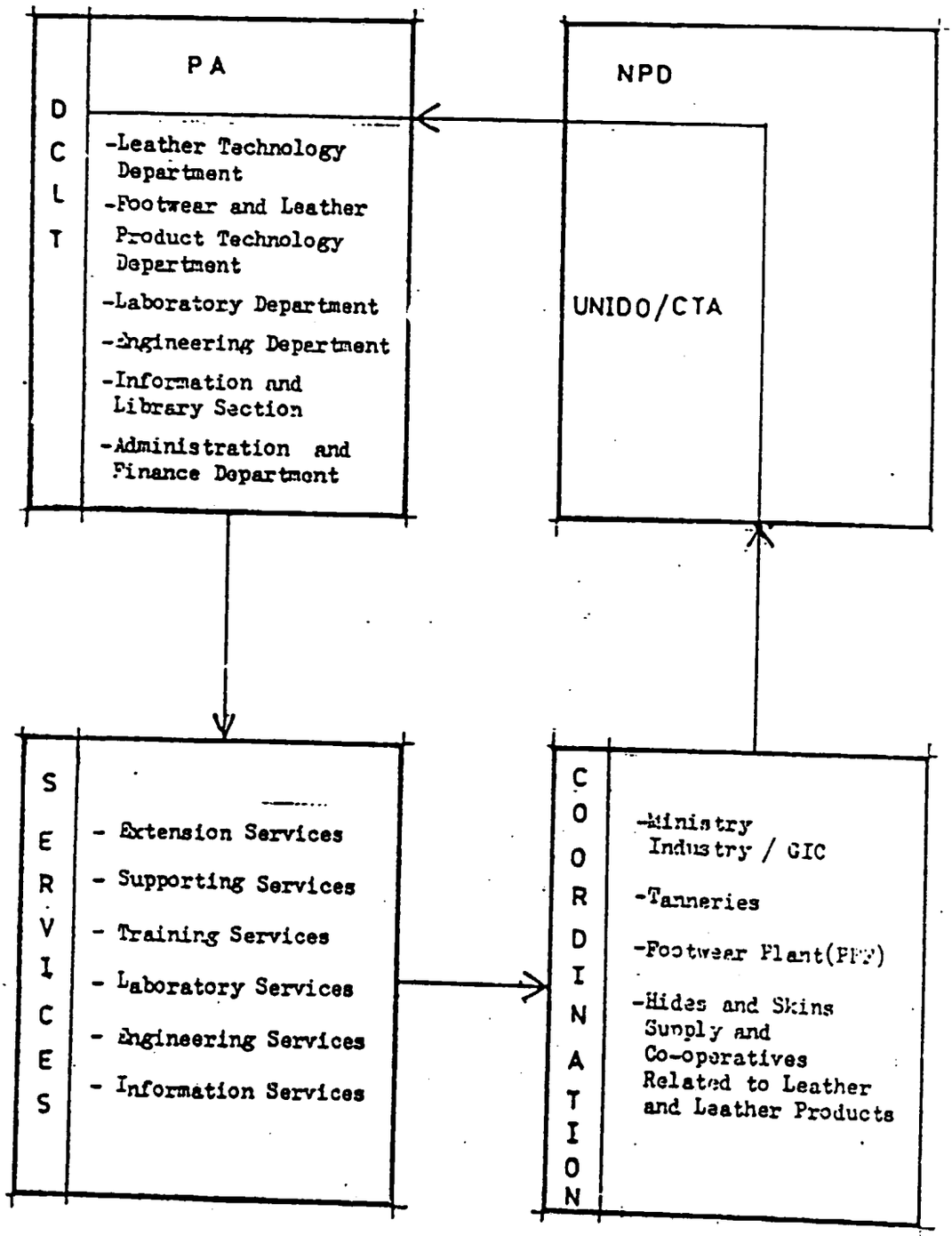
1. Techno-Economic Report - DCLT. (for 2 site areas).
2. Terminal Report by CTA.
3. Marketing Report by the Marketing Expert as Terminal Reports.
4. Draft Project Document based on DCLT site selected at LF(R) 1.

GENERAL PATTERN OF ORGANIZATION OF THE DCLT



ANNEX I

ORGANISATION STRUCTURE OF THE PROJECT (FUNCTIONAL)



ANNEX - 2

A. SITE AREA LF(R)1

B. SITE AREA INDEPENDENT

Estimated Government Inputs Related To : -

- BUILDINGS AND ENGINEERING WORKS ;
- PROJECT BUDGET PROVISION BARCHART AND PLANNED IMPLEMENTATION SCHEDULE ; AND
- ESTIMATED GOVERNMENT OPERATING COST 1986-90

Estimated Government Inputs Related to Buildings and Engineering Work

Sr.No.	Building	Measurement	Cost (Kyats)
1.	Pilot Tannery	50'x 120' (1sq.ft - 250)	1,500,000
2.	Footwear & Leather	40'x 110' (1sq.ft - 200)	880,000
3.	Laboratory	40'x 80' (1sq.ft - 200)	640,000
4.	Office	50'x 90' (1sq.ft - 200)	900,000
5.	Lecture/Conference	40'x 90' (1sq.ft - 180)	648,000
6.	Gate House	10'x 15' (1sq.ft - 160)	24,000
7.	Transformer House	20'x30' (1sq.ft - 300)	180,000
8.	Engineering Maintenance Shop	40'x 60' (1sq.ft - 180)	432,000
9.	Effluent Treatment plant	----	417,600
10.	W.C & Bath	20'x 30' (1sq.ft - 250)	150,000
11.	Land Preparation Soil test , etc		250,000
12.	Road (Reinforced)	18'x18"x1200'	240,000
13.	Parking	30'x 20'	32,000
14.	Fencing	1968'	160,000
15.	Total Installation cost		609,800
16.	Transport,Clearance,Post and Bank Charges.		1,229,400
17.	Costs related to other Project support.		115,000
18.	Training Support		31,500
19.	Locally purchased equipment		1,085,000
		GRAND TOTAL ...	9,524,300

ESTIMATE OF THE OPERATING BUDGET FOR 1986-90

(Data provided by DCLT National Staff)

TABLE VIII, A + B SITE AREAS

(Kyats in thousands)

Sr. No.	Description	Y E A R				
		1986	1987	1988	1989	1990
1.	Salaries	162.00	162.00	168.04	174.08	180.120
2.	Consumables	-	-	69.88	293.49	308.16
3.	Fuel and Lubricant	-	-	1.55	6.20	6.20
4.	Electricity	-	-	3.63	14.50	14.50
5.	Water/Effluent Treatment	-	-	3.00	12.00	12.00
6.	Building and Machine Maintenance	-	-	-	100.00	105.00
7.	Travel Expenses	-	-	8.00	30.00	30.00
8.	Transport and Maintenance of Vehicles	14.40	14.40	14.40	36.12	37.93
9.	Insurance	-	-	10.00	40.00	40.00
	GRAND TOTAL	176.40	176.40	278.50	706.39	733.91

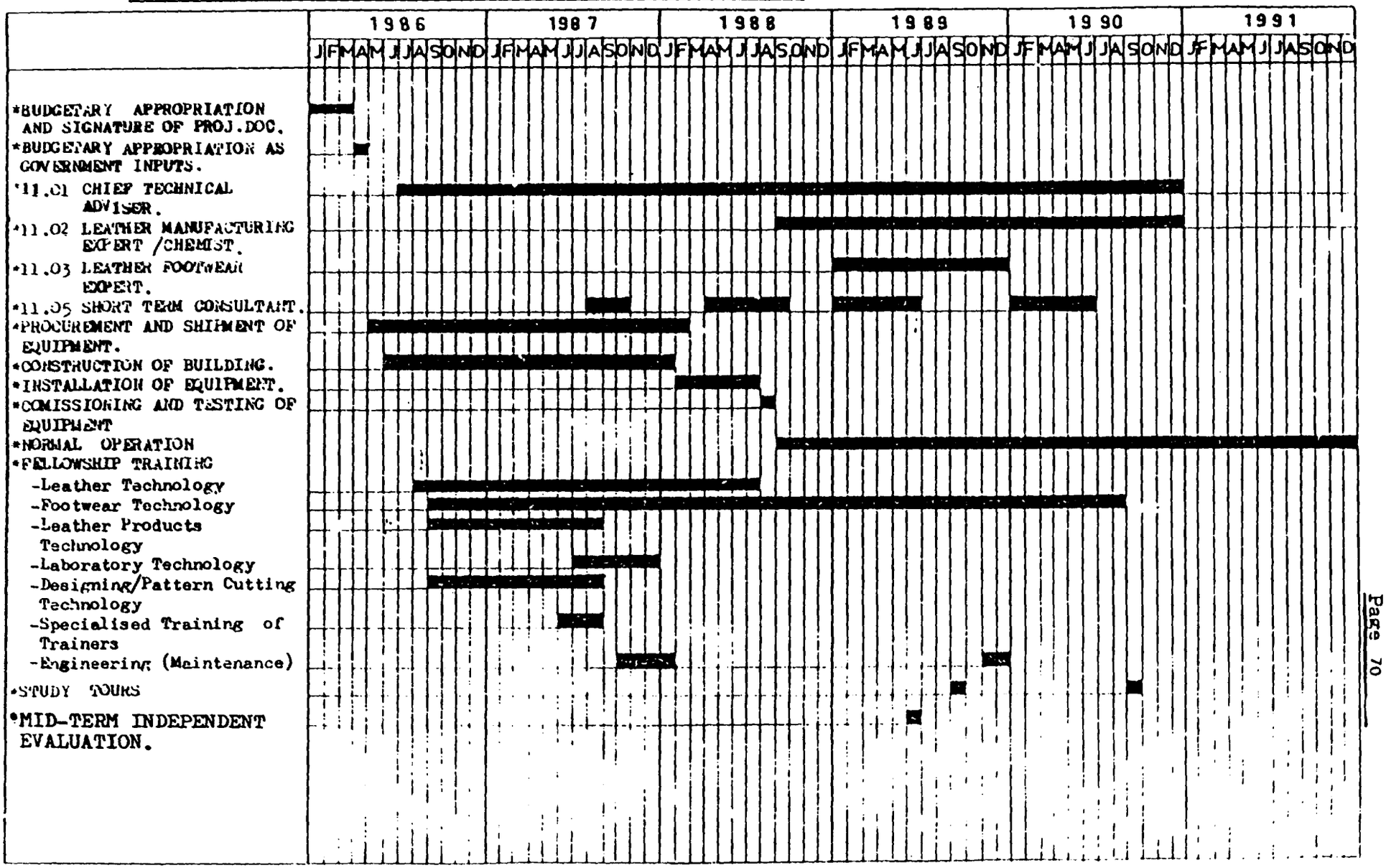
A - SITE AREA LF(R)1

DCLT - PROJECT BUDGET/REVISION

(Government Input)

Sr. No.	Description	TOTAL	1986	1987	1988	1989	1990
		Value in KYATS					
1.	Costs related to other project support.	115000	9000	12000	22000	42000	30000
2.	Training Support	31500	9000	10500	1500	6000	4500
3.	Transport, Clearance, Post, and Bank Charges.	1229400	18250	1141870	46980	11150	11150
4.	Buildings	5354000	3000000	2354000	-	-	-
5.	Installation Cost	609800	-	-	609800	-	-
6.	Others Civil Works	1099600	-	-	1099600	-	-
7.	Locally purchased equipment.	1085000	785000	300000	-	-	-
8.	Operating Cost	2071600	176400	176400	278500	706390	733910
	GRAND TOTAL ...	11595900	3997650	3994770	2058380	765540	779560

BAR-CHART PLANNED IMPLEMENTATION SCHEDULE



UNIDO A SITE ARM L7(3) 1 **PROJECT BUDGET/REVISION**

3. COUNTRY	4. PROJECT NUMBER AND AMENDMENT	5. SPECIFIC ACTIVITY
BURMA	DP/BUR/85/	31.7.D

10. PROJECT TITLE
Assistance to the Development Centre for Leather Technology (DCLT)

15. INTERNATIONAL EXPERTS (Functional titles required except for lines 11-50)	16. TOTAL m/m	16. TOTAL $	17. 1986 m/m	17. 1986 $	18. 1987 m/m	18. 1987 $	19. 1988 m/m	19. 1988 $	20. 1989 m/m	20. 1989 $	21. 1990 m/m	21. 1990 $
11-01 Chief Technical Adviser	54	420900	6	40500	12	84600	12	89400	12	98400	12	108000
02 Leather Manufacturing Expert	28	236200					4	29800	12	98400	12	108000
03 Leather Footwear Expert	12	98400		-		-		-	12	98400		-
04												
05												
06												
07												
08												
09												
10												
11												
12												
13												
14												
15												
16												
11-50 Short term consultants	21	168150	3	20250			6	44200	6	49200	6	54300
11-99 Sub-total - International experts*	115	923650	9	60750	12	84600	22	163900	42	344400	30	270000

21. REMARKS

* If more than 16 experts are required check here ☐ and attach continuation sheet 1A. This sub-total must include all experts.

UNIDO A SITE ARE LP(R) 1 **PROJECT BUDGET/REVISION** PAGE 2

4 PROJECT NUMBER	16 TOTAL		17 1986		18 1987		19 1988		20 1989		21 1990	
	m/m	$	m/m	$	m/m	$	m/m	$	m/m	$	m/m	$
OPAS EXPERTS (functional titles required)												
12-01												
12-02												
12-03												
12-99 Sub-total—OPAS experts*												
ADMINISTRATIVE SUPPORT PERSONNEL		10350		750		600		3000		3000		3000
13-00 Clerks, secretaries, drivers												
13-99 Freelance interpreters (non-UNDP projects)												
13-99 Sub-total—Administrative support personnel		10350		750		600		3000		3000		3000
UN VOLUNTEERS (functional titles required)												
14-01												
14-02												
14-03												
14-04												
14-99 Sub-total—UN Volunteers*												
15-00 Project travel		16950		1350		1800		3000		6300		4500
16-00 Other personnel costs (including UNIDO staff mission costs)		8000						4000				4000
NATIONAL EXPERTS (functional titles required)												
17-01												
17-02												
17-03												
17-04												
17-05												
17-99 Sub-total—National experts*												
19-99 TOTAL - PERSONNEL COMPONENT	115	958950	9	62850	12	87000	22	173900	42	353700	30	281500

*If additional individual budget lines are required, check here ☐ and attach continuation sheet 1A. These sub-totals must include budget lines listed on page 1A.

UNIDO A SITE AREA LP(R) 1 PROJECT BUDGET/REVISION PAGE 3

6. PROJECT NUMBER	16 TOTAL m/m	TOTAL $	17. 1986 m/m	1986 $	18 1987 m/m	1987 $	19. 1988 m/m	1988 $	20 1989 m/m	1989 $	21 1990 m/m	1990 $
SUBCONTRACTS												
31-00 Subcontracts												
TRAINING												
31-00 Individual fellowships	216	465900	32	67200	113	235400	61	140300	10	23000		-
32-00 Study tours: UNDP group training		40000								20000		20000
33-00 In-service training												
34-00 Non-UNDP group training												
35-00 Non-UNDP meetings		3500										3500
30-99 TOTAL - TRAINING COMPONENT	216	509400	32	67200	113	235400	61	140300	10	43000		23500
EQUIPMENT												
41-00 Expendable equipment		27100						10000		8550		8550
42-00 Non-expendable equipment		915000		14000		875000		26000				
43-00 Premises												
40-99 TOTAL - EQUIPMENT COMPONENT		942100		14000		875000		36000		8550		8550
MISCELLANEOUS												
51-00 Sundries		16000		1000		2000		3000		4000		6000
55-00 Hospitality (non-UNDP projects)												
56-00 Support costs (CC and DC projects only)												
50-99 TOTAL - MISCELLANEOUS COMPONENT		16000		1000		2000		3000		4000		6000
SURPLUS/DEFICIT												
81-00 Surplus/Deficit (AGAM/ES use only)												
99-99 PROJECT TOTAL	115	2426450		145050		1199400		353200		409250		319550
* COST SHARING (UNDP/IF projects only)												
* NET UNDP CONTRIBUTION												

* For information only - not for PAD input

Note: - Above excludes 13 per cent overhead costs

Estimated Government Inputs Related to Buildings and Engineering Work

Sr.No.	Building	Measurement	Cost (Kyats)
1.	Pilot Tannery (wet)	50'x 80' (1sq.ft - 250)	1,000,000
2.	Pilot Tannery(dry)	50'x 100' (1sq.ft - 250)	1,250,000
3.	Footwear & Leather	40'x 100' (1sq.ft - 200)	800,000
4.	Laboratory	40'x 80' (1sq.ft - 200)	640,000
5.	Office	50'x 90' (1sq.ft - 200)	900,000
6.	Lecture/Conference	40'x 90' (1sq.ft - 180)	648,000
7.	Gate House	10'x 15' (1sq.ft - 160)	24,000
8.	Transformer House	30'x 40' (1sq.ft - 300)	360,000
9.	Engineering Machine Shop	40'x 50' (1sq.ft - 180)	360,000
10.	Boiler House	25'x 30' (1sq.ft - 300)	225,000
11.	Fuel oil tank Foundation.	15'x 15' (1sq.ft - 200)	45,000
12.	Pump and Compresser House	12'x 20' (1sq.ft - 300)	72,000
13.	Surface Water Tank	10000 gal	20,000
14.	Overhead Tank & Trestle	5000 gal	100,000
15.	Tube Well	6" Dig.	50,000
16.	Effluent Treatment plant	----	417,600
17.	W.C & Bath	20'x 30' (1sq.ft - 250)	150,000
18.	Land Preparation Soil test , etc		500,000
19.	Road (Reinforced)	18'x18"x200'0 (1C.ft - 8)	432,000
20.	Parking	30'x 20' (1sq.ft - 160)	96,000
21.	Fencing	2(450 + 350)	160,000
		B/FORWARD TOTAL ...	8,249,600

Estimated Government Inputs Related to Buildings and Engineering work (Contd.)

Sr.No.	Building	Measurement	Cost (Kyats)
		B/FORWARD TOTAL	8,249,600
22.	Total Installation cost		834,400
23.	Transport,Clearance,Post and Bank Charges.		1,817,500
24.	Cost related to other project support		115,000
25.	Training support		31,500
26.	Local purchased equipment		464,100
		GRAND TOTAL	11,512,100

Remark : 1. The temporary project office will be in the first build Lecture hall or in a temporary Shed.

2. Total size of all buildings 29,240 Sq.ft.

3. Total land requirement (450' x 350')

ESTIMATE OF THE OPERATING BUDGET FOR 1986-90

(Data provided by DCLT National Staff)

TABLE VIII A + B SITE AREA (Kyats in thousands)

Sr. No.	Description	Y E A R				
		1986	1987	1988	1989	1990
1.	Salaries	162.00	162.00	168.04	174.08	180.120
2.	Consumables	-	-	69.88	293.49	308.16
3.	Fuel and Lubricant	-	-	1.55	6.20	6.20
4.	Electricity	-	-	3.63	14.50	14.50
5.	Water/Effluent Treatment	-	-	3.00	12.00	12.00
6.	Building and Machine Maintenance	-	-	-	100.00	105.00
7.	Travel Expenses	-	-	8.00	30.00	30.00
8.	Transport and Maintenance of Vehicles	14.40	14.40	14.40	36.12	37.93
9.	Insurance	-	-	10.00	40.00	40.00
	GRAND TOTAL	176.40	176.40	278.50	706.39	733.91

B - Site Area Independent

DCLT - PROJECT BUDGET

(Government Input)

Sr. No.	Description	TOTAL	1986	1987	1988	1989	1990
		Value in KYATS					
1.	Costs related to other project support.	115000	9000	12000	22000	42000	30000
2.	Training Support	31500	9000	10500	1500	6000	4500
3.	Transport, Clearance, Post, and Bank Charges.	1817500	15203	1715204	64793	11150	11150
4.	Buildings	6429000	3000000	3429000	-	-	-
5.	Installation Cost	834400	-	-	834400	-	-
6.	Others Civil Works	1820600	50000	632600	688000	-	-
7.	Locally purchased equipment.	464100	300000	164100	-	-	-
8.	Operating Cost	2071600	176400	176400	278500	706390	733910
	GRAND TOTAL ...	13583700	4009603	6139804	1889193	765540	779560

UNIDO B. SITE AREA INDEPENDENT PROJECT BUDGET/REVISION

PAGE 1

3. COUNTRY	4. PROJECT NUMBER AND AMENDMENT	5. SPECIFIC ACTIVITY
BURMA	DP/BUR/85/	31.7.D

10. PROJECT TITLE
Assistance to the Development Centre for Leather Technology (DCLT)

15. INTERNATIONAL EXPERTS (Functional titles required except for line 11-50)	16. TOTAL m/m	16. TOTAL $	17. 1986 m/m	17. 1986 $	18. 1987 m/m	18. 1987 $	19. 1988 m/m	19. 1988 $	20. 1989 m/m	20. 1989 $	21. 1990 m/m	21. 1990 $
11-01 Chief Technical Adviser	54	420900	6	40500	12	84600	12	89400	12	98400	12	108000
02 Leather Manufacturing Expert	28	236200					4	29800	12	98400	12	108000
03 Leather Footwear Expert	12	98400		-		-		-	12	98400		-
04												
05												
06												
07												
08												
09												
10												
11												
12												
13												
14												
15												
16												
11-50 Short term consultants	21	168150	3	20250			6	44000	6	49200	6	94000
11-99 Sub-total - international experts*	115	923650	9	60750	12	84600	22	163900	42	344600	30	220000

21. REMARKS

* If more than 16 experts are required check here ☐ and attach continuation sheet 1A. This sub-total must include all experts.

UNIDO — SITE AREA INDEPENDENT — PROJECT BUDGET/REVISION

4 PROJECT NUMBER	16 TOTAL m/m	16 TOTAL $	17 1986 m/m	17 1986 $	18 1987 m/m	18 1987 $	19 1988 m/m	19 1988 $	20 1989 m/m	20 1989 $	21 1990 m/m	21 1990 $
OPAS EXPERTS (functional titles required)												
12-01												
12-02												
12-03												
12-99 Sub-total—OPAS experts[a]												
ADMINISTRATIVE SUPPORT PERSONNEL		10350		750		600		3000		3000		3000
13-99 Clerks, secretaries, drivers												
13-99 Freelance interpreters (non-UNDP projects)												
13-99 Sub-total—Administrative support personnel		10350		750		600		3000		3000		3000
UN VOLUNTEERS (functional titles required)												
14-01												
14-02												
14-03												
14-04												
14-99 Sub-total—UN Volunteers[a]												
15-00 Project travel		16950		1350		1800		3000		6300		4500
16-00 Other personnel costs (including UNIDO staff mission costs)		8000						4000				4000
NATIONAL EXPERTS (functional titles required)												
17-01												
17-02												
17-03												
17-04												
17-05												
17-99 Sub-total—National experts[a]												
19-99 TOTAL—PERSONNEL COMPONENT	115	958950	9	62850	13	37000	22	173900	42	353700	30	281500

[a] If additional individual budget lines are required, check here ☐ and attach continuation sheet 1A. These sub-totals must include budget lines listed on page 1A

UNIDO **B. SIER AREA INDEPENDENT** PROJECT BUDGET/REVISION PAGE 3

4. PROJECT NUMBER	16 TOTAL m/m	TOTAL $	17 1986 m/m	1986 $	18 1987 m/m	1987 $	19 1988 m/m	1988 $	20 1989 m/m	1989 $	21 1990 m/m	1990 $
SUBCONTRACTS												
21-00 Subcontracts												
TRAINING	216	465900	32	67200	113	235400	61	140300	10	23000		-
31-00 Individual fellowships		40000								20000		20000
32-00 Study tours; UNDP group training												
33-00 In-service training												
34-00 Non-UNDP group training		3500										3500
35-00 Non-UNDP meetings	216	509400	32	67200	113	235400	61	140300	10	43000		23500
39-99 TOTAL - TRAINING COMPONENT												
EQUIPMENT		27100						10000		8550		8550
41-03 Expendable equipment		1365600		11650		1314300		39650				
42-00 Non-expendable equipment												
43-00 Premises		1392700		11650		1314300		49650		8550		8550
49-99 TOTAL - EQUIPMENT COMPONENT		16000		1000		2000		3000		4000		6000
MISCELLANEOUS												
51-00 Sundries												
55-00 Hospitality (non-UNDP projects)												
56-00 Support costs (ICC and OC projects only)		16000		1000		2000		3000		4000		6000
59-99 TOTAL - MISCELLANEOUS COMPONENT												
SURPLUS/DEFICIT												
81-00 Surplus/Deficit (ADM/FS use only)												
99-99 PROJECT TOTAL	115	2877050	9	142700	12	1638700	22	366850	42	403250	30	319550
* COST SHARING (UNDP/IPF projects only)												
* NET UNDP CONTRIBUTION												

*For information only - not for PAD input

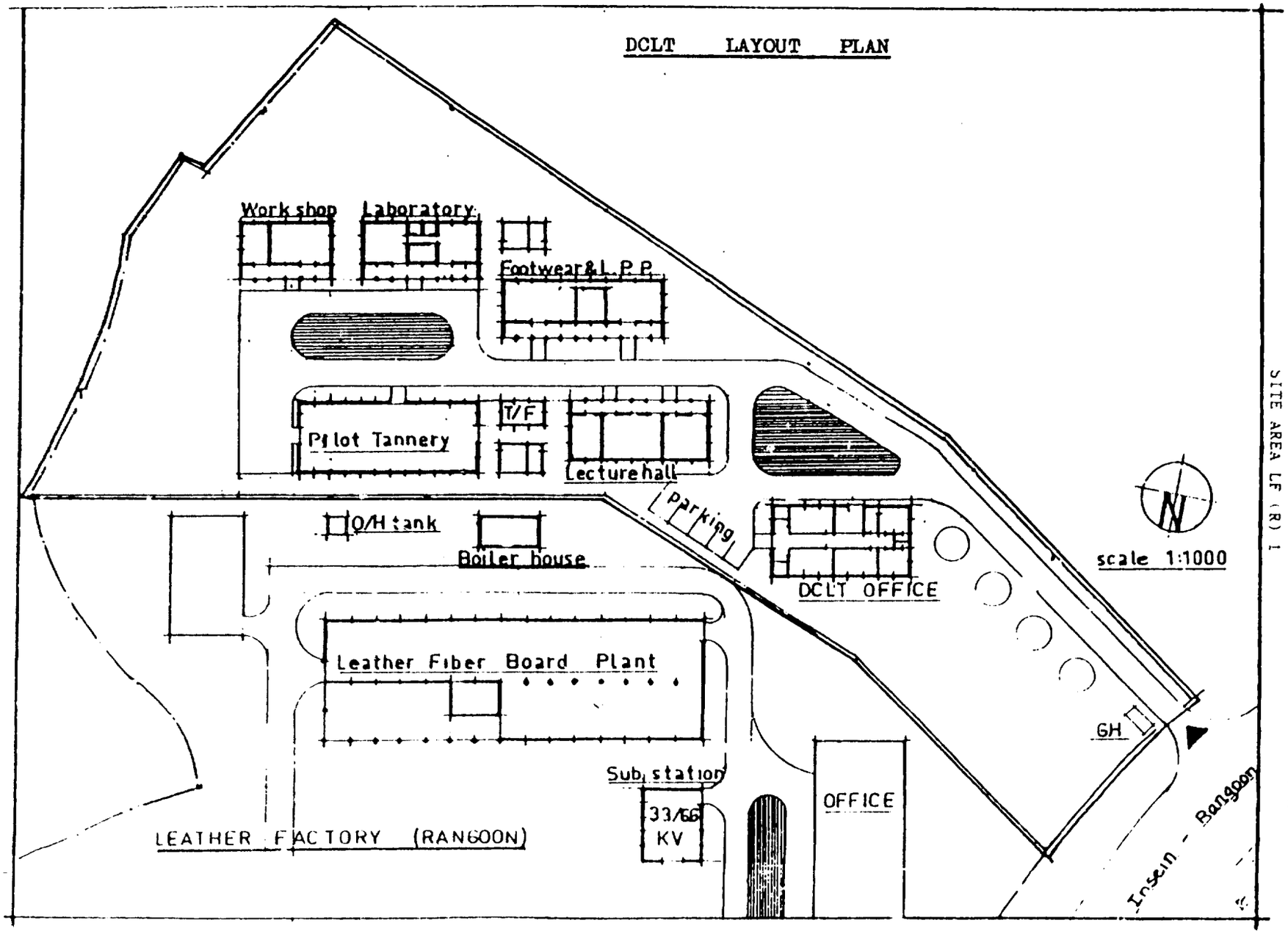
Note: - Above excludes 13 per cent overhead costs

ANNEX - 3

A. SITE AREA LF(R) 1

B. SITE AREA INDEPENDENT

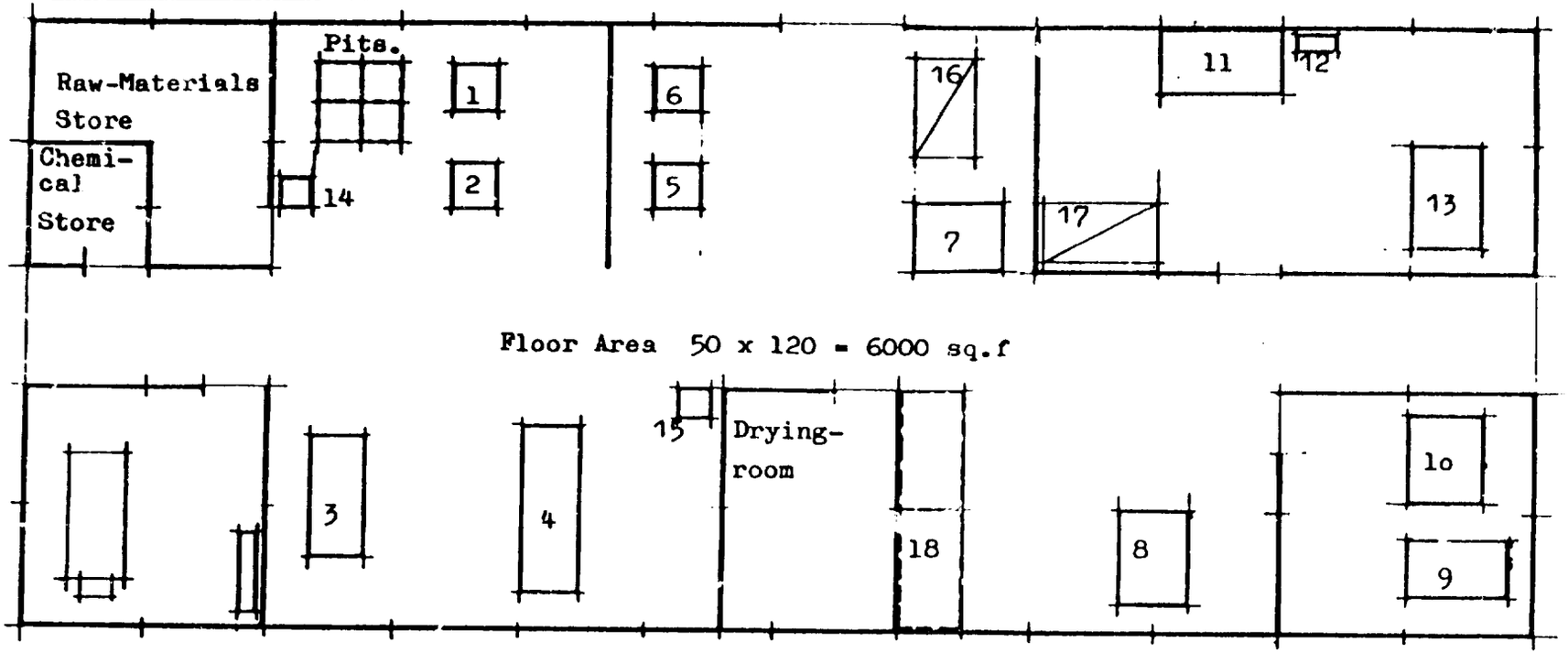
- DCLT Layout
- PILOT TANNERY PLANT LAYOUT
- PILOT FOOTWEAR, LEATHER PRODUCTS PLAN LAYOUT.
- LABORATORY LAYOUT
- LECTURE BLOCK LAYOUT
- OFFICE BLOCK
- POWER DISTRIBUTION SYSTEM
- WATER SUPPLY SYSTEM
- STEAM DISTRIBUTION SYSTEM
- LIGHTING SYSTEM
- COUNTRY LOCATION MAP SHOWING LEATHER AND FOOTWEAR PLANTS.
- RANGOON CITY MAP SHOWING DCLT SITE



SITE AREA LF (R) 1

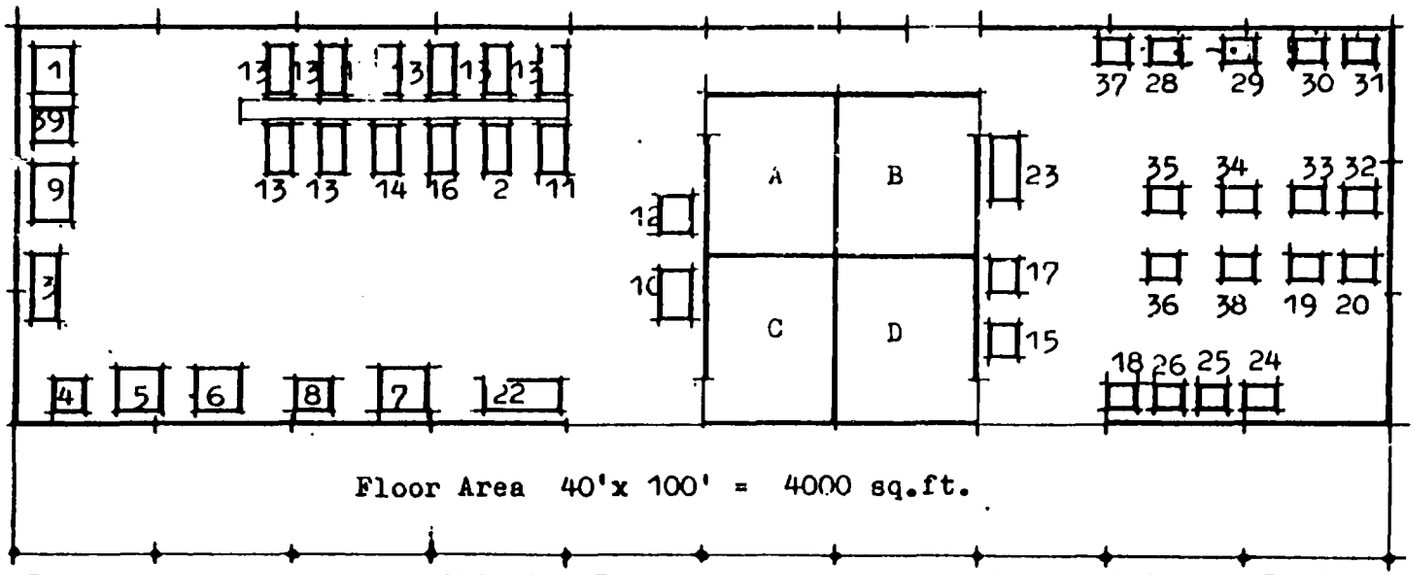
ANNEX 3 A

DCLT - TANNERY PILOT PLANT



1. Steel Drum
2. Steel Drum
3. Fleshing M/c
4. Ex-lime Splitting M/c
5. Steel Drum
6. Steel Drum
7. Shaving M/c
8. Schodel Stacking M/c
9. Buffing M/c
10. Polishing M/c
11. Spraying Cabinet
12. Air-Compressor
13. Hydraulic Press
14. Scale Balance
15. Scale Balance
16. Setting out Table
17. Padding Table
18. Saw-Dust

DCLT - FOOTWEAR AND LEATHER PRODUCTS PILOT PLANT LAYOUT PLAN

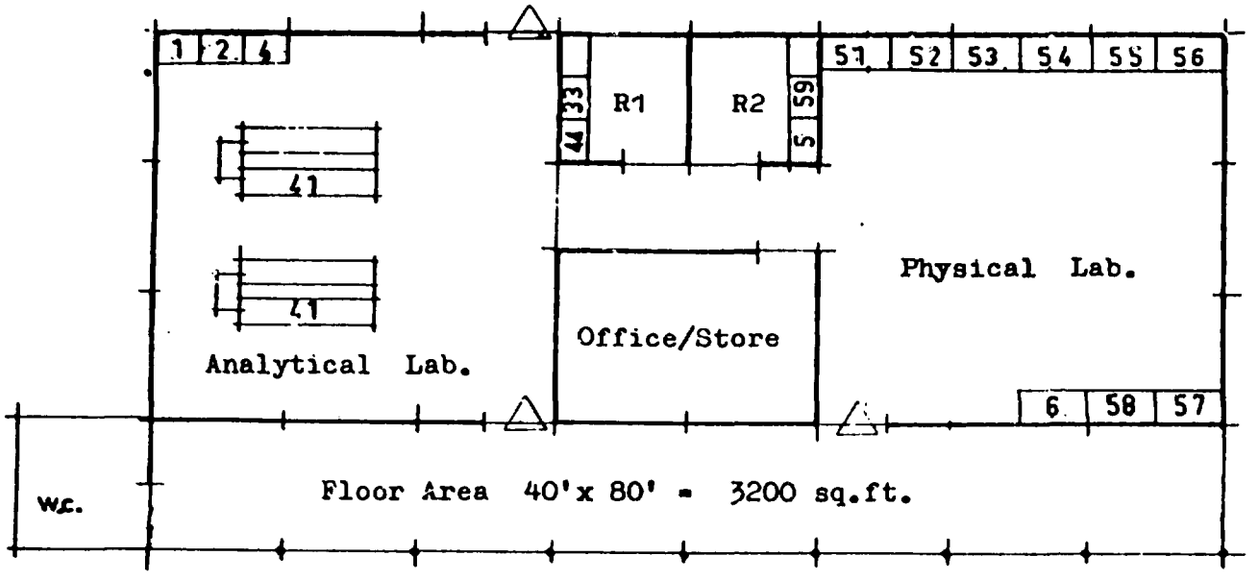


A-Raw Room
B-Design Room
C-Finished Room
D-Office Room

1-Pattern Grading
2-Eyeletting M/c
3-Heel Part Moulding & Lasting M/c
4-Toe Pulling & Forepart Lasting M/c
5-Side Lasting M/c
6-Heel Seat Lasting M/c
7-Sole Laying Press
8-Sole Roughing M/c
9-Heat Activator
10-Splitting M/c
11-Hand Work
12-Clicking Press
13-Sewing M/c
14-Skiving M/c
15-Strap Cutting
16-Folding M/c
17-Guillotine Cutter
18-Waist Belt Skiving
19-Eye Brushing M/c
20-Hand Rivetting M/c
22-Combined Finishing M/c
23-Splitting M/c
24-Gloving Former
25-Embossing M/c
26-Stamping & Marking M/c
28-Sole Splitting & Roughing M/c
29-Sole Reducing M/c
30-Sole Marking M/c
31-Sole Heel Seat Rough M/c
32-Pre-Trimming By Hand
33-Rand Laying M/c
34-Pre-Trimmed Sole Edge Blending
35-Sole Scouring M/c
36-Pretrimmed Sole Edge Colouring M/c
37-Cutter Sharpening M/c
38-Brushing M/c
39-Pattern Shear & Vice

DCLT - 33

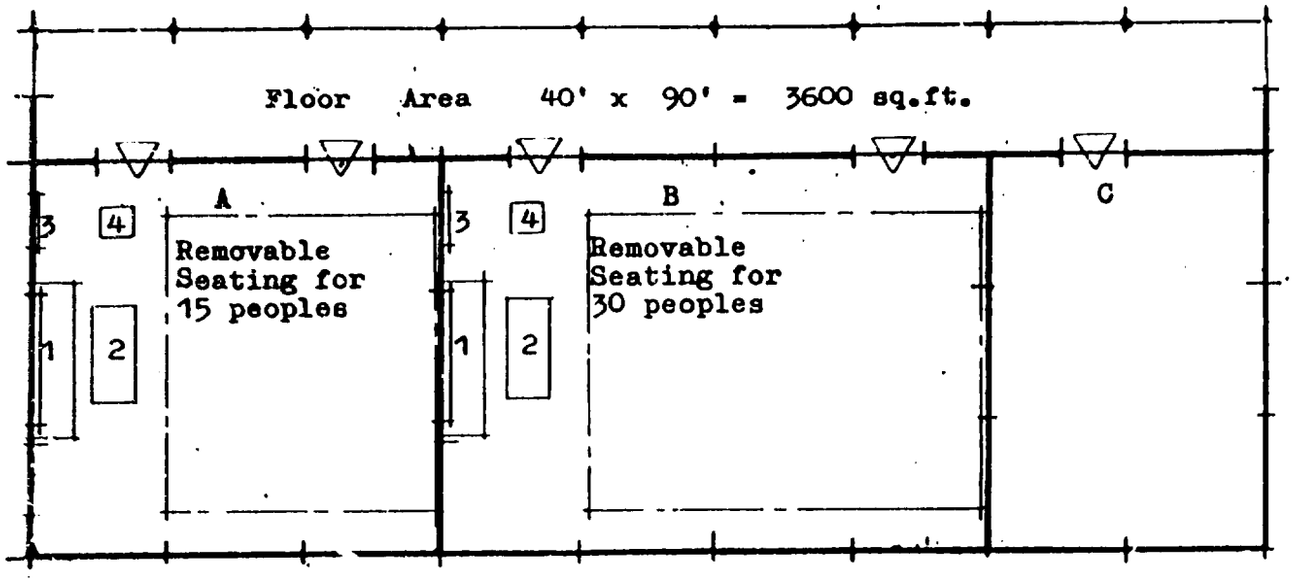
DCLT - LABORATORY LAYOUT PLAN



33. Microscope
44. Analytical Balance
59. Drying Oven
5. Muffle Oven
51. Flexometer
52. Tensile Strength Tester
53. Penetrometer
54. Tensometer
55. Rub Fastness Tester
56. Permeometer
57. Lastometer
58. Adhesion of Leather Finishing Tester
6. Leather Sample Grinding Machine
1. Distilled Water Apparatus
4. Water Bath Heater
2. Hot Water Boiler
41. Laboratory Table
R1. Analytical Balance Room
R2. Heating Oven Room

DCLT-16

DCLT - LECTURE / CONFERENCE HALL LAYOUT PLAN

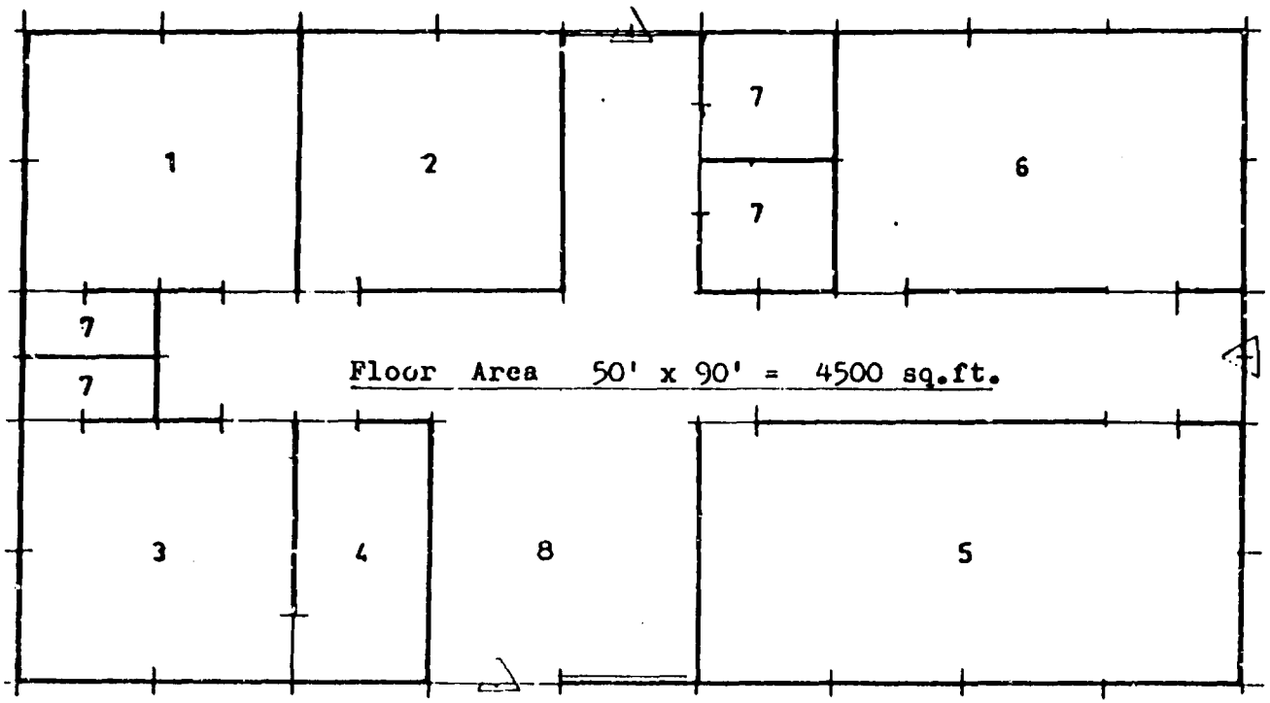


A. Lecture Room (A)
B. Lecture Room (B)
C. Recreation Room
1. Black-board, Slide Screen and Platform
2. Demonstration Table
3. Over Head Screen
4. Over Head Projector

Note:- Windows fitted with drawable Blackout Curtains.

DCLT 22

DCLT - OFFICE PLAN



1.Director Room

2.Meeting Room

3.Expert Room

4.Kitchen

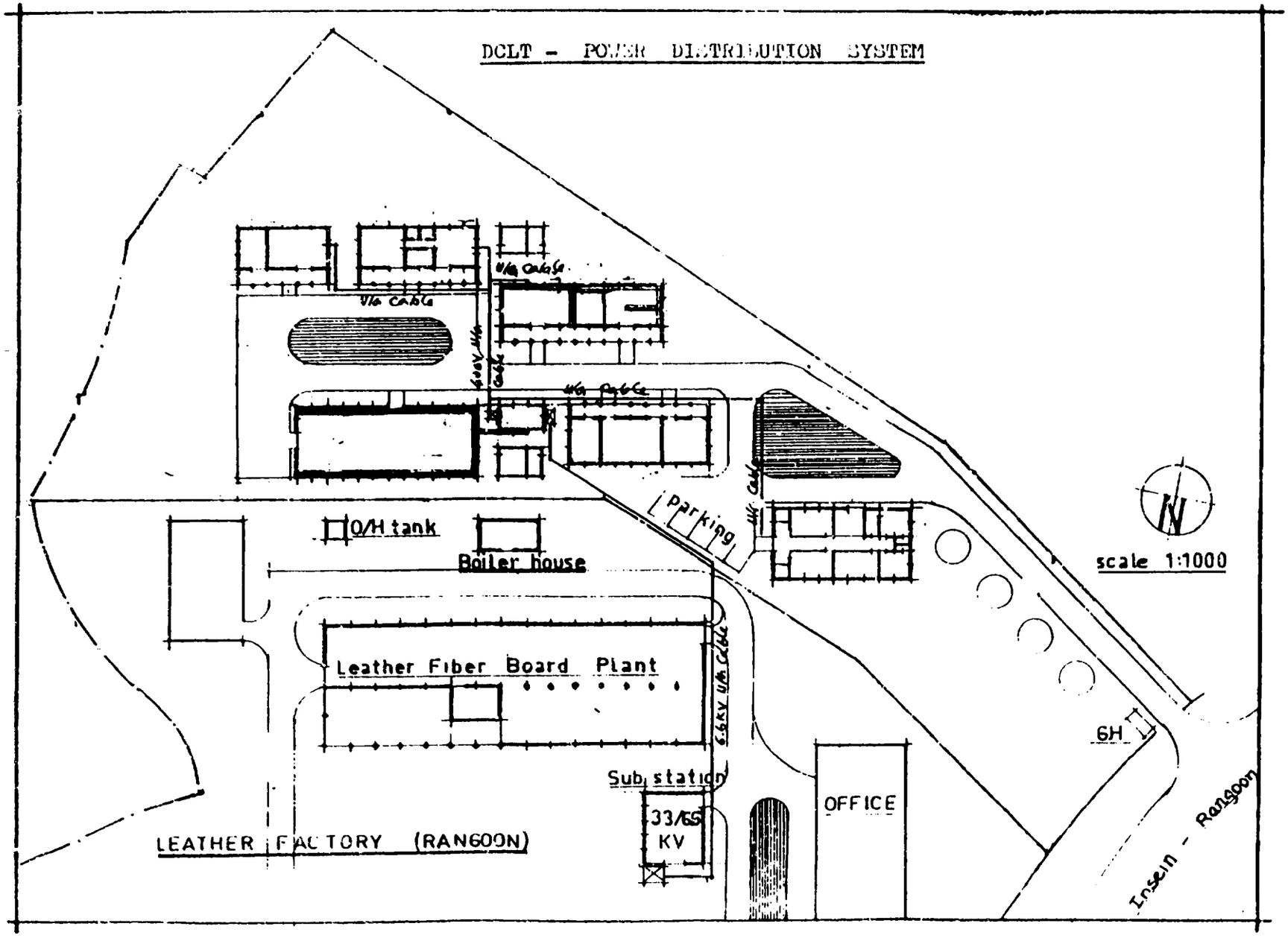
5.Administretion Dept.

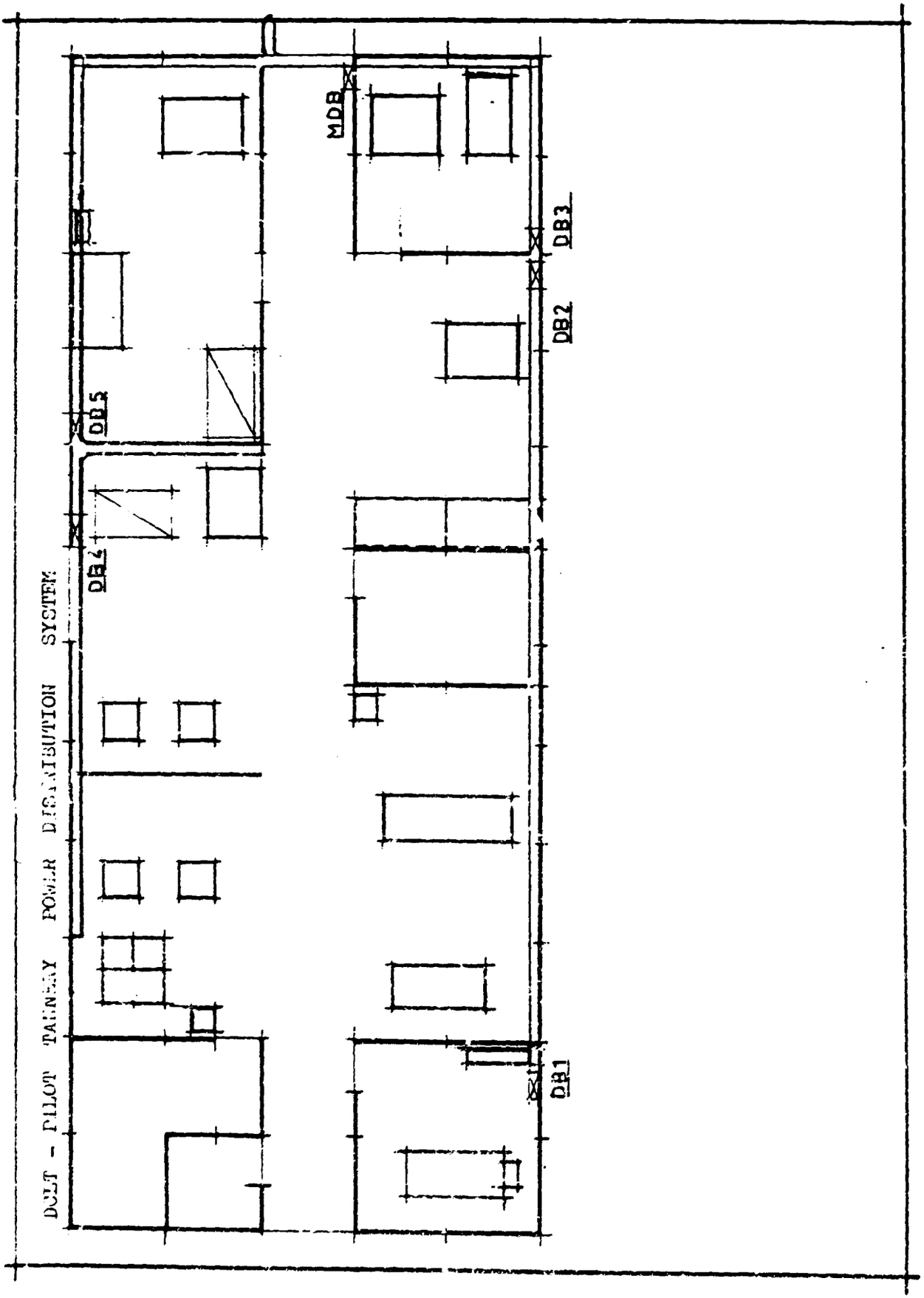
6.Information Dept.

7.W.C.

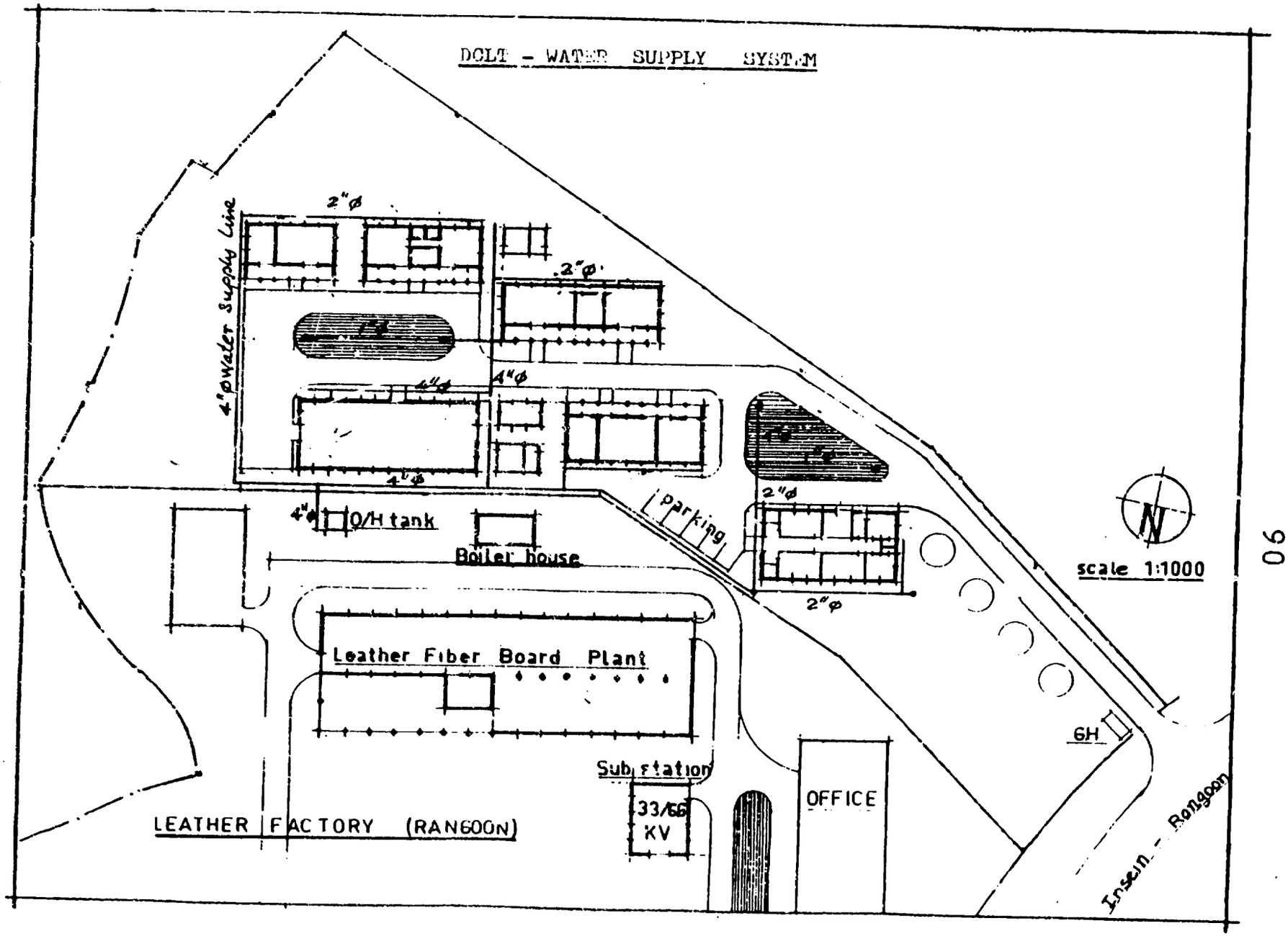
8. Entrance

DCLT-19

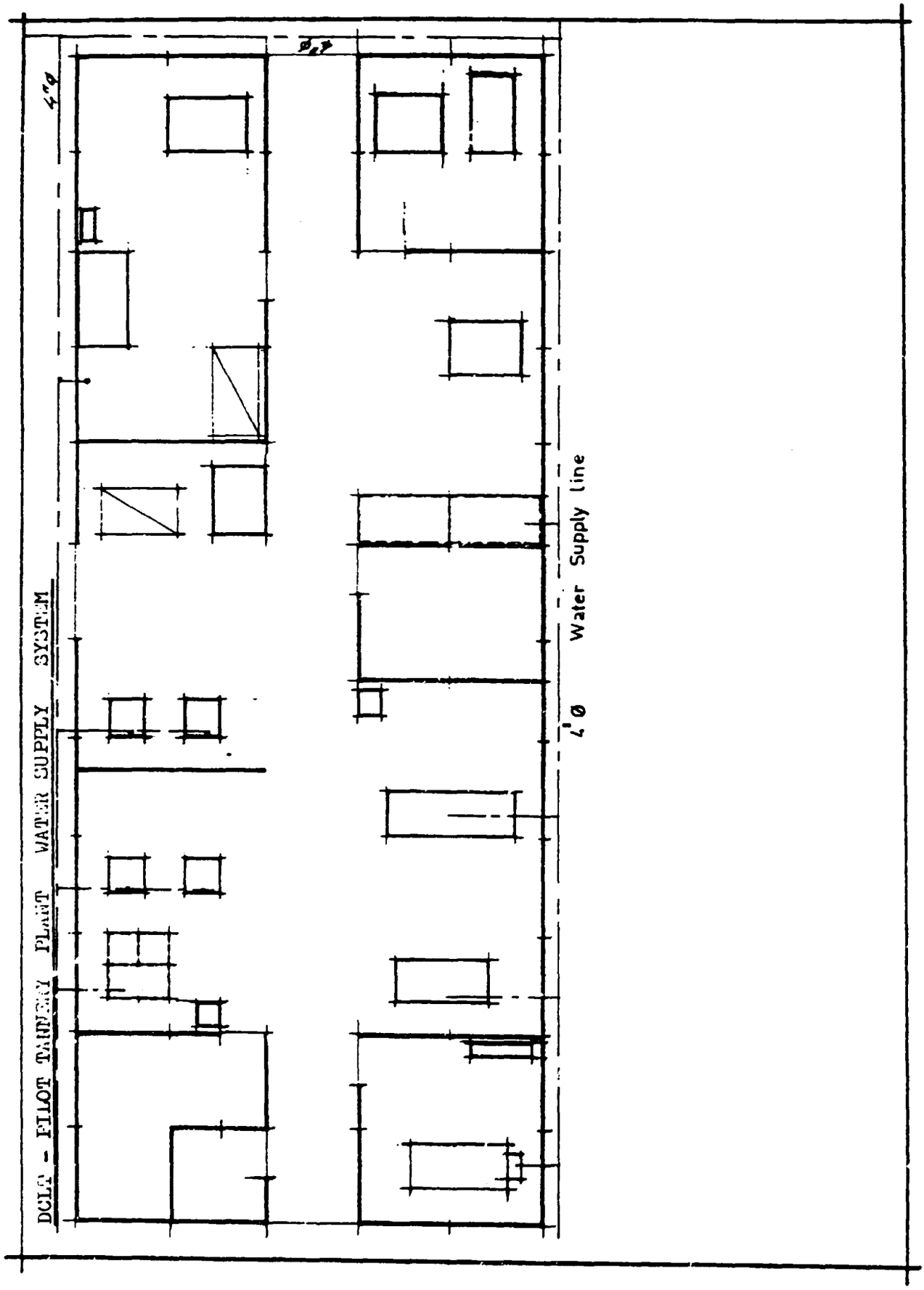

DCLT - POWER DISTRIBUTION SYSTEM
O/H tank
Boiler house
Parking
Leather Fiber Board Plant
Sub station
33/6.6 KV
OFFICE
6H
LEATHER FACTORY (RANGOON)
Insein - Rangoon
scale 1:1000
N

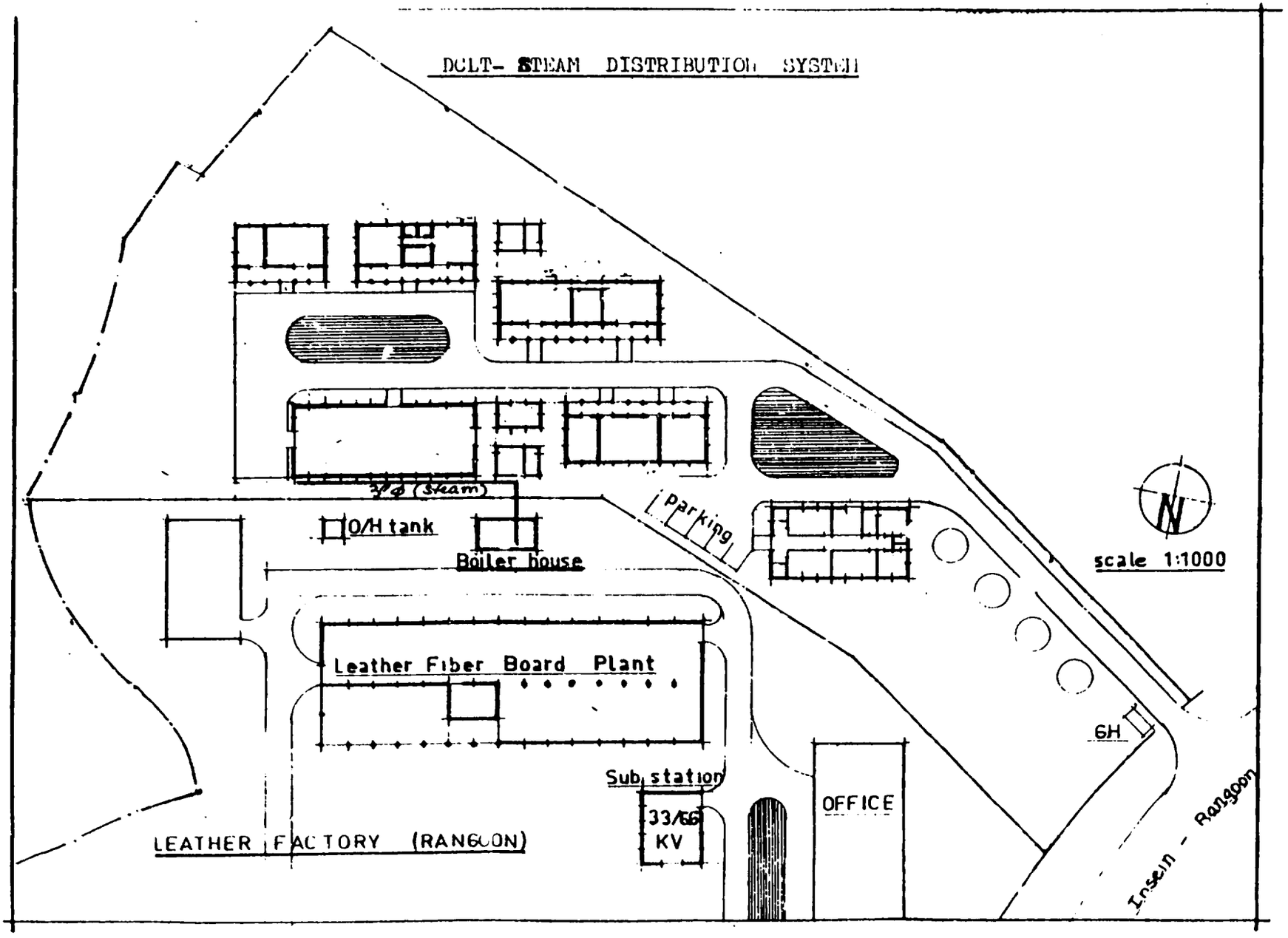


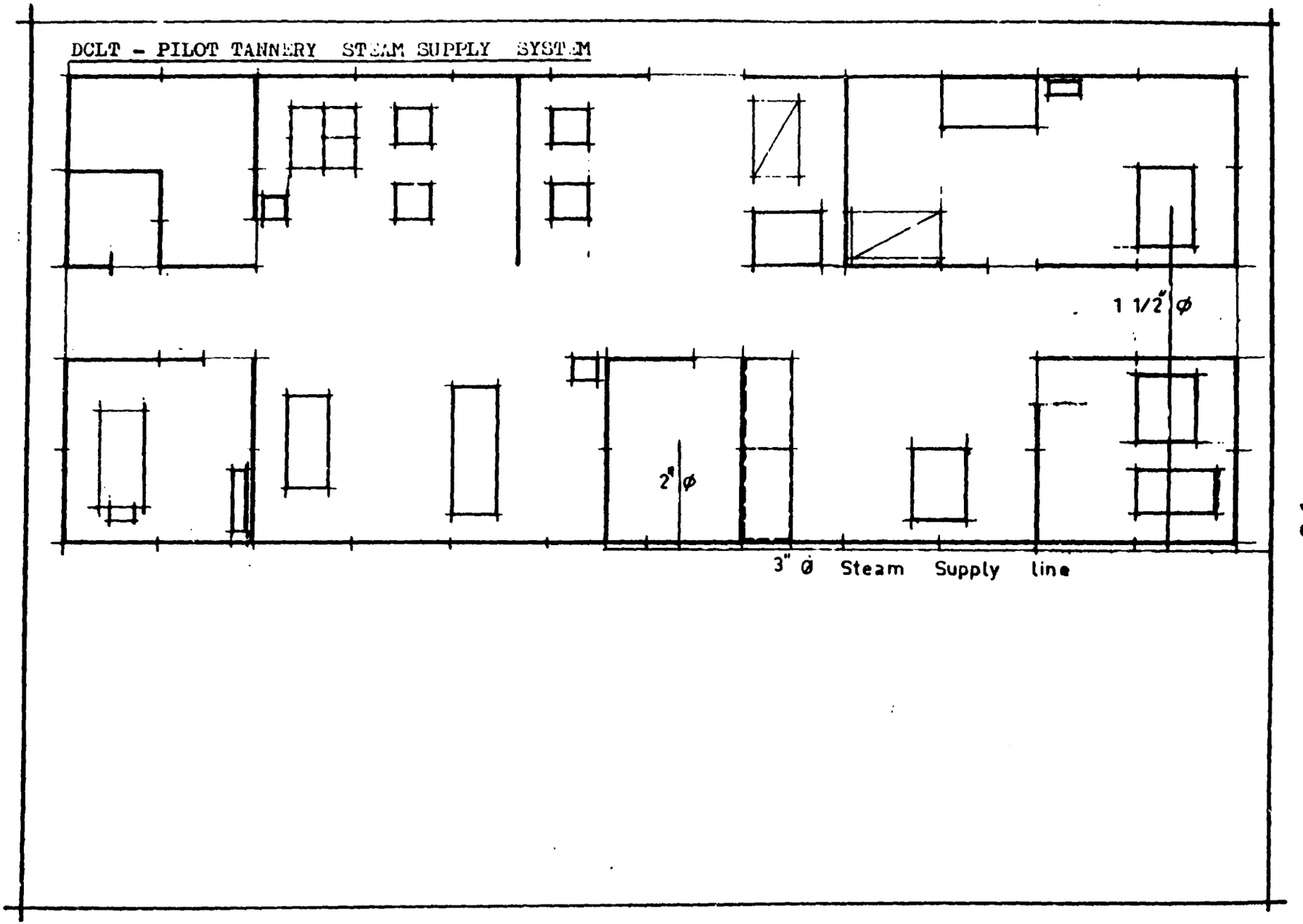
DCLT - PILOT TANNERY POWER DISTRIBUTION SYSTEM


DCLT - WATER SUPPLY SYSTEM
4"ϕ water Supply Line
2"ϕ
2"ϕ
4"ϕ
4"ϕ
4"ϕ
4"ϕ
O/H tank
Boiler house
parking
2"ϕ
2"ϕ
N
scale 1:1000
Leather Fiber Board Plant
Sub station
33/66 KV
OFFICE
GH
LEATHER FACTORY (RANGOON)
Insein - Rangoon

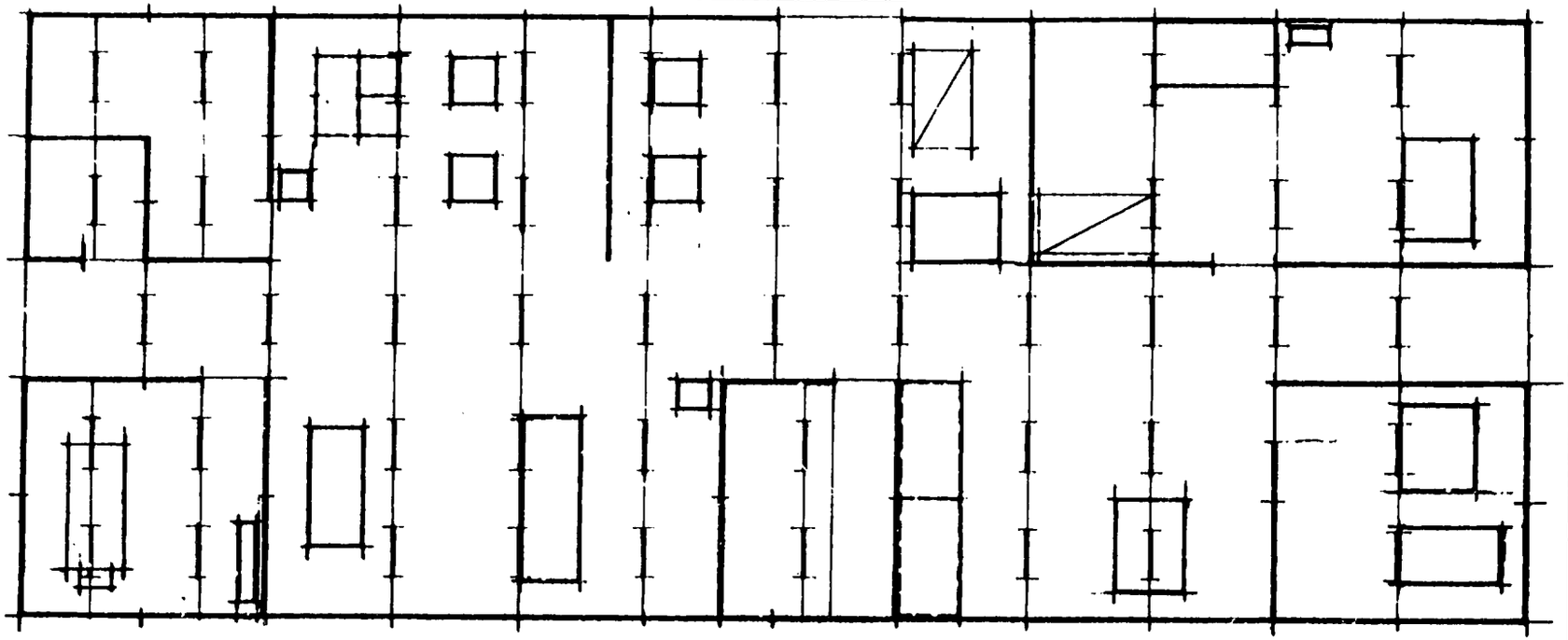
06


DCLC - PILOT TANNERY PLANT WATER SUPPLY SYSTEM
4'0
Water Supply line


DCLT- STEAM DISTRIBUTION SYSTEM
3/Φ (Steam)
O/H tank
Boiler house
Parking
N
scale 1:1000
Leather Fiber Board Plant
6H
Sub station
33/66 KV
OFFICE
LEATHER FACTORY (RANGOON)
Insein - Rangoon

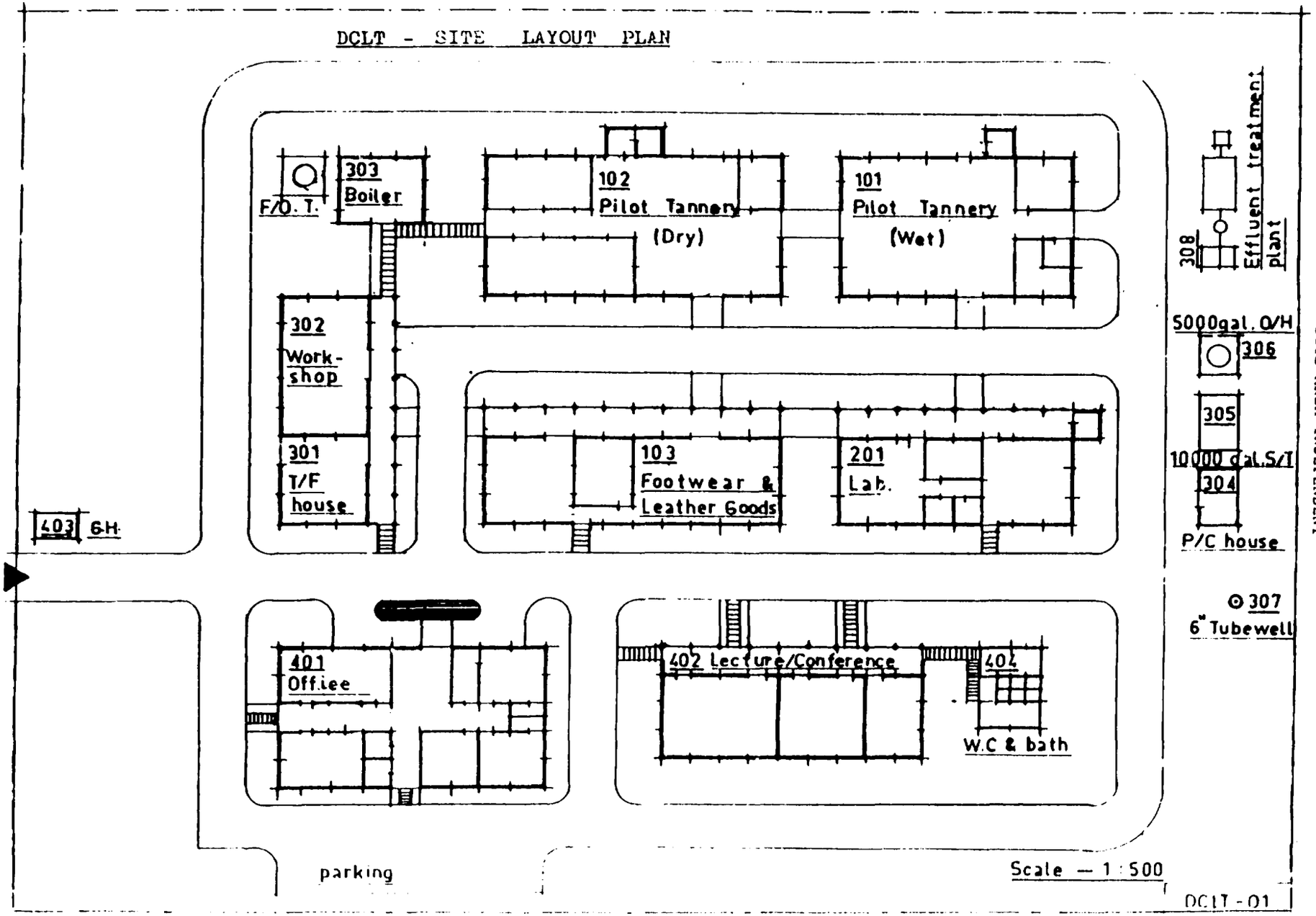

DCLT - PILOT TANNERY STEAM SUPPLY SYSTEM
1 1/2" ϕ
2" ϕ
3" ϕ Steam Supply line

DCLP- PILOT TANNERY PLANT (LIGHTING PLAN)

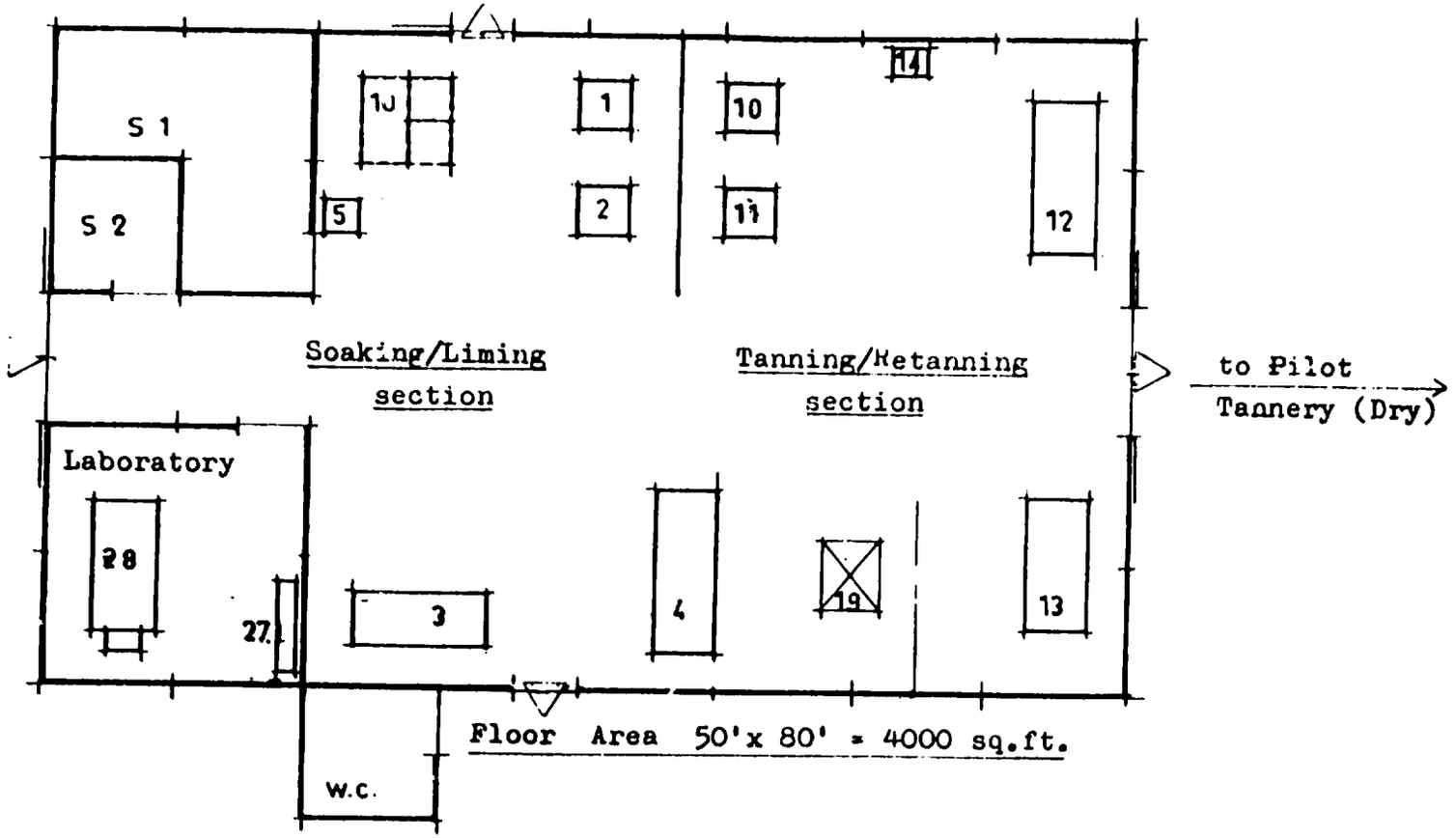


FLuorescent Lamp.

DCLT - SITE LAYOUT PLAN



DCLT - PILOT TANNERY (WET)



Floor Area 50'x 80' = 4000 sq.ft.

1-2-10-11. Steel Drums

5-14. Scale Balance

3. Fleshing Machine

4. Ex-lime Splitting Machine

12. Sammying Machine

13. Shaving Machine

27. Wacker Apparatus

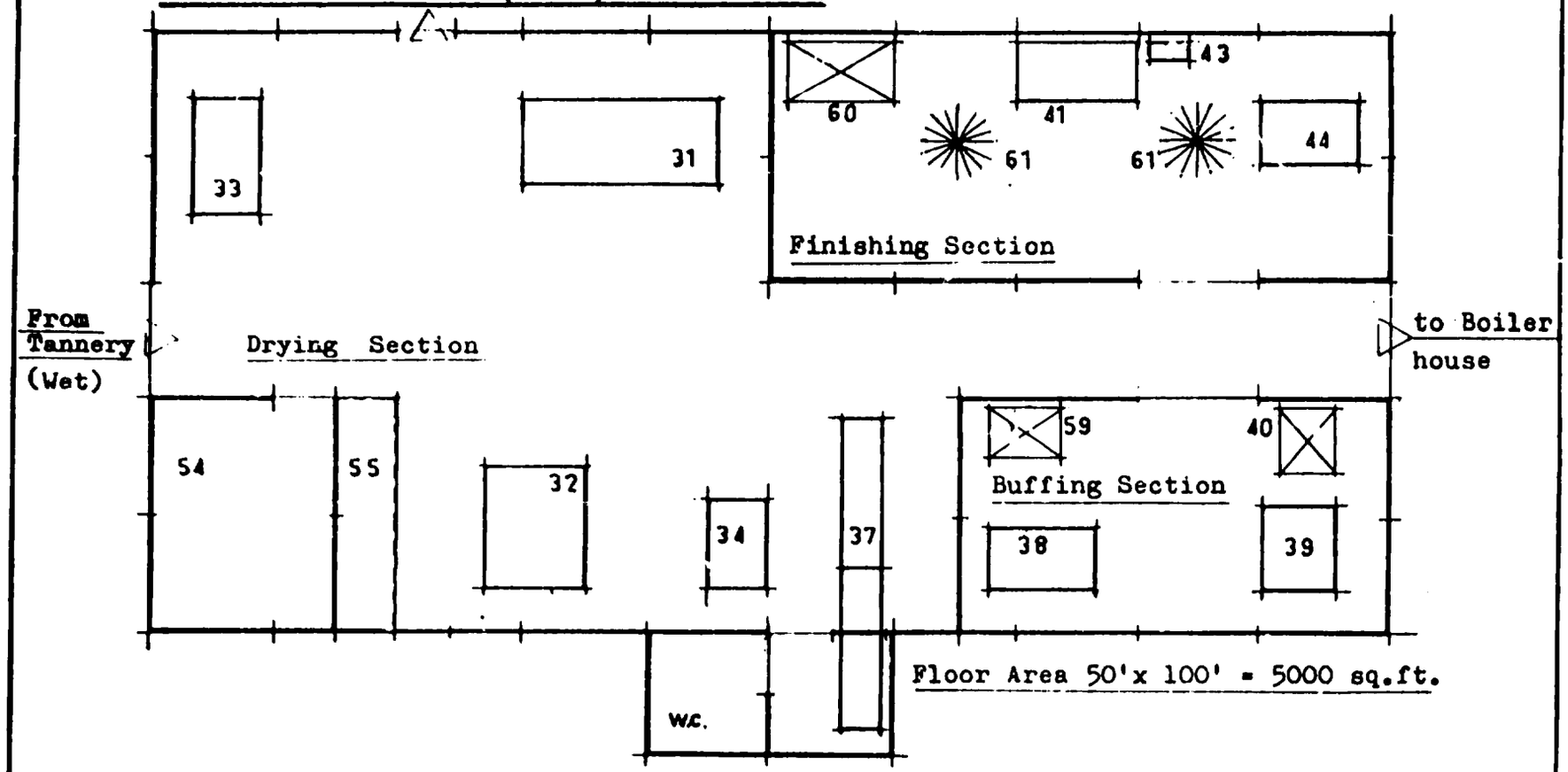
28. Laboratory Table

19. Selection and Trimming Table

S1. Raw Store S2. Chemical Store

DC LT-05

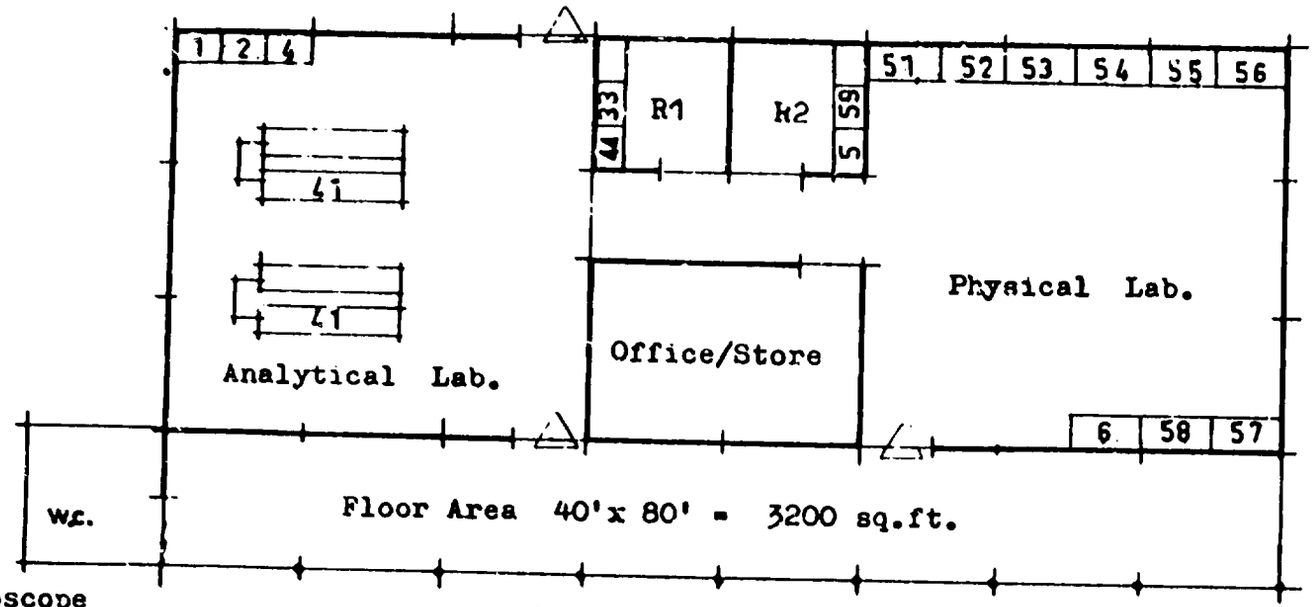
DCLT - PILOT TANNERY (DRY) LAYOUT PLAN



33. Sammying/Setting Machine
31. Vacuum Dryer
32. Molissa Staking Machine
34. Schoedel Staking Machine
37. Toggle Dryer
38. Buffing Machine
39. Stone Polishing Wheel
41. Hand Spraying Cabinet
43. Air-compressor
44. Embossing Press
54. Drying Room
55. Recondition
40. Cleaning Table
59. Selection and Trimming Table
60. Padding Table
61. Wheel For Hang Drying

DCLT-09

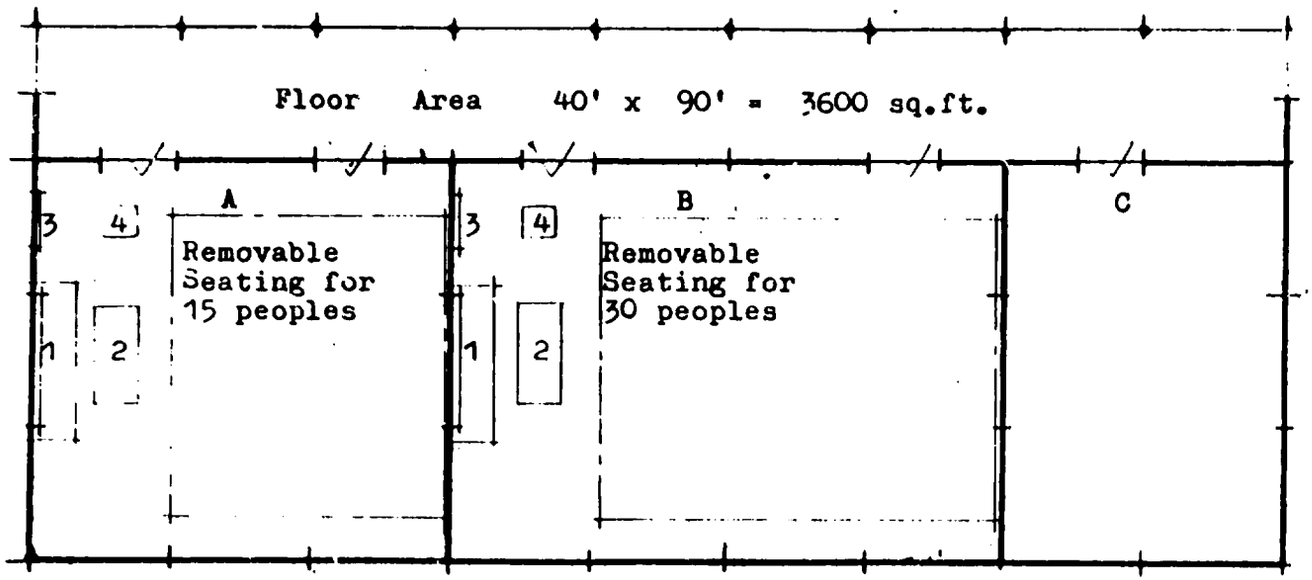
DCLT - LABORATORY LAYOUT PLAN



33. Microscope
44. Analytical Balance
59. Drying Oven
5. Muffle Oven
51. Flexometer
52. Tensile Strength Tester
53. Penetrometer
54 Tensometer
55. Rub Fastness Tester
56. Permeometer
57. Lastometer
58. Adhesion of Leather Finishing Tester
6. Leather Sample Grinding Machine
1. Distilled Water Apparatus
4. Water Bath Heater
2. Hot Water Boiler
41. Laboratory Table
R1. Analytical Balance Room
R2. Heating Oven Room

DCLT - 16

DCLT - LECTURE / CONFRRENCE HALL LAYOUT PLAN

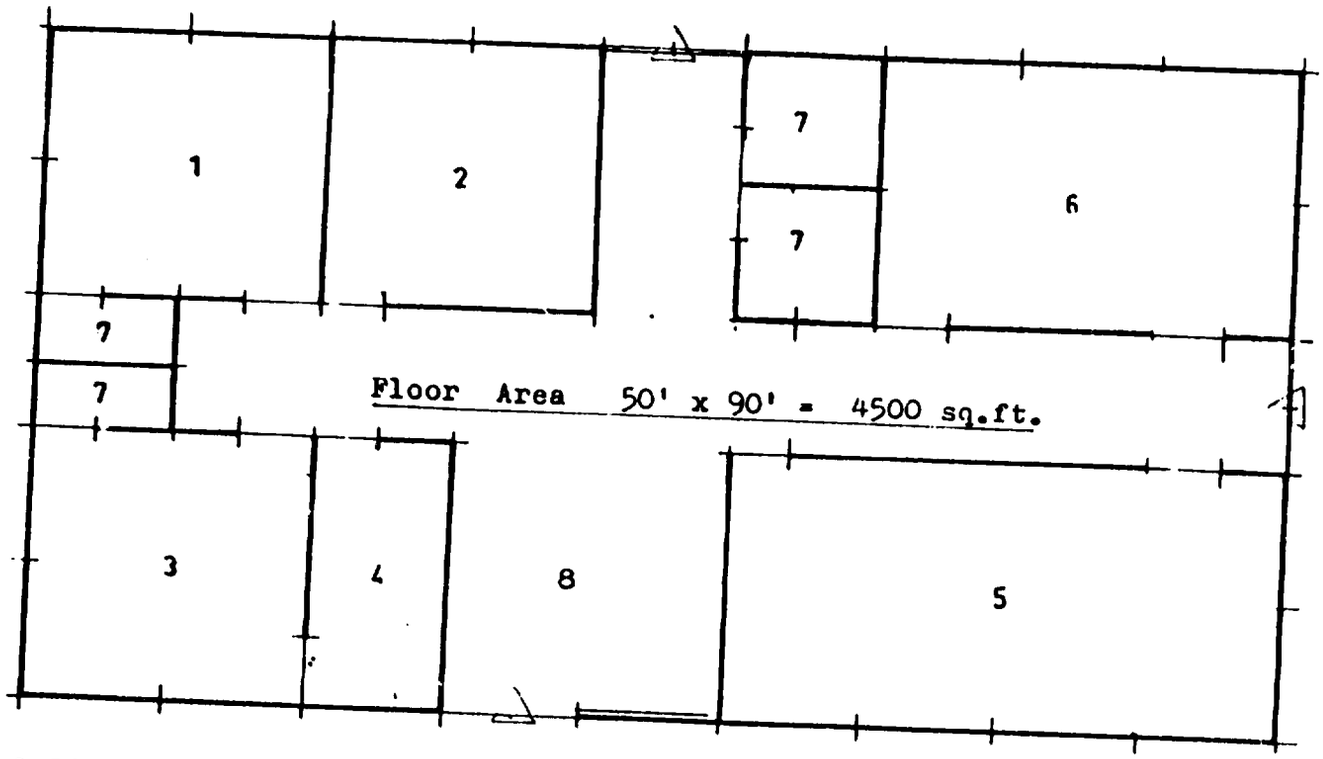


A. Lecture Room (A)
B. Lecture Room (B)
C. Recreation Room
1. Black-boa_d,Slide Screen and Platform
2. Demonstration Tab'e
3. Over Head Screen
4. Over Head Projector

Note:- Windows fitted with drawable Blackout Curtains.

DCLT 22

DCLT - OFFICE PLAN



1.Director Room

2.Meeting Room

3.Expert Room

4.Kitchen

5.Administration Dept.

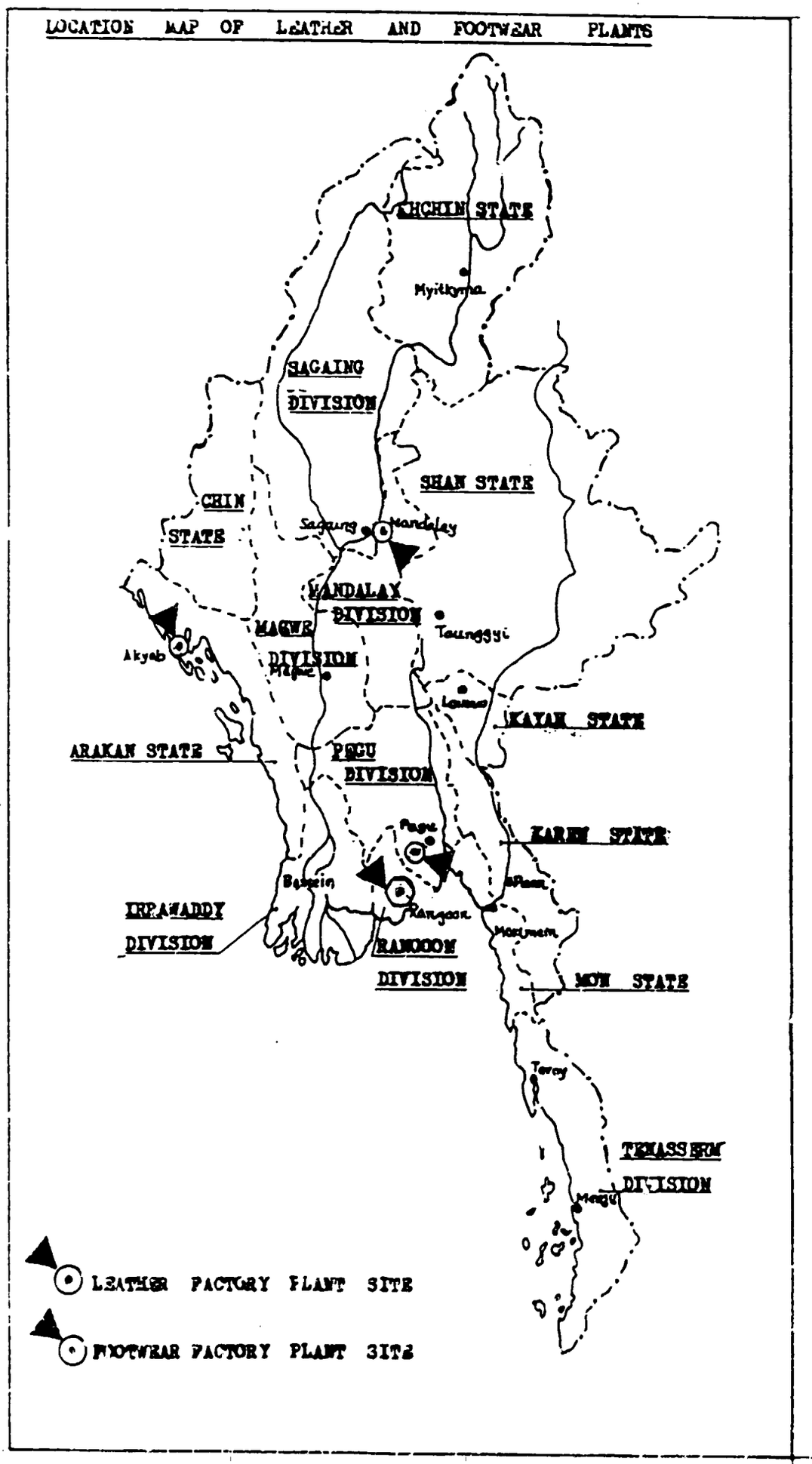
6.Information Dept.

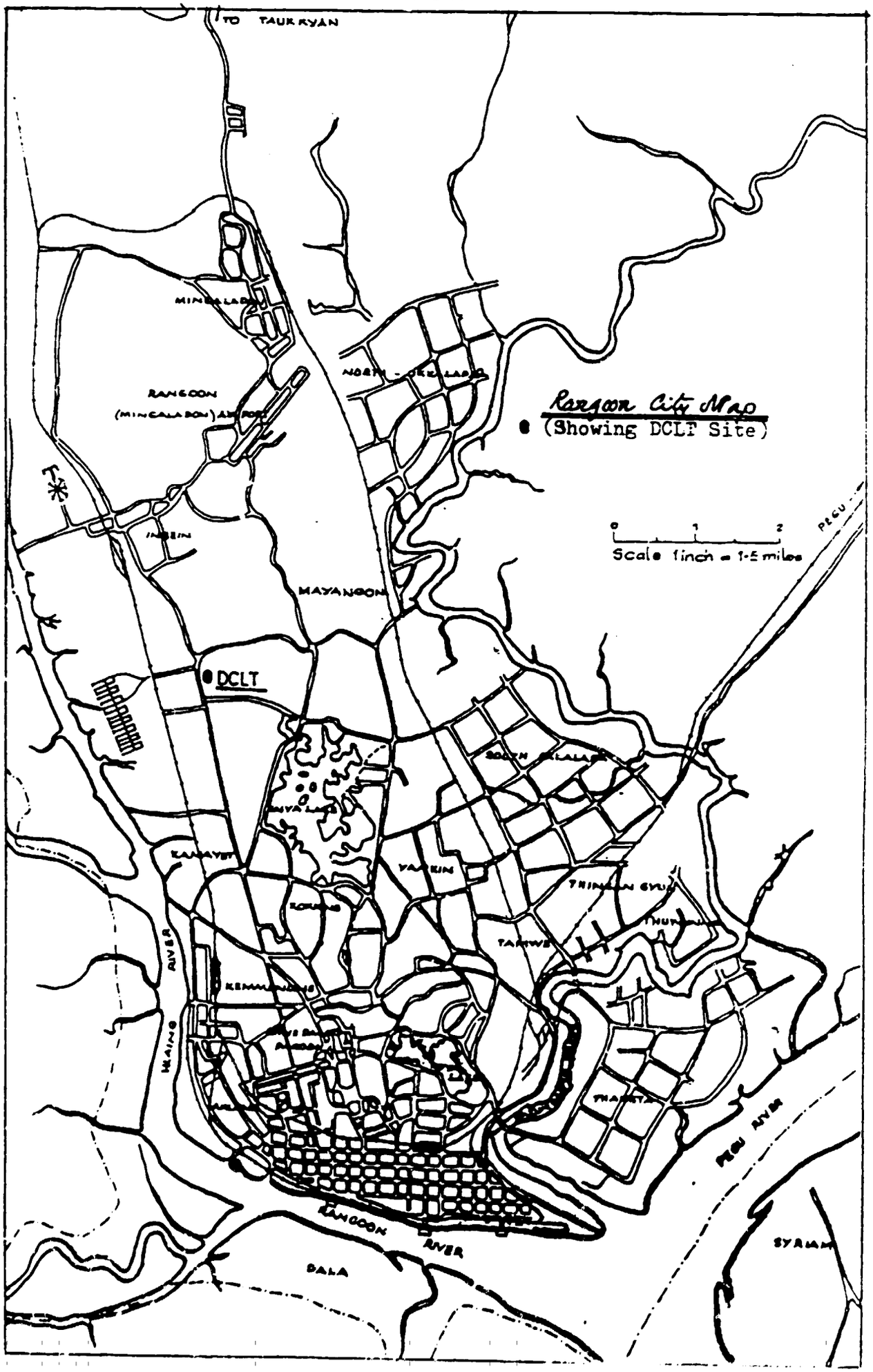
7.W.C.

8. Entrance

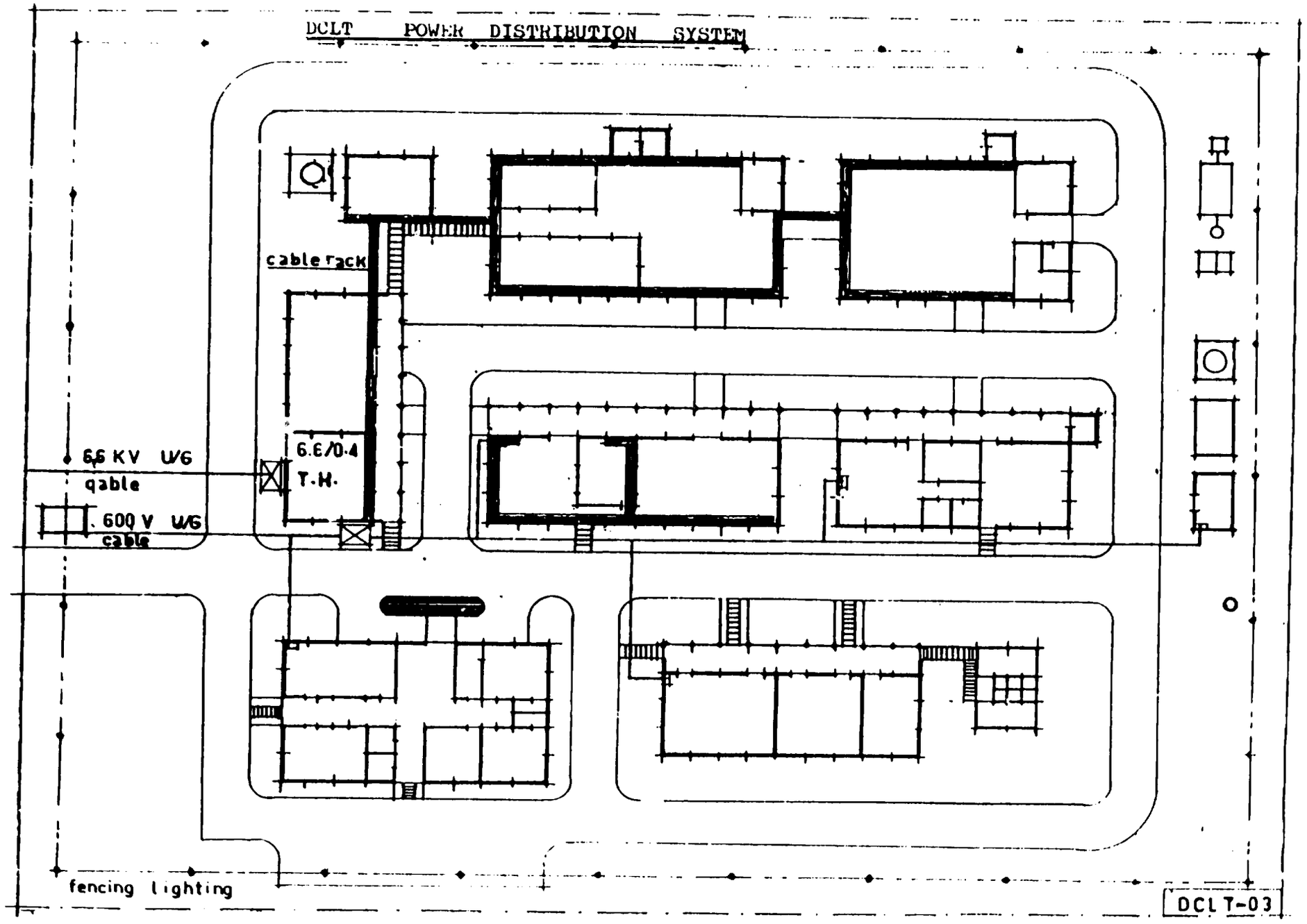
100

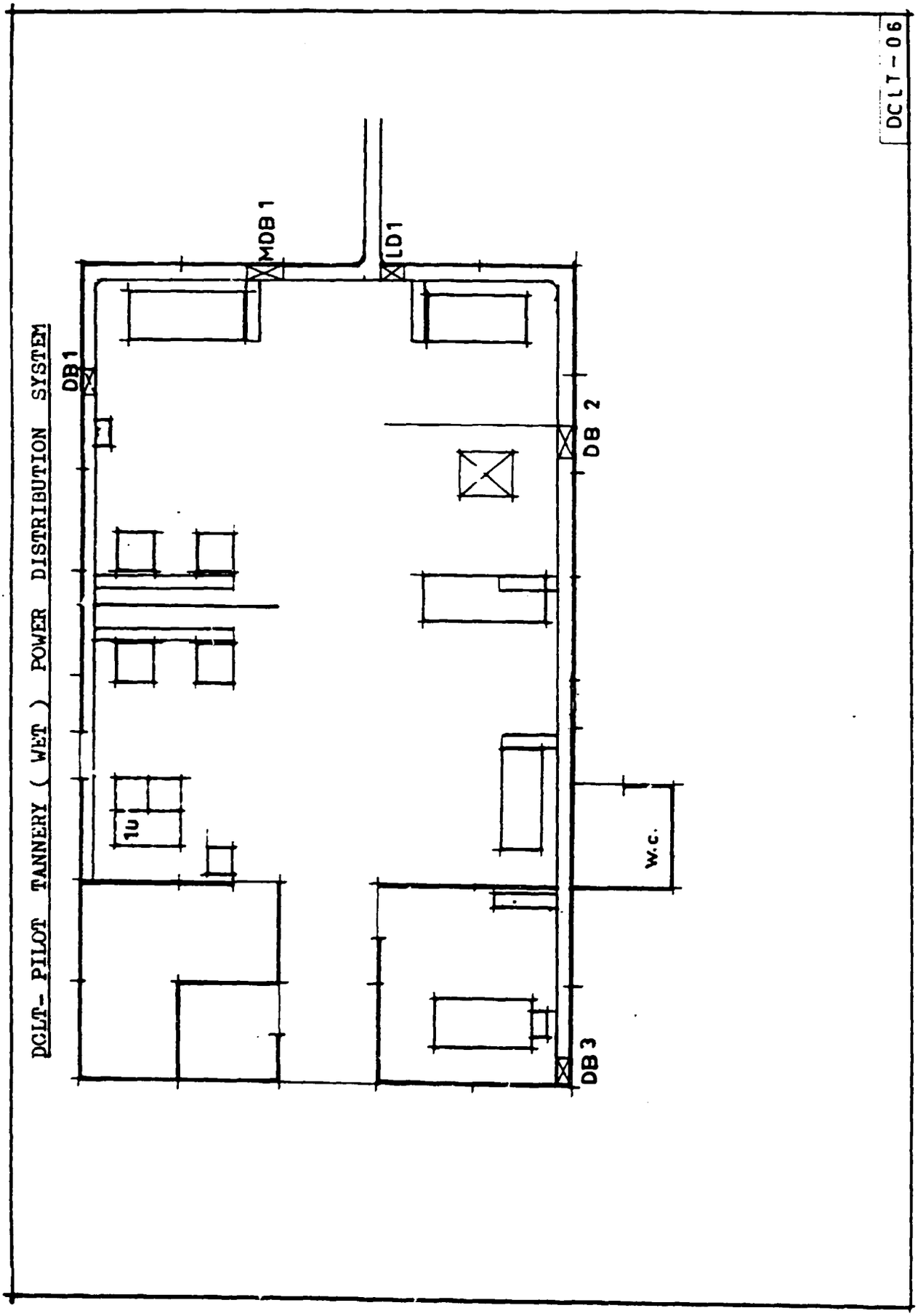
DCLT-19

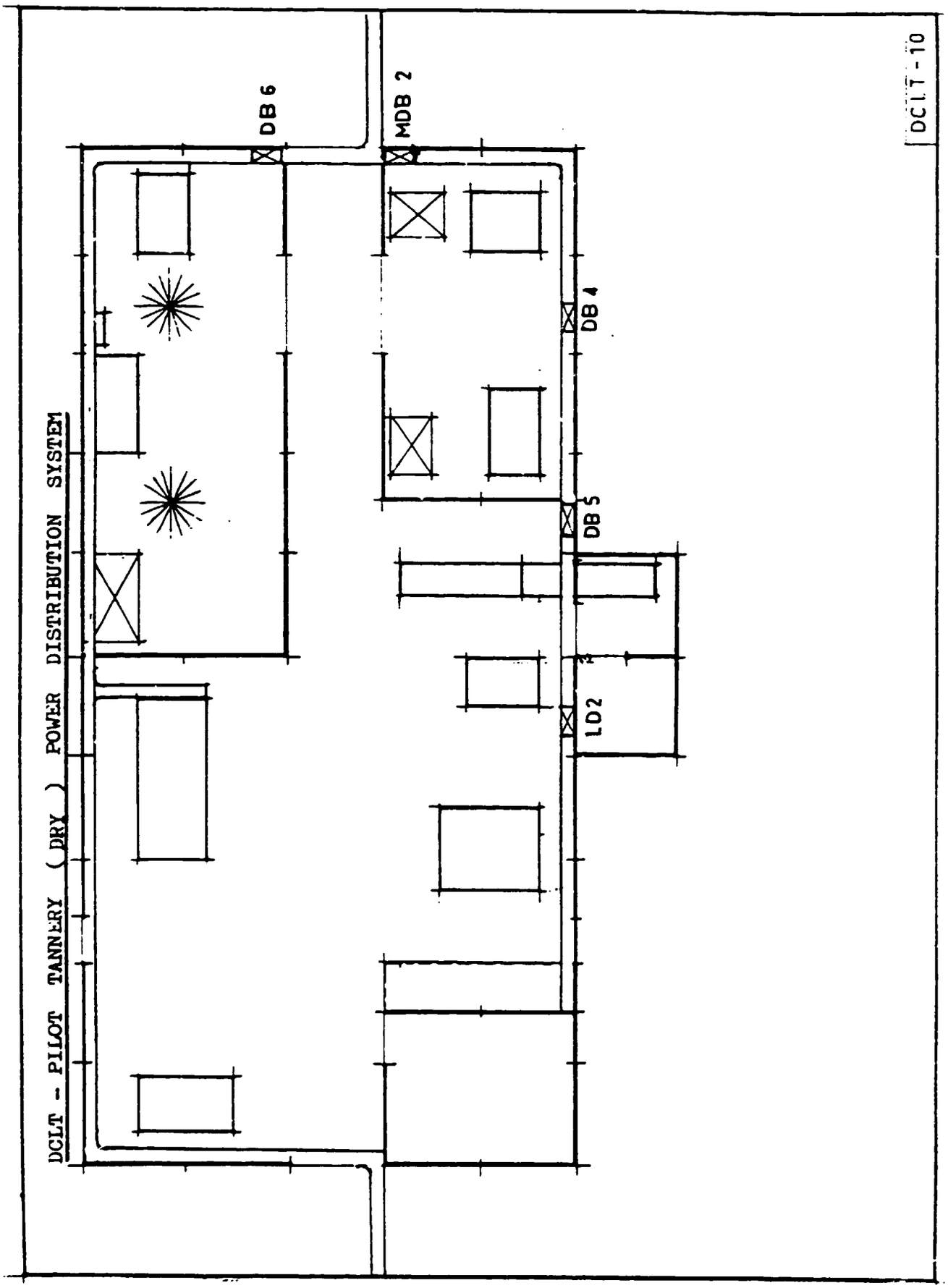

LOCATION MAP OF LEATHER AND FOOTWEAR PLANTS
KACHIN STATE
Myitkyina
SAGAING DIVISION
SHAN STATE
CHIN STATE
Sagaing
Mandalay
MANDALAY DIVISION
MAGWE DIVISION
Taunggyi
Akyab
Magwe
Loimwe
KAYAH STATE
ARAKAN STATE
PEGU DIVISION
Pegu
KAREN STATE
Bassein
Moulmein
IRRAWADDY DIVISION
Rangoon
RANGOON DIVISION
MON STATE
Tavoy
TENASSERIM DIVISION
Mergui
LEATHER FACTORY PLANT SITE
FOOTWEAR FACTORY PLANT SITE



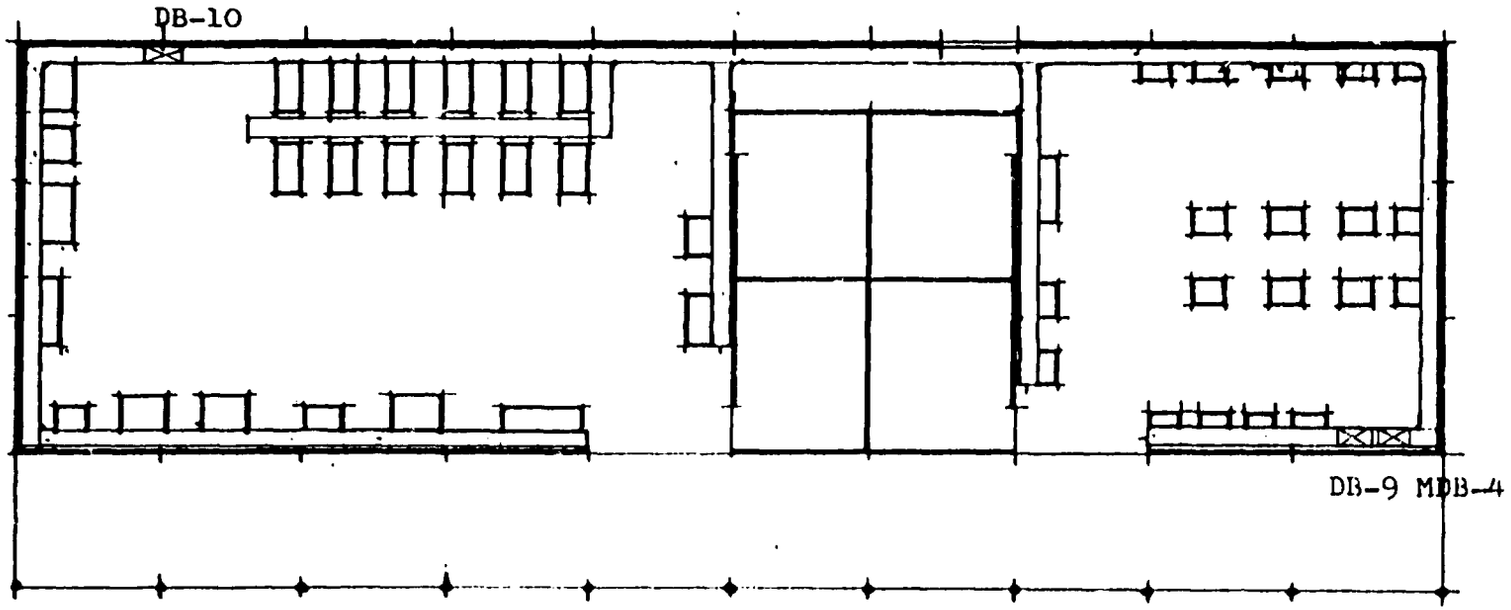
Rangoon City Map
(Showing DCLT Site)


DCLT POWER DISTRIBUTION SYSTEM
cable rack
6.6/0.4
T.H.
6.6 KV U/G
qable
600 V U/G
cable
fencing lighting
DCLT-03


DCLT-06
DCLT- PILOT TANNERY (WET) POWER DISTRIBUTION SYSTEM
MDB 1
LD1
DB 1
DB 2
DB 3
W.C.

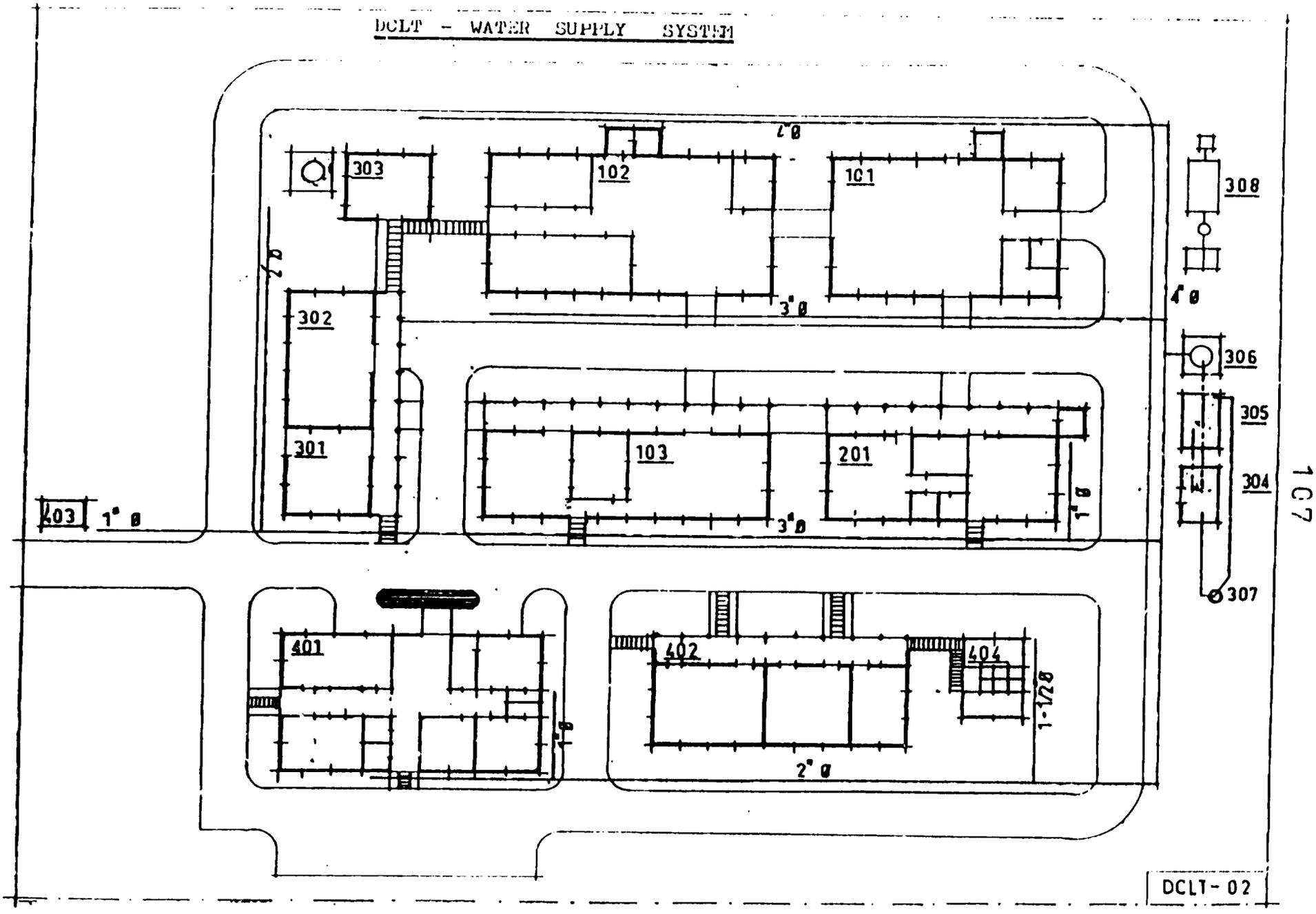

DCLT - PILOT TANNERY (DRY) POWER DISTRIBUTION SYSTEM
DB 6
MDB 2
DB 4
DB 5
LD2
DCLT-10

DCLT- FOOTWEAR AND LEATHER PRODUCTS PILOT PLANT POWER DISTRIBUTION SYSTEM

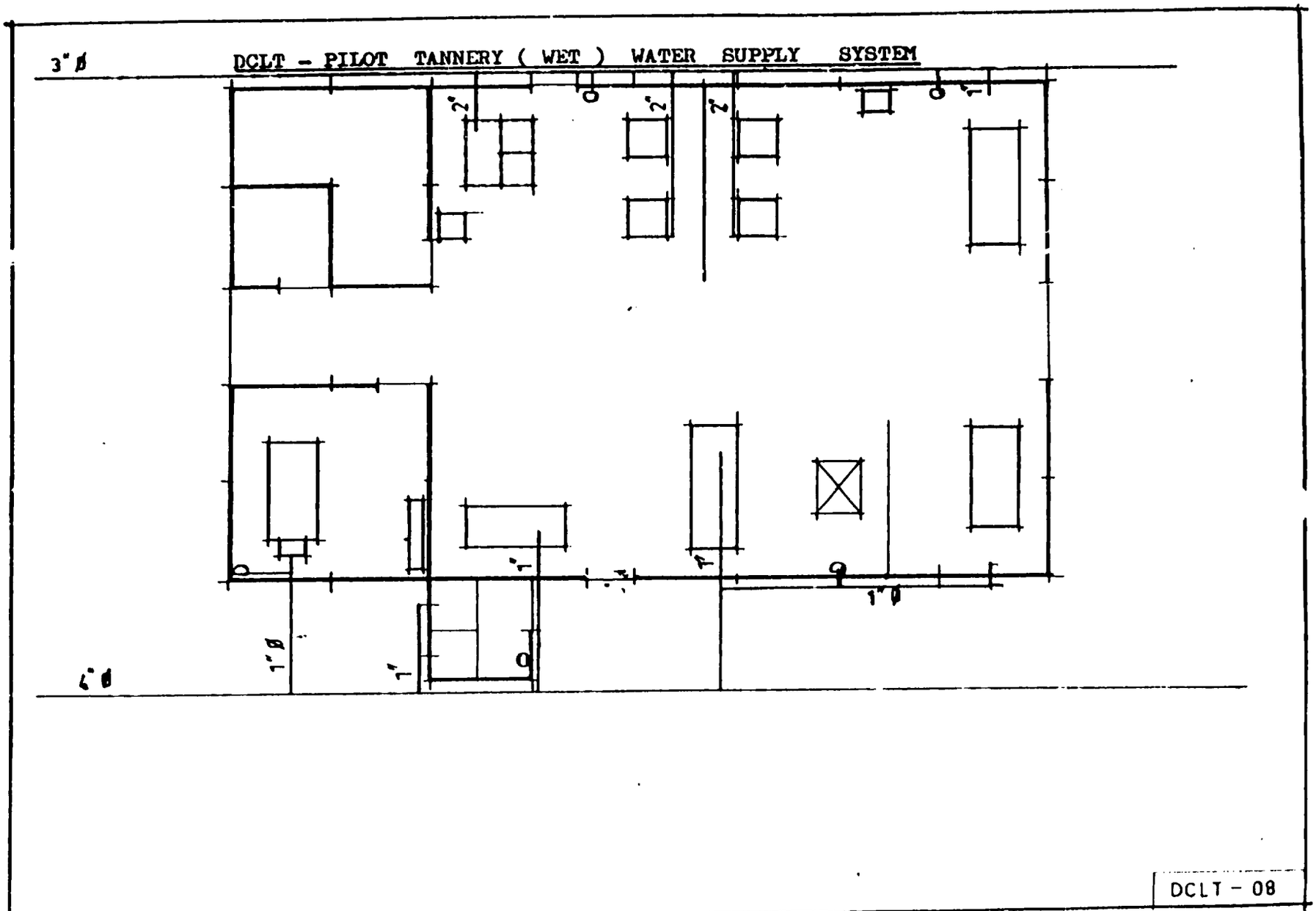


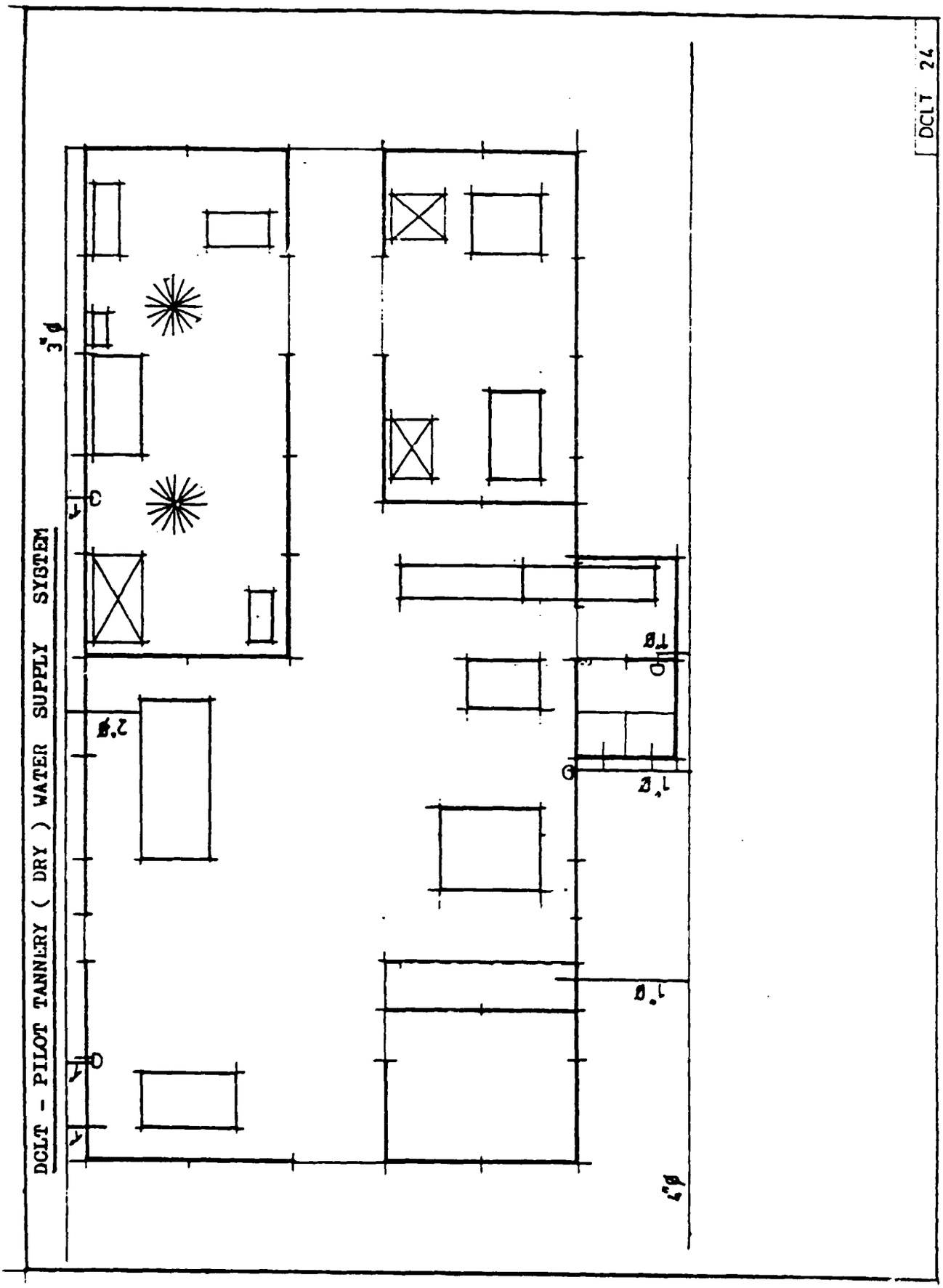
DCLT - 3

DCLT - WATER SUPPLY SYSTEM

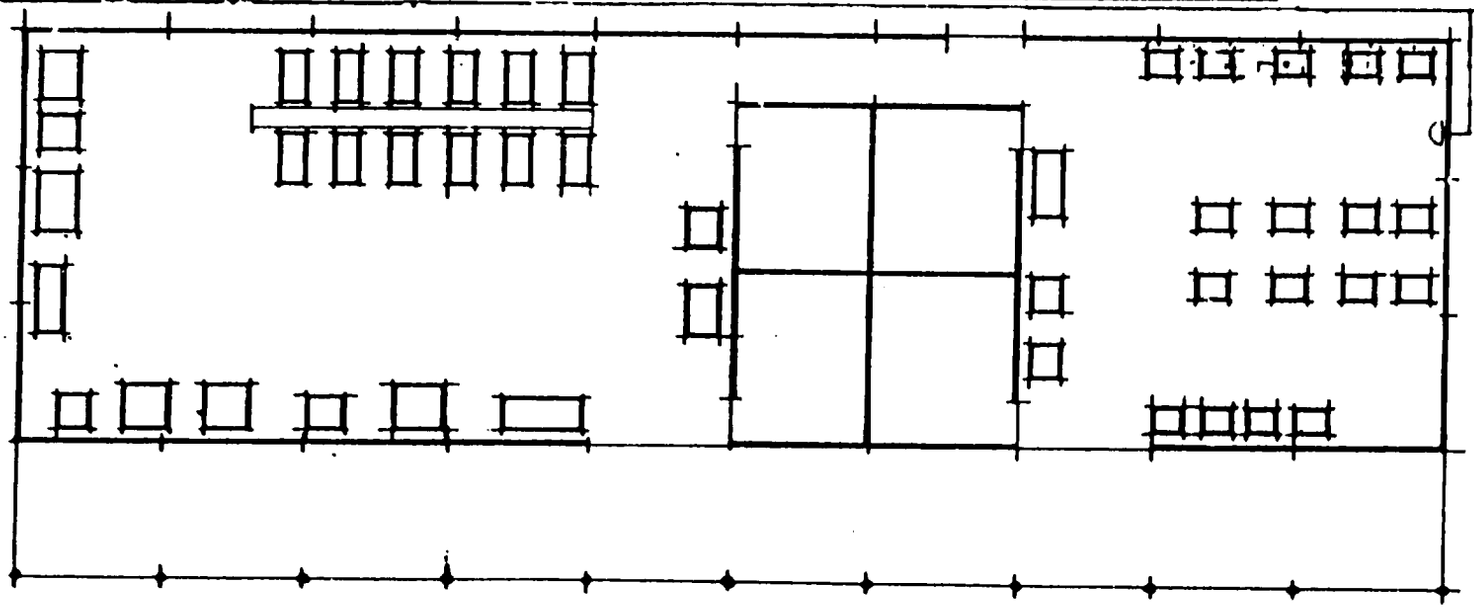


DCLT-02


DCLT - PILOT TANNERY (WET) WATER SUPPLY SYSTEM
3"ø
2"
2"
2"
1"
1"
1"
1"ø
1"ø
1"
6"ø
DCLT - 08

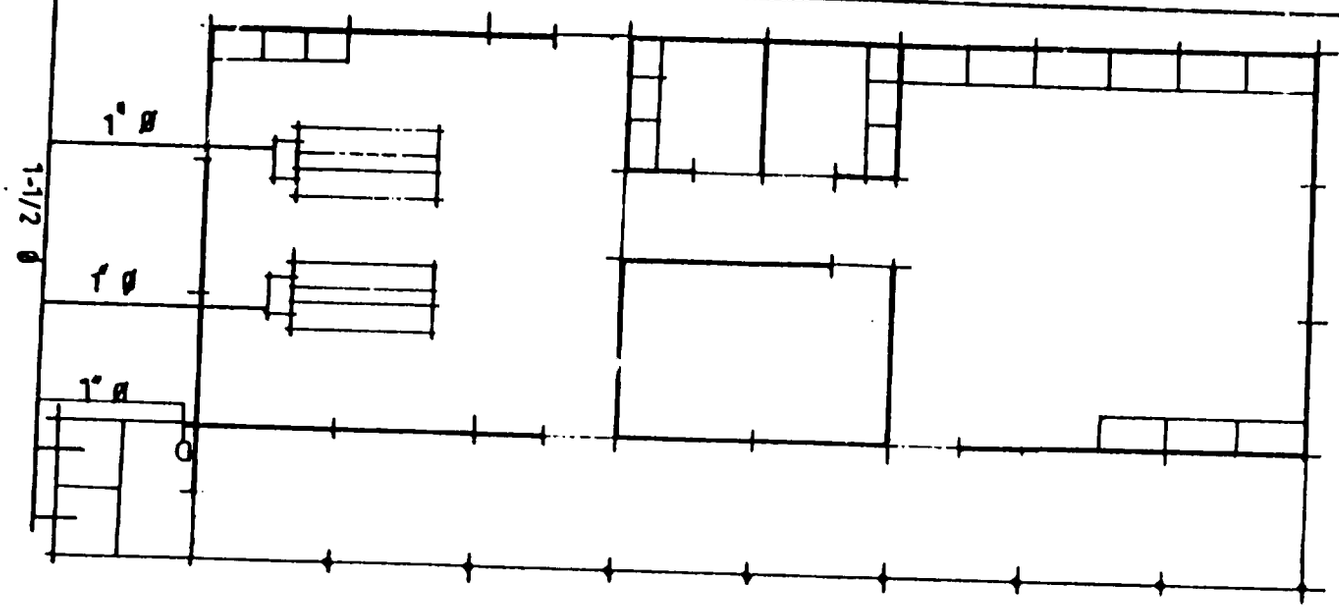

DCLT 24
DCLT - PILOT TANNERY (DRY) WATER SUPPLY SYSTEM

DCLT- FOOTWEAR AND LEATHER PRODUCTS PILOT PLANT WATER SUPPLY SYSTEM

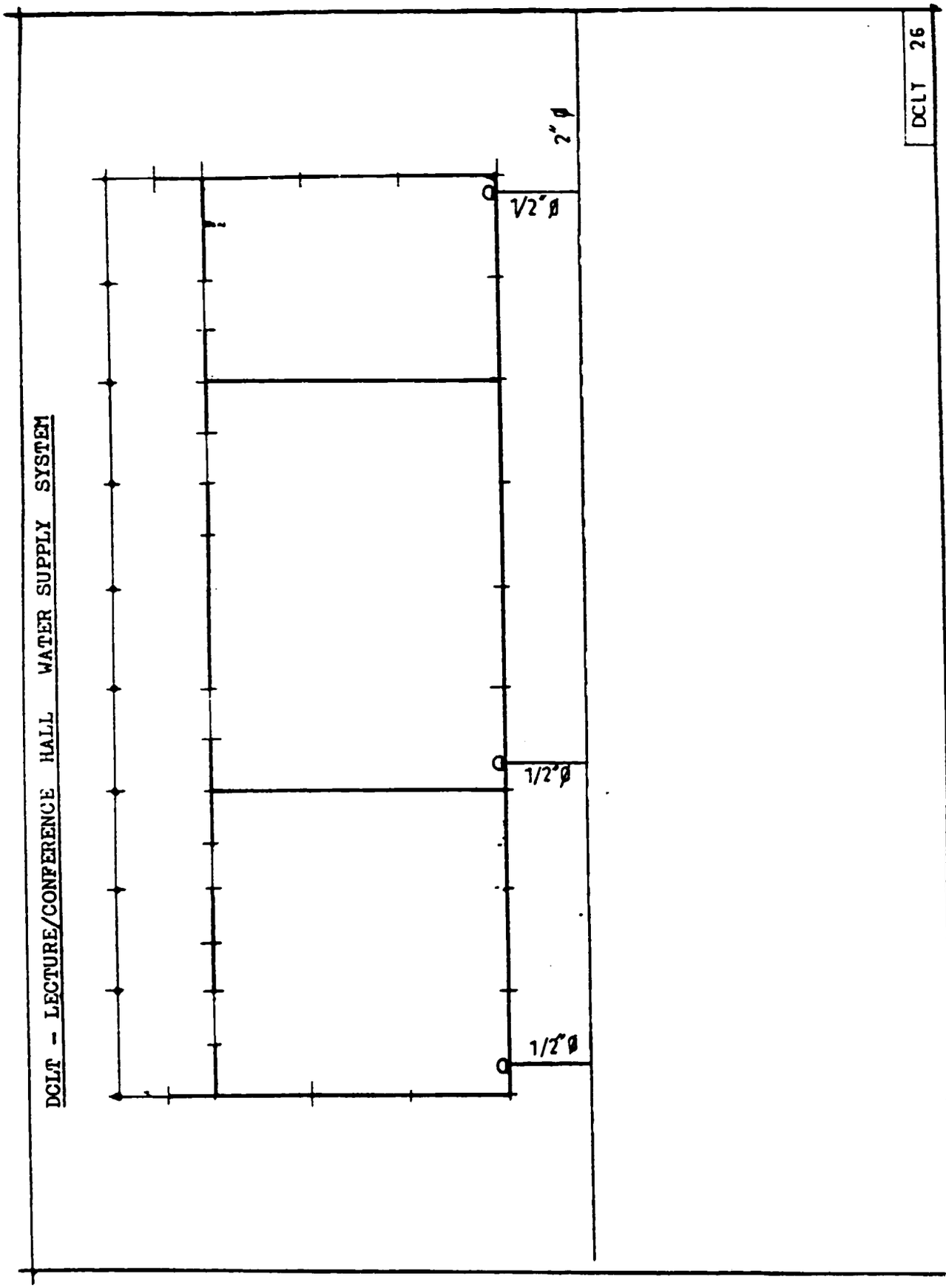


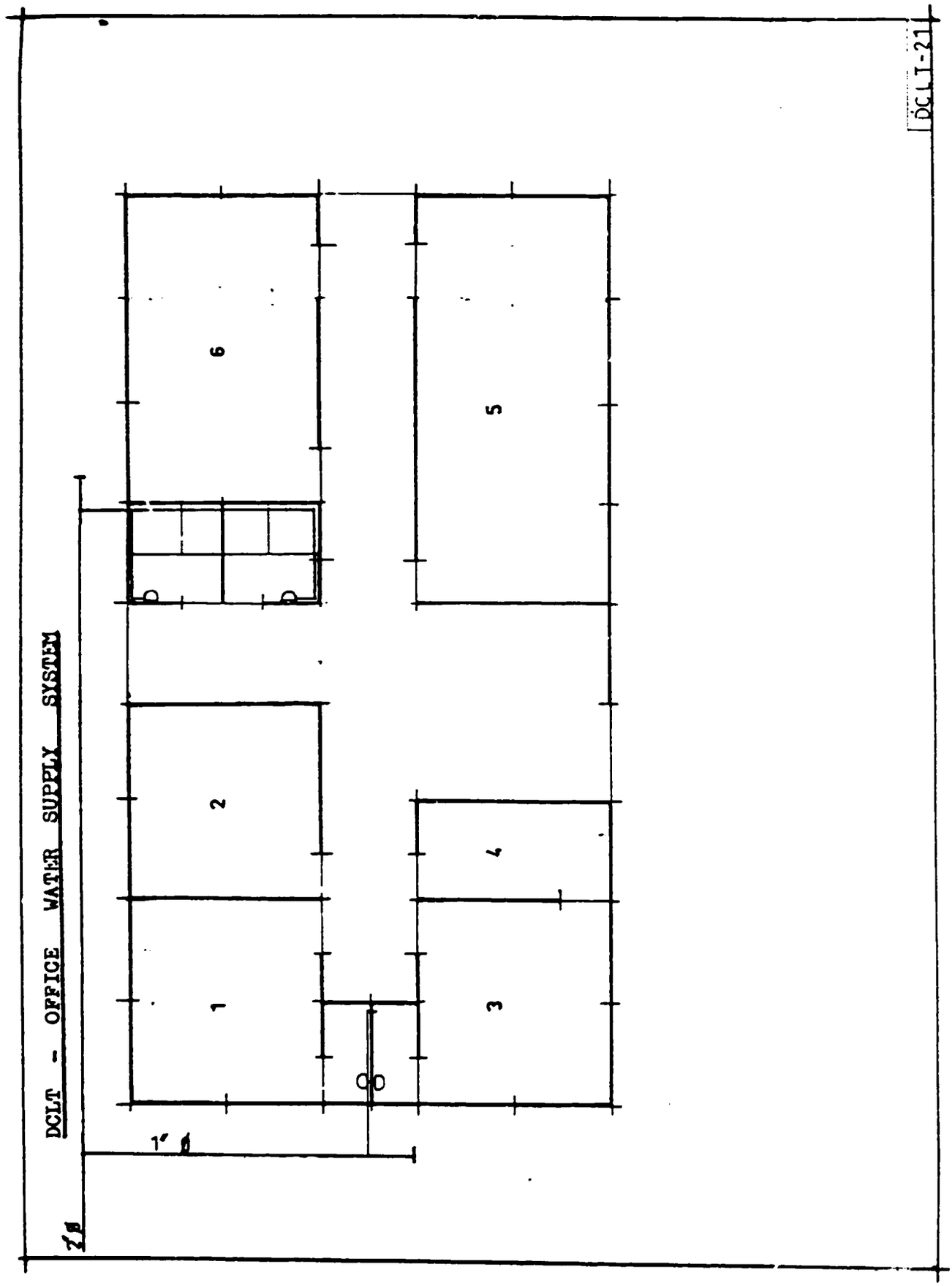
DCLT-31

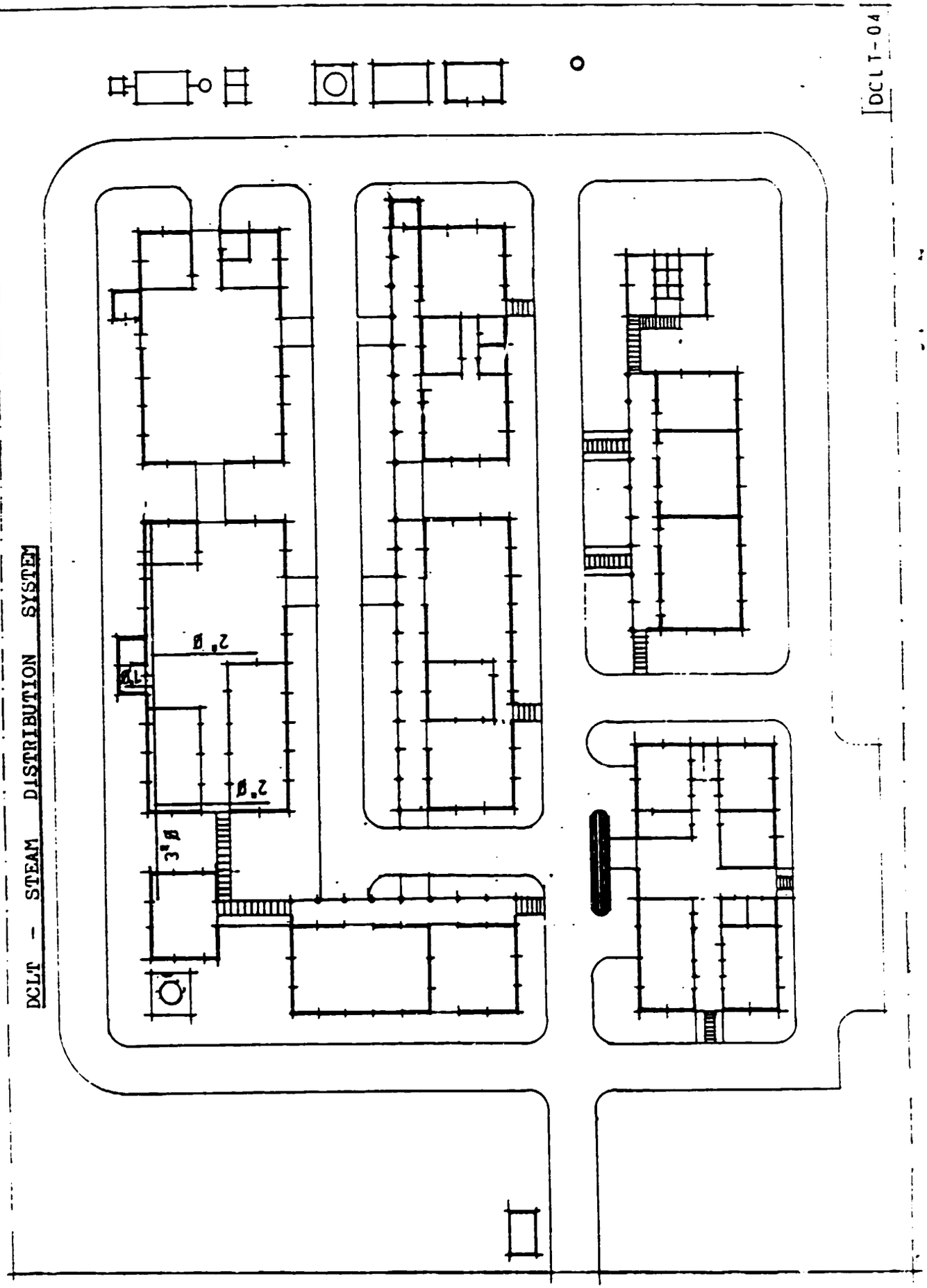
DCLT - LABORATORY WATER SUPPLY SYSTEM

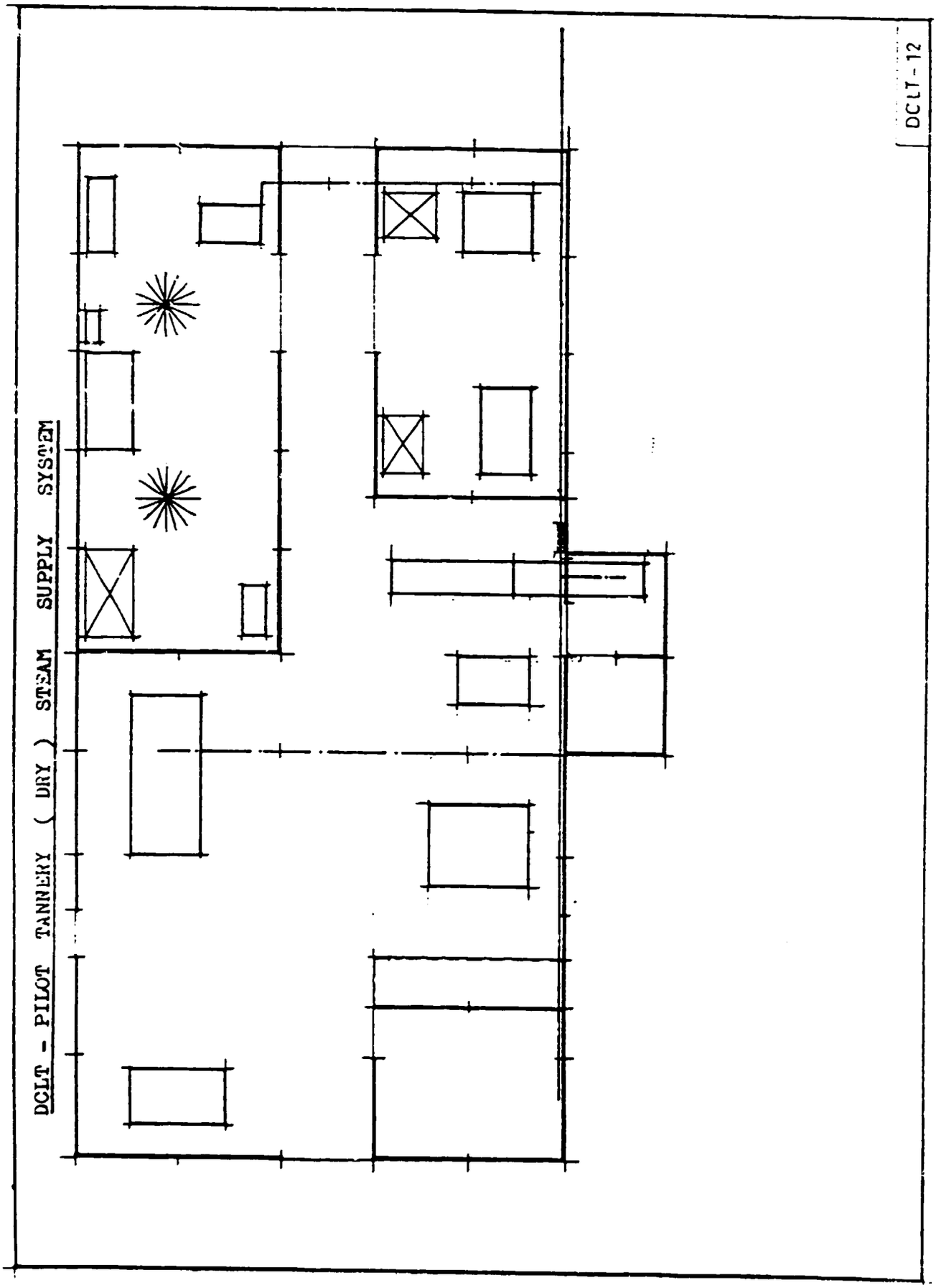


DCLT - 18


DCLT 26
2" ø
1/2" ø
1/2" ø
1/2" ø
DCLT - LECTURE/CONFERENCE HALL WATER SUPPLY SYSTEM

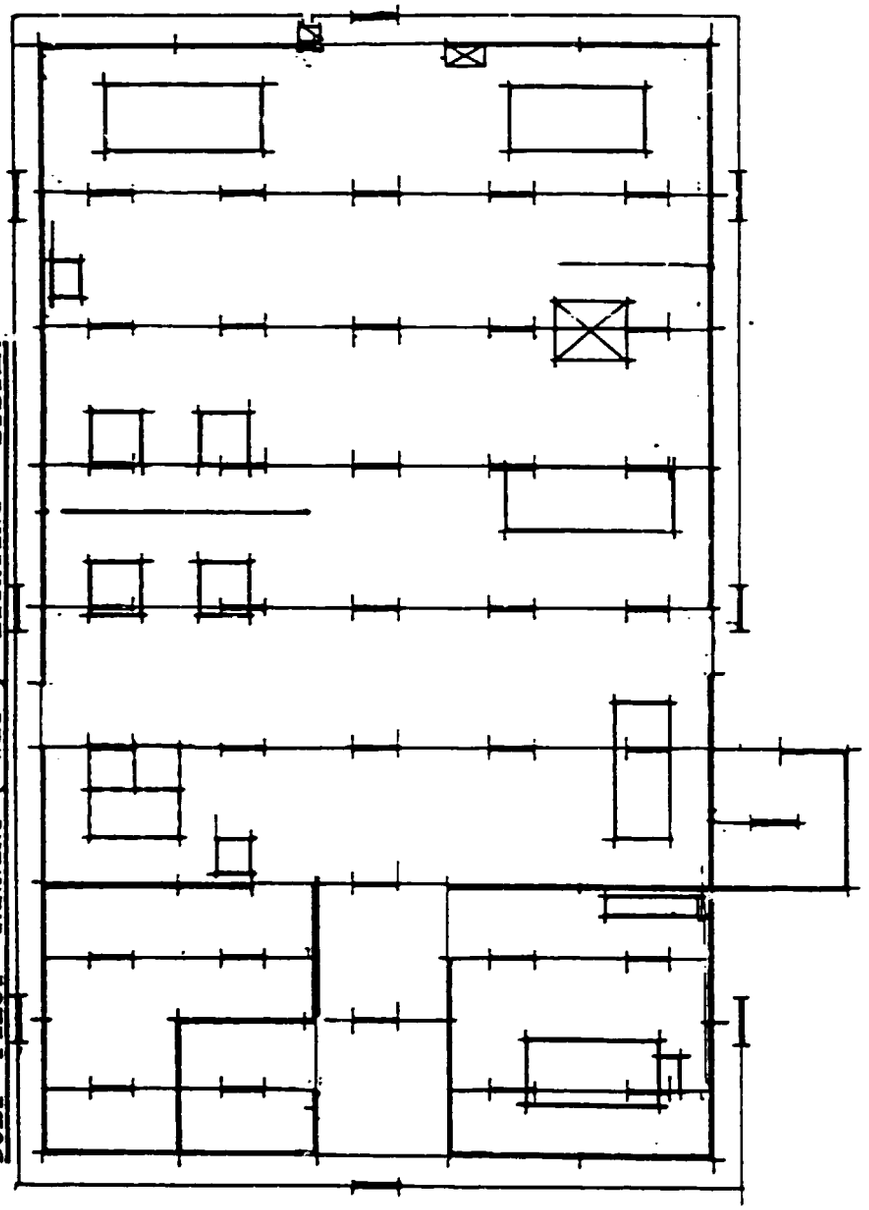

DCLI-21
DCLT - OFFICE WATER SUPPLY SYSTEM
1" ø
1
2
3
4
5
6


DCLT-04
DCLT - STEAM DISTRIBUTION SYSTEM
2"Ø
2"Ø
3"Ø

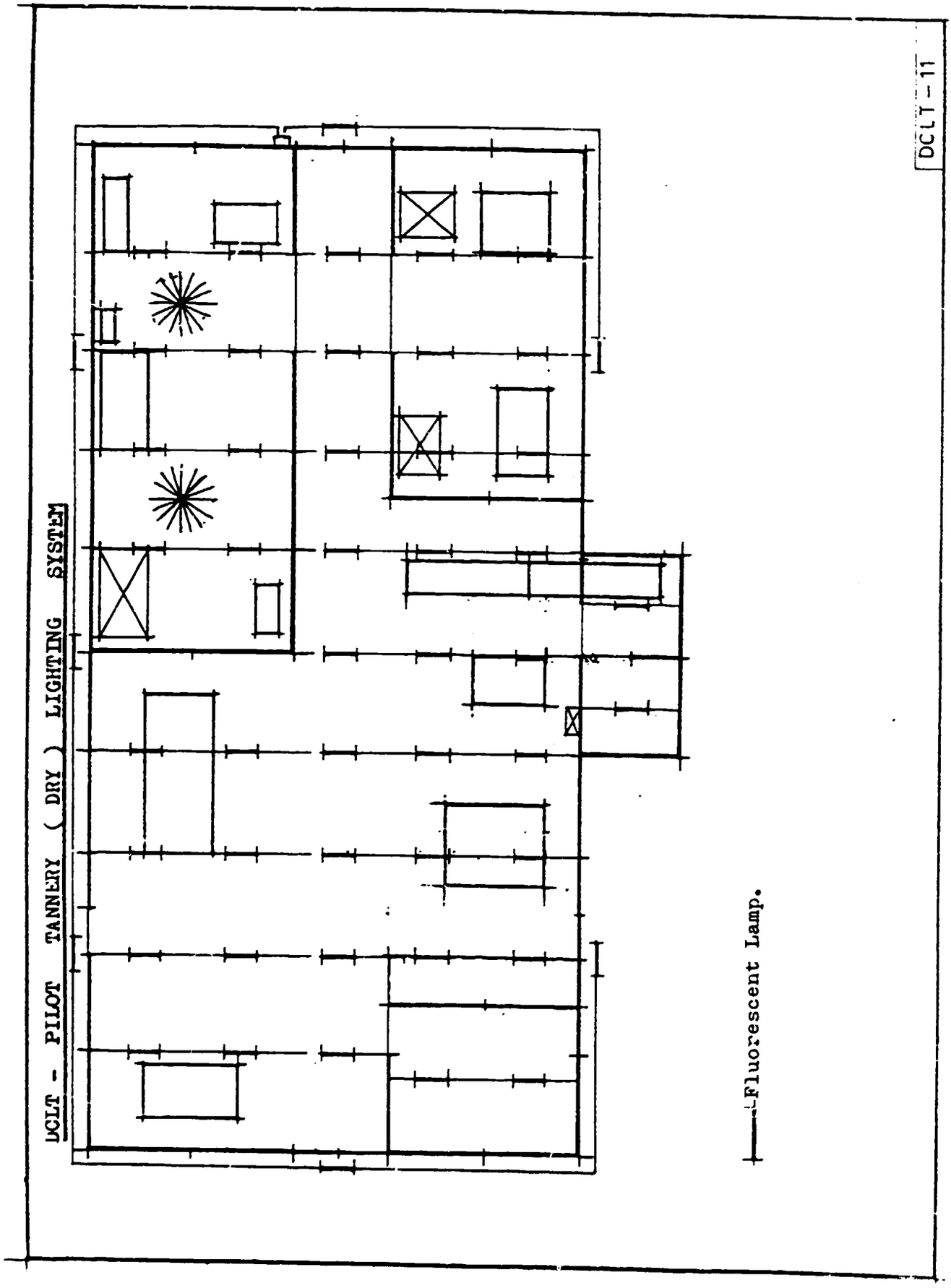

DCLT - PILOT TANNERY (DRY) STEAM SUPPLY SYSTEM
DCLT-12

DCLT-07

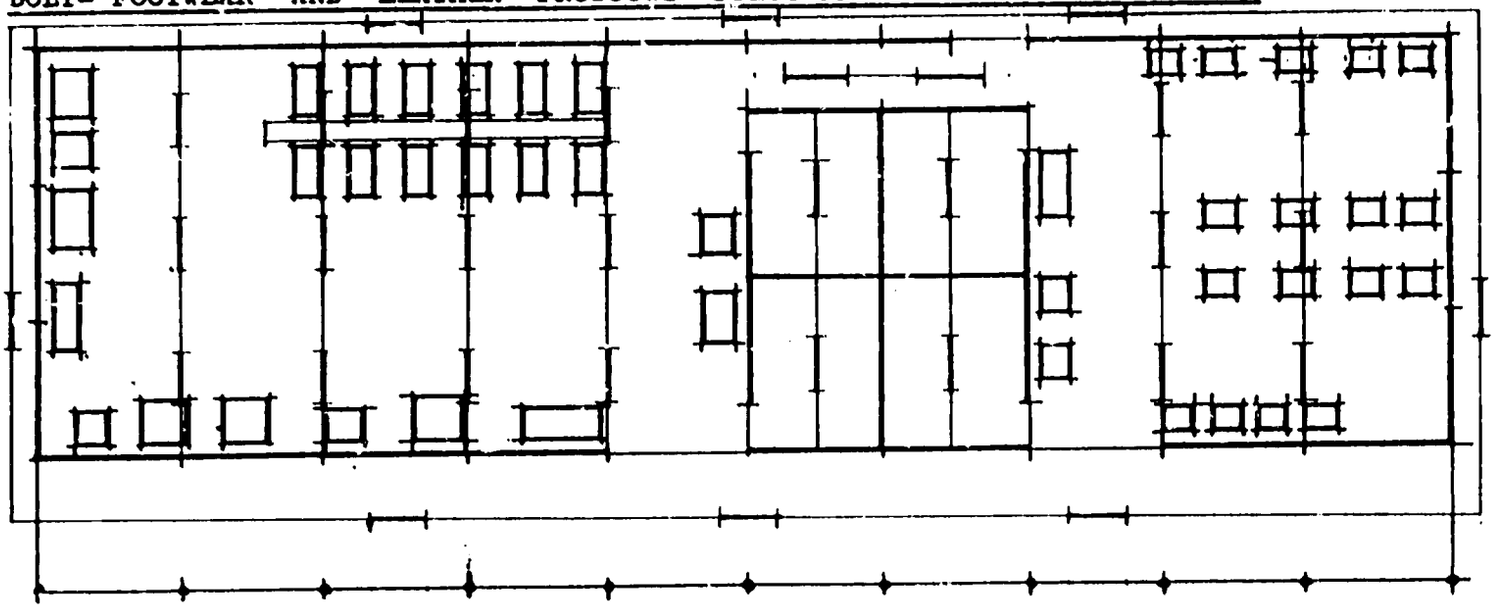
DCLT- PILOT TANNERY (WET) LIGHTING SYSTEM



Fluorescent Lamp.


DCLT-11
DCLT - PILOT TANNERY (DRY) LIGHTING SYSTEM
Fluorescent Lamp.

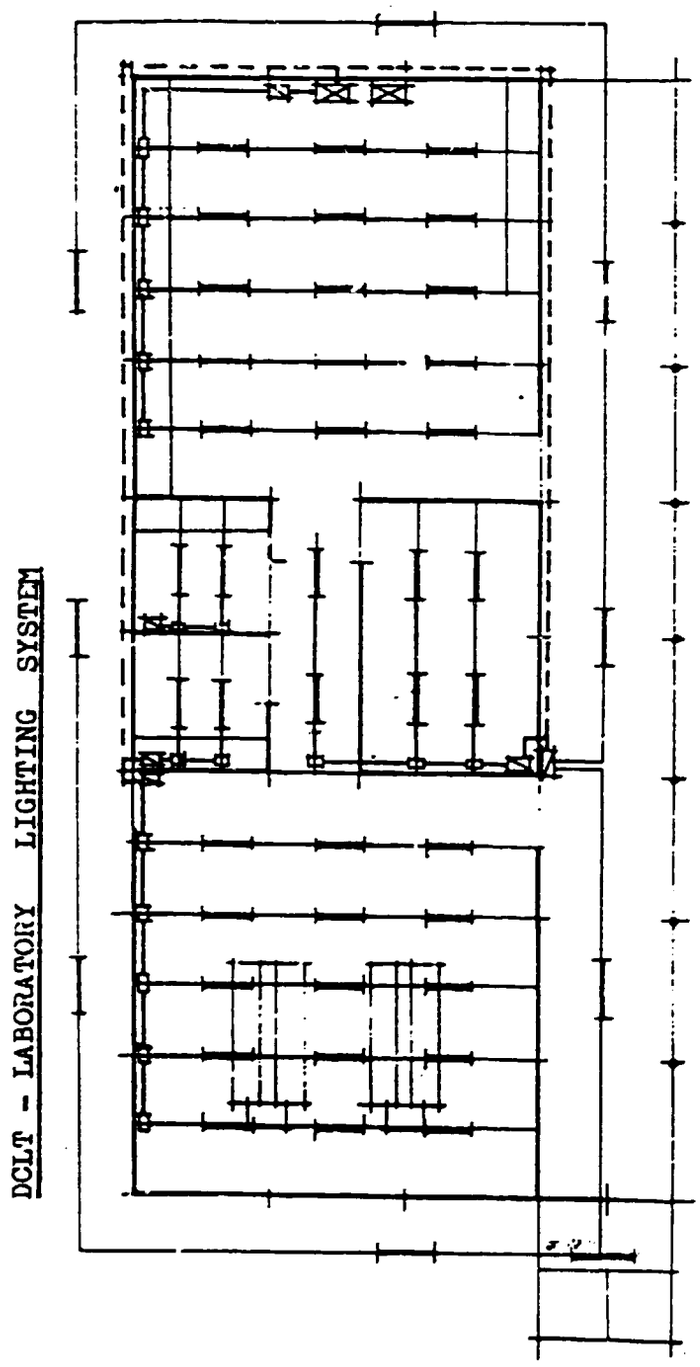
DCLT- FOOTWEAR AND LEATHER PRODUCTS PILOT PLANT LIGHTING SYSTEM



⊢⊣ Fluorescent Lamp

DCLT-30

DCLT - 17

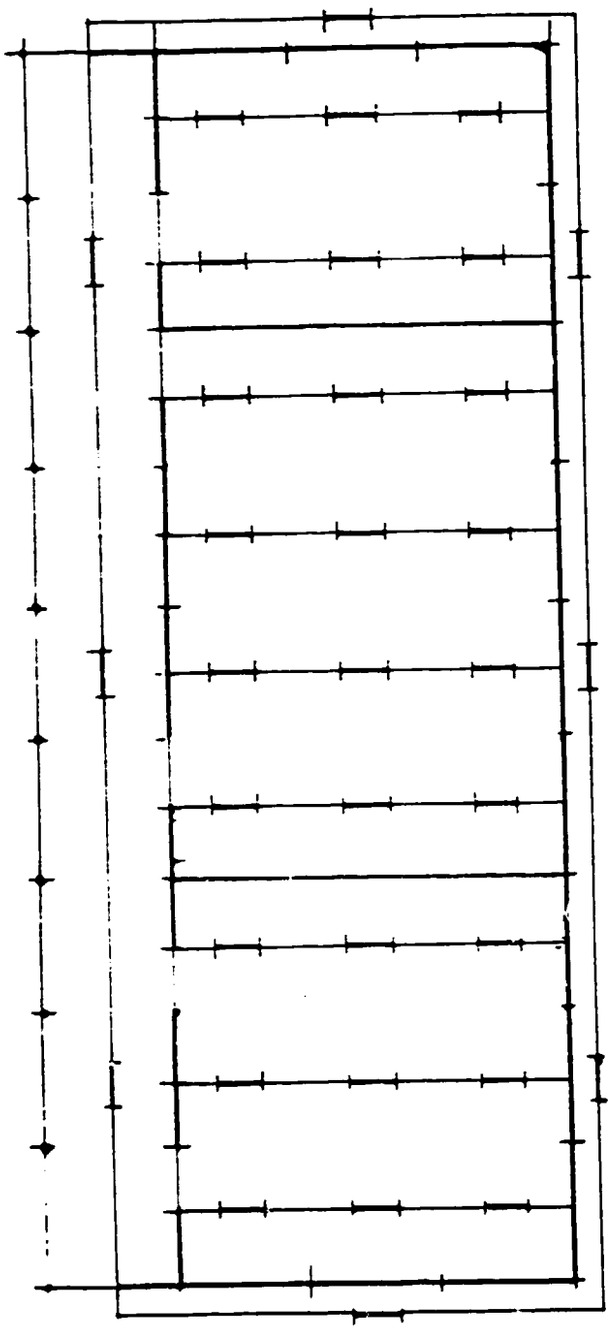


DCLT - LABORATORY LIGHTING SYSTEM

Fluorescent Lamp.

DCLT 23

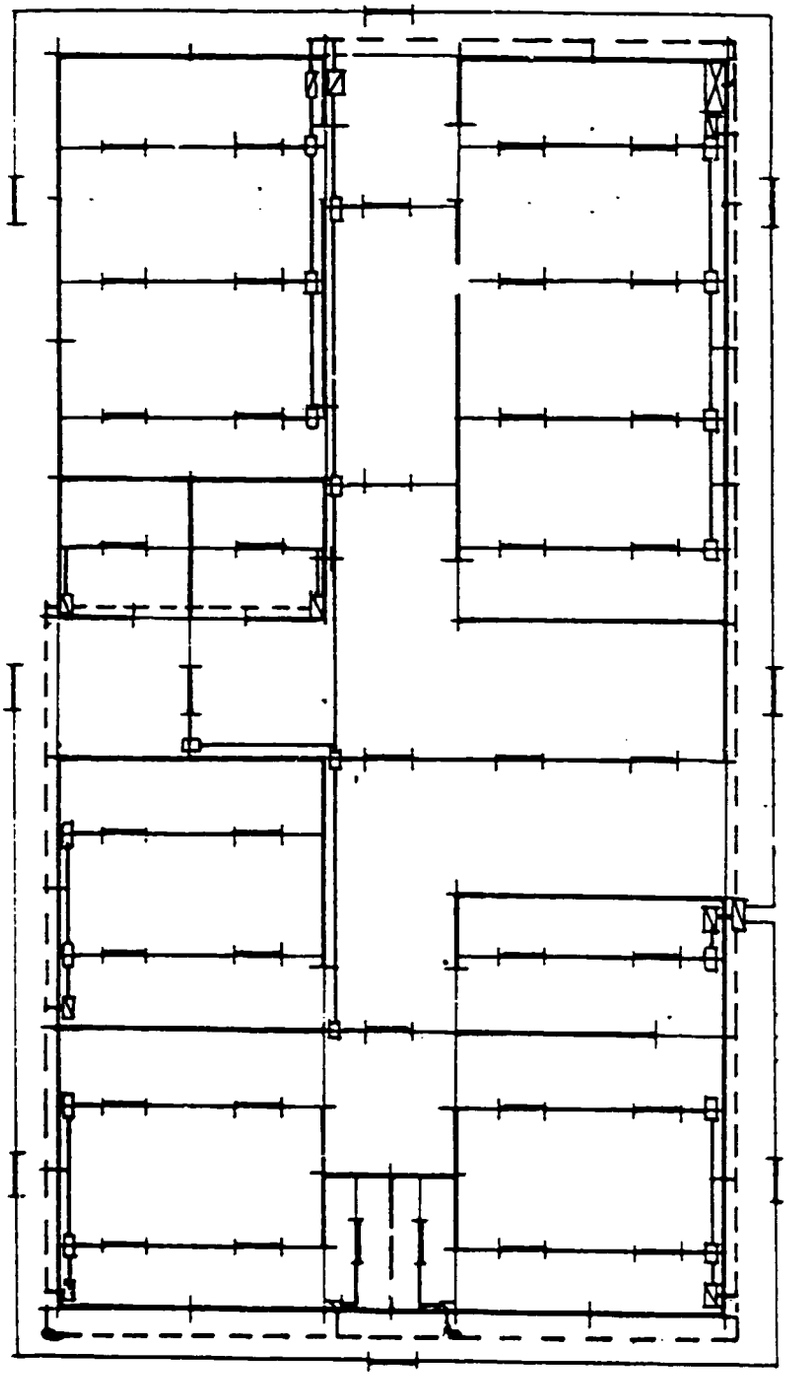
DCLT - LECTURE/CONFERENCE HALL LIGHTING SYSTEM



Fluorescent Lamp.

DCLT - 20

DCLT - OFFICE LIGHTING SYSTEM



Fluorescent Lamp.

MACHINERY AND EQUIPMENT - SITE AREA LF(R) 1 — ANNEX 4

D C L T

1. PILOT TANNERY

Equipment	Specifications	Import (I)/ Local (L)	Estimated Price US $ FOB	Kwat
(A) SOAKING/LIMING SECTION				
1. 1 Stainless Steel Drum for Hides.	80 x 40 cm speed 2 and 4 rpm.	(I)	7,100	
2. 1 Stainless Steel Drum for Skins.	60 x 30 cm speed 2 and 4 rpm.	(I)	6,900	
3. 1 Fleshing Machine for Hides/skins	1800 mm width	(I)	48,100	
4. 1 Lime Splitting Machine.	1800 mm	(I)	68,000	
5. 1 Weighing Scale for limed pelt.	5-50 kgs	(I)	600	
6. 1 Marking Punch Set	9 tubes	(I)	60	
7. 4 Thickness Gauges.	Large B.10 mm	(I)	250	
8. 20 Rolls PH Paper.	Lyphan :- 10 x PH 1-11 10 x PH 3-5-1	(I)	100	
9. 2 Calculators		(I)	150	
(B) TANNING/RETANNING SECTION				
10. 1 Stainless Steel Drum for Hides.	80 cm x 40 cm automatic speed 6 & 12 rpm.	(I)	7,100	
11. 1 Stainless Steel Drum for Skins.	60 cm x 30 cm speed 6 & 12 rpm.	(I)	6,900	
12. 1 Shaving Machine	600 mm working width	(I)	2[illegible]	
13. 1 Weighing Scale for Chemicals.	0-01 - 5000 gm.	(I)	[illegible]	
14. 4 Slickers 4 Slickers	Brass } - Glass }	(I)	60	
15. Be' Meters	0- 10° Be' (ten)	(I)	70	
16. Thermometers with wooden cover.	0-100°C (five)	(I)	20	
17. 1 Scudding/Fleshing Beam and Knife		(L)		200
B/FORWARD TOTAL			: 175,110	200

Pilot Tannery (Contd.)

Equipment	Specifications	Import (I) FOB Local (L)	Estimated Price US $	Kvat
	B/FORWARD TOTAL :		175,110	200
18. 1	Selection/Trimming Table	(L)		300
19. 5	Plastic Buckets 12 lit.	(L)		500
20. 5	Measuring Jugs 1 lit.	(L)		250
21. 1	Desk and Chair	(L)		230
22. 2	Hand Cutting Knives.	(L)		20
23. 1	Hot Water Boiler 12 lit.	(I)	150	
24. 1	PH Meter. Pocket Type	(I)	170	
25.	General Testing Equipment for Pilot Tannery.	(I)	550	
26.	One Wacker Apparatus 10 glass drums.	(I)	4,840	
27. 1	Laboratory Table with top shelves and basin.	(L)		20000
28. 1	Desk and Chair	(L)		230
29. 2	Chairs	(L)		110
(C)	DRYING TO FINISHING			
30. 1	Staking Machine Molissa Type (for Hides).	(I)	21,200	
31. 1	Staking Machine. Schoedel Type (for skins).	(I)	11,500	
32. 2	Exhaust Fans	(I)	550	
33. 1	Electric Blower	(I)	900	
34. 1	Buffing Machine 600mm	(I)	24,200	
35. 1	Polishing Machine 600mm	(I)	19,400	
36. 1	Vacuum Cleaner	(I)	200	
37. 1	Spray Booth with Exhausts.	(L)		30000
38. 2	Hand Spray Guns with spares ½ Lit. Nozzle 1.0	(I)	330	
39. 1	Compressor. 250 lit./2 outlets	(I)	1,260	
40. 1	Hydraulic Press. 137 x 66 cm Electric Heated.	(I)	36,300	
	B/FORWARD TOTAL ...		296,660	51840

Pilot Tannery (Contd.)

	Equipment	Specifications	Import (I)/FOB Local (L)	Estimated Price US $	Kyat
		B/FORWARD TOTAL :		296,660	51840
41.	4 Embossing Plates	1 - smooth 1 - hair cell (fine) 1 - zug grain 1 - goat grain 1 - upholstery grain.	(I) -	13,200	
42.	1 Weighing Scale for Pigment and Finishing material.	0.01 to 5000 gms.		1,100	
43.	1 Electric Mixer			400	
44.	1 Viscometer	4 mm nozzle		30	
45.	50 Empty Glass Bottles.	500 ml. with conical lid.		200	
46.	50 Empty Plastic Bottles.	1000 ml. with screwing lid.		110	
47.	Paper Stickers and Oil Stick writing pencils.			40	
48.	Miscellaneous Equipment.	Hand tools,		1,100	
49.	1 Place for hang drying (wooden stand) 10 sides or 30 skins (with 10 pole)		(L)		800
50.	1 Place for Reconditioning				
51.	5 Plastic Jugs	(1 liter)			250
52.	5 " Buckets	(12 liter)			500
53.	5 Pallets for conditioning				250
54.	1 Selection/Trimming tables				300
55.	1 Padding Table (Pads + Cloth)				300
56.	2 Wheel for hang drying (12 arms)	Wooden Horses ON WHEELS			3900
57.	1 Table	OS - 4			170
58.	2 Chairs	OS -11			110
59.	10 Pairs Rubber Gloves				200
60.	4 Aprons				
61.	3 Pairs Gum Boots				120
62.	1 Steel Cabinet C-4				960
63.	1 Minimax (Fire Extinguisher)				130
64.	4 Pairs Eye Glasses (for protection)				
65.	2 Boxes Eye Lotion (Boric Acid)				40
66.	1 Table, OS-7				130
		F.O.B. GRAND TOTAL :		312,840	60,000
		C.I.F. (+16.5%) GRAND TOTAL :		364,400	

D C L T

2. Footwear and Leather Products Pilot Plant

	Equipment	Specifications	Import(I)/Local (L)/FOB	Estimated US $	Price Kyat
1.	One Pattern Making & Grading Machine.(See also item 59)		(I)	19100	
2.	One Eyelet Machine		(I)	1300	
3.	One Heal Part Moulding Machine & Lasting Tools.		(I)	6600	
4.	One Toe Pulling & Forepart Lasting Machine with Toe steaming apparatus.		(I)	27300	
5.	One Side Lasting machine.		(I)	8600	
6.	One Head Seat Lasting machine.		(I)	24000	
7.	One Sole Laying Press.		(I)	8800	
8.	One Sole Roughing Machine & Dust Collector.		(I)	13500	
9.	One Heat Activator		(I)	1800	
10.	One Splitting, steady knife Machine. + Grinding Appratus(for heavy Leather)		(I)	5900	
11.	Hand Tools, Miscellaneous Equipment including lasts.		(I)	8800	
12.	Electric Hydraulic Swival Arm Cutting Press (small).	25 tons	(I)	6300	
13.	Eight Sewing machines.	various types	(I)	13200	
14.	One Skiving machine	5 cm	(I)	3900	
15.	One Strap Cutting machine.		(I)	2200	
16.	One Folding machine.		(I)	2600	
		B/FORWARD TOTAL :		153900	

Footwear and Leather Products Pilot Plant (Contd.)

	Equipment	Specifications	Import(I)FOB Local (L)	Estimated Price US $	Kyat
			B/FORWARD TOTAL:	153900	-
17.	One Cutting Machine/ Guillotine Cutter		(I)	900	
18.	One Waist Belt Skiving Machine.		(I)	2500	
19.	One Eye Brushing Machine.		(I)	1200	
20.	One Hand Rivetting Machine		(I)	1000	
21.	Various locally made items for Footwear & Leather products section.		(L)		12000
22.	One combined Finishing Machine.		(I)	4800	
23.	One Fortuna Band Knife Splitting Machine working width 47 cm.		(I)	16000	
24.	3 Gloving Former		(I)	1400	
25.	1 Embossing Machine		(I)	9000	
26.	1 Stamping and Marking Machine		(I)	2200	
27.	2 Football Cutting Dies		(I)	900	
28.	Machine Model 807/EC12 Automatic loose sole splitting and roughing machine, with motor and exhauster		(I)	5940	
29.	Machine Model 408/COBS Automatic sole reducing machine with one matrix and motor		(I)	2530	
			B/FORWARD TOTAL	202270	12000

Footwear and Leather Products Pilot Plant (Contd.)

	Equipment	Specifications	Import(I)FOB Local (L)	Estimated Price US $	Kyat
			B/FORWARD TOTAL:	202270	12000
30.	Machine Model 482/C11B	Pneumatic loose sole marking machine,with automatic centering and contact,heating,without compressor	(I)	1450	
31.	Machine Model 29/S6	Automatic loose sole heel seat roughing machine for unit sole,by circular cutter with dust extractor	(I)	3300	
32.	Machine Model 600	Loose sole pre-trimming machine by hand,with extractor and motor, without cutter	(I)	1320	
33.	Machine Model 79/S3GL	Rand laying machine for loose prefinish sole,speed variator and cutting device with heating	(I)	1760	
34.	Machine Model 808/G	Pre-trimmed sole edge blending machine,with adjustable guides, exhauster and 2 mortors	(I)	880	
35.	Machine Model 814/GL	Horizontal unit sole scouring machine with pneumatic controlled oscill. movement ,without compressor	(I)	990	
36.	Machine Model 1034	Automatic pretrimmed sole edge Coloring machine,complete with 2 motors	(I)	2530	
37.	Machine Model 501	Automatic tungsten-carbide cutter sharpening machine,with diamond stone and motor	(I)	990	
		B/FORWARD TOTAL		215470	12000

Footwear and Leather Products Pilot Plant (Contd.)

	Equipment	Specifications	Import(I)FOB Local (L)	Estimated Price US $	Kyat
			B/FORWARD TOTAL:	215470	12000
38.	Machine Model 422/VOR	Brushing machine, with 2 motors, 2 speeds with dust extractor and vertical bag collector	(I)	630	
39.		Pattern Shears, Vice, Binding, Grading + other small items for shoe decoration Locks, Zips, Buttons etc.		1500	
			FOB GRAND TOTAL	217600	12000
			CIF(+16.5%) GRAND TOTAL	253500	12000

D C L T

3. LABORATORY DEPARTMENT

	Equipment	Specifications	Import(I)/ Local(L)	Estimated Price US $ FOB	Kyat
	(A) Chemical Analytical Section				
1.	One Distillation Apparatus.	2 lit/hour	I	260	
2.	Two hot water boiler with fittings.	12 lits.	I	300	
3.	Four Soxhlet extractor apparatus with condensers	250 ml.	I	160	
4.	One Water Bath Heatable.		I	1000	
5.	One Muffle Oven Furnace.	1000°C	I	1040	
6.	Cre Leather Sample Grinding Machine.		I	1600	
7.	Three Porcelain (Platinum) Crucibles tongs.	38 ml.	I	30	
8.	One Leather Moisture Meter.	8-50%		370	
9.	1000 Round filter paper 100 Sheet 500 Round 40/41/42 for Acid solution.	Ashless and normal		100	
10.	10 (ten) Analytical Funnels and stand.		I	70	
11.	70 Conical flasks	Diff.sizes	I	80	
12.	70 Beakers	-do-	I	90	
13.	Two Hot Plate	Combitherm Heating	I	220	
14.	50 Volumetric Pipets.	Diff.sizes	I	60	
15.	40 Measuring Cylinder.	100 ml. 250 ml. 500 ml.	I	100	
			B/FORWARD TOTAL :	5480	

Equipment	Specifications	Import(I)/ Local(L)	Estimated Price US $ FOB	Kyat
	B/FORWARD TOTAL:		5480	
16. 50 Flasks with f'at bottom.		I	320	
17. Three Desicators		I	500	
18. 50 Petri Dishes		I	20	
19. Various Chemical		L	-	500
20. Two Calculators		I	120	
21. One Electric PH meter with accesse ories.		I	930	
22. 40 Volumetric flasks		I	200	
23. 500 Test Tubes and three tube racks.	160 x 16 mm.	I	160	
24. Three Electrical Burners.		I	270	
25. Two Stainless Steel Tripots.		I	10	
26. 20 Watch Glasses for Beakers.	10 = 80 mm. 10 = 100 mm.	I	10	
27. Kjeldal Flasks	Diff.sizes	I	60	
28. Typewriter	Electric	I	1100	
29. 100 Empty Glass Bottles with Conical Lid.	500 ml.	I	550	
30. One Minimax-Fire Extinguisher.		L		130
31. One First Aid Box		L		700
32. One Frigidaire		L		11500
33. One Microscope Laboratory type.		I	880	
34. Two Stop Watch	Precision upto 60 min.	I	220	
35. Spatule spoons and Genenal laboratory Items	120 mm	I	600	
	B/FORWARD TOTAL :		11430	12830

Equipment	Specifications	Import(I)/ Local(L)	Estimated Price US $ F.O.B	Kyat
	B/FORWARD TOTAL :		11430	12830
36. Rubber Tubes	10 mm Ø 3 meter 13 " Ø 3 " 16 " Ø 3 "	(I)	110	
37. Filter Sandless	130 x 20 mm	(I)	70	
38. Tongs for Beakers " " Crucibles " " Test Tubes	3 each 3 " 3 "	(I)	110	
39. Indicators : (powder or tablets).	various	(I)	30	
40. Items to be made locally : -		(L)		
- One table OS-7				130
- Two table OS-4				340
- Four tables OS-11				220
- Four Protective Eye Glasses				240
- Five Rubber Gloves				100
- Two Eye Lotion				40
- General Office Equipment				500
- Towels/Cleaning Dusters				500
- One Minimax Fire Extinguisher				130
- One Steel Cabinet C-4				960
- One Typewriter Table OS-5				170
- One Revolving Chair OS-8				560
- One Demonstration Table TD-5				440
41. 2 Laboratory tables + Top centre shelves + basin, level tables with tiles as in LF (R) 2.				40,000
42. 6 Buffer solutions 6 " "	PH 4.40 PH 6.87		10	
43. 1 Thickness Gauge (table type DM 100.L) 2 " "	200 mm " B-30406		440 110	
44. 3 Analytical balance : - 1 x 0,0001 - - 2 x 0.01 -	80 Type KERN 810/07 3000 gm Type KERN 810/43		920 2150	
45. 1 Ford Viscosimeter 4 mm Nozzle			30	
46. 10 pH Paper, Lyphan Type : - 5 x pH 1-11, R 111 - 5 x pH 3.0-5.1, L625	) -)		30	
B/FORWARD TOTAL ...			15440	57,160

Equipment	Specifications	Import(I) Local(L)	Estimated Price US $	Kyat
	B/FORWARD TOTAL :		15440	57160
47. 10°Be'	4 x 0-10°	(I)	30	
	4 x 10-30°		40	
	2 x 30-60°		30	
15 Barkometer	5 x 0 - 10°NR.30603	(I)	80	
	5 x 0 - 25°NR.30606		30	
	5 x 0 - 60°NR.30605		30	
48. 10 Thermometer,	- 10°+ 100°C or - 10°C+110°C CAT No.4000 - 06		30	
	5 x -10°C+ 360°C CAT No 4.000 - 18	(I)	50	
49. 1 Liter petroleum ether S.B.P.60 S.B.P. Local		(L)		40
50. 10 Automatic Pellet burettes,complete	CAT No.1230-02	(I)	290	
51. 1 Adhesion of Leather Finishing Testing Machine.		(I)	800	
52. 1 Universal Drying Oven Type U-10	22°C.	(I)	250	
53. 1 Exhaust Ventilator for fume digestor,6" blades		(I)	300	
	FOB GRAND TOTAL ...		17400	57200
	CIF (+16.5%)GRAND TOTAL ...		20300	

D C L T

4. Information and Library Department.

	Equipment	Specifications	Import(I)FOB Local(L)	Estimated Price US $	Kyat
(A)	**Training and Service Aids**				
1.	Electrical Stencil Duplicator +Fluid	Gestetner(widely used in Burma)	I	1430	
2.	Electronic Stencil Cutter(Scanner)+ Stencils.		I	1280	
3.	Slide Projector and Film Strip		I	180	
4.	Overhead Projector + Table		I	450	
5.	Screen for item 3 & 4		I	50	
6.	Portable Cassete Recorder,Microphone, Speaker and Amplifier		I	330	
7.	Typewriters (two)	Olympia(widely used in Burma)	I	2200	
8.	Photocopier		I	1900	
9.	Frigidaire		L		11500
10.	2 Exhaust Fans 12"		I	100	
11.	Voltage Regulator:-				
	-4 x 100 KVA, Type SVC 1000W		I	[illegible]	
	-2 x 1.5 KVA, Type SVC 1500W		I	480	
	-6 x 5.0 KVA, Type SVC 5000W		I	2400	
12.	Intercom 2 - 11 stations + Adaptor		I	110	
13.	Single Bowl- Double Drainer 50" x 18"		I	210	
14.	35mm Camera,Flash Gun ,Lens and Acessories		I	1650	
15.	Projection TV set with Video Cassette Recorder With adjustable mobile TV/Video stand		I	4400	
		B/FORWARD TOTAL		17870	11500

Information and Library Department(Contd.)

Equipment	Import(I)FOB: Local(L)	Estimated Price US $	Kyat
(B)Locally Available Items for Office, Class Room, Workshop and Others. B/FORWARD TOTAL		17870	11500
1. General Office			
1 Burmese Typewriter 24"	L		4000
4 Tables OS-4	L		680
8 Chairs OS-11	L		440
6 Cupboards OS-13 (Almirah)	L		2820
2 Steel Cabinet C -4	L		1930
Printing Items,Local Letter Head - Papers) Envelopes and) - General Office ")	L		1500
3 Typewriter Table + Chairs OS-5 + OS-8	L		2250
2 Minimax (Fire Extinguisher)	L		130
8 Waste Paper Baskets OS-17	L		150
16 Letter Trays OS - 18	L		280
1 Telephone Switch Board 10 Connections : 4 office, 1 lab., 1 tannery, 1 Store, 1 Shoe center, 1 leather goods, 1 Kitchen	L		5200
2. Entrance			
2 Glass Show Case	L		1300
1 Table CT - 18	L		140
6 Setty Chairs (single) SC-16(S)	L		810
Decoration -Flowers	L		1000
3. Director's Office			
1 Chair OS-8	L		560
1 Table OS-1	L		760
1 Table CT-18	L		140
2 Setty Chairs(Single) SC-16(S)	L		260
1 " " (Double) SC-16(D)	L		200
1 Steel Cabinet C4	L		960
1 Cupboard OS-13	L		470
4. Expert's Office:			
1 Chair OS-8	L		560
1 Table OS-1	L		760
1 " CT-18	L		140
2 Setty Chairs (Single) SC-16 (S)	L		260
1 " " (Double) SC-16 (D)	L		200
1 Cupboard OS-13	L		470
1 Steel Cabinet C4	L		960
5. Lecture-Rooms			
2 Platform G 39	L		800
2 Chairs for Lecturer OS-11	L		110
B/FORWARD TOTAL		17870	41740

Information and Library Department (Contd.)

Equipment	Import(I)FOB Local(L)	Estimated Price US $	Kyat
B/FORWARD TOTAL		17870	41740
2 Table for Lecturer Demonstration table TD-5	L		880
2 Blackboard 6' x 4 '(wall type)	L		140
45 Desks - Chairs, C- 14	L		3550
4 Erasers/Duster	L		10
4 Packets Chalks	L		10
2 Blackboard-revolving ED-6	L		240
45 Steel Locker + Locks	L		22500
1 First Aid Boxes	L		700
6. Store Room (Tannery Chemicals)			
1 Scale Balance 5 - 50 kg.	I	570	
1 Calculator HR 8	I	60	
5 Plastic Buckets	L		500
3 Plastic Shovels (small)	L		150
4 Pallets	L		400
4 Shelves(chemical samples)6'x5'x1'	L		3000
1 Table OS - 4	L		170
2 Chairs OS - 11	L		110
Office Stationary/Stock List Books	L		300
1 Plier	L		20
1 Hammer 1 lb	L		20
1 Screw Driver	L		10
7. Store Room (Office/Laboratory)Library	L		
1 Table OS-4	L		170
2 Chairs OS-11	L		110
6 Shelves for Laboratory Items	L		730
3 Shelves for Leather bundles	L		360
8 Shelves for Office Items/Library	L		980
8. Work Shop/Spare Parts Store			
1 Vice 6" + Table	L		1200
Pliers,Screw Driver	L		30
1 set Wrenches	L		2400
1 Table OS - 4	L		170
2 Chairs OS-11	L		110
Stationary office items	L		300
Stock list cards/books	L		500
3 Shelves for small spares 6'x5'x1'	L		2250
1 Hammer ,1 lb.	L		20
1 Hand Drilling Machines + drills	L		2000
Screws	L		1000
Nails	L		1000
Lubrication Oils)) Hydraulic Oils ,)- for starting Oil frre of resin)	L		6500
Paints/brushes	L		5000
1 Minimax(Fire extinguisher)	L		120
1 First Aid Boxes	L		700
B/FORWARD TOTAL		18500	100100

Information and Library Department(Contd.)

Equipment	Import(I)FOB Local(L)	Estimated Price US $	Estimated Price Kyat
	B/FORWARD	18500	100100
	TOTAL		
9. Kitchen			
2 Table, OS-7	L		260
1 Cooking hot Plate	L		290
1 Frigidaire	L		11500
3 Tea Set	L		130
24 Cutlery : Forks/Spoons/Knife	L		510
10 Towels,etc	L		510
3 Dining set (4 persons)	L		2100
10. Toilets			
10 Toilet places, wall urinel	L		2500
6 EWC-(Europe Style)	L		3000
Paper) Towels) - Soap)	L		500
11. Gardening/Plants Inside/Outside	L		1000
12. Cleaning Auxiliaries			
Various Items	L		1000
18 Basins and acessories	L		6300
13. Outside Lighting			
4 Corners-light FA.4142 OGL) - 2 Street lights, FA.4142 OGL)	L		2370
14. Lamps			
300Lamp,fluorescent	L		72000
15. Aircondition			
8 Airconditioner single for window type	L		83000
16. Fans			
26 Ceiling Fans 52"	L		48230
4 Table Fans 12"	L		2900
FOB GRAND TOTAL		18500	338200
CIF(+16.5%)GRAND TOTAL		21600	

D C L T

5. AUXILIARY EQUIPMENT

		Estimate of Cost. FOB US $	Kyats
(A)	TRANSFORMER HOUSE		
1.	1 Cubicle Complete with protection, metering and main feeder oil circuit breaker with accessories.	11220	
2.	200 M underground power cable cross-linked polyethylene insulated and PVC sheathed cable Armoured 6KV CVCSZV 3C - 22 mm^2	2400	
3.	Complete cable termination set 6KV 3C -22 mm^2 indoor type	360	
4.	6.6 KV Incoming cubicle indoor type	12400	
5.	50M 600V Underground cable 600V CVCSZV 4C - 250 mm^2	2400	
6.	Complete cable termination set 600V 4C - 250 mm^2	200	
7.	300 KVA 6.6/0.4 KV transformer		200000
8.	400V outgoing cubicle indoor type	15000	
9.	45 Power insulation adhesive tapes for 500volt for tropical climate 19mm W x 5M	50	
10.	1 Cable cutter	120	
11.	1 Cable crimping plier up to 8mm^2	20	
12.	1 Cable crimping plier 14-100mm	320	
13.	1 Insulating Polytester	340	
14.	1000 M-Bare copper wire 5mmø	1000	
15.	100 Power insulation self bonding tape for 500V for tropical climate W 19mm x TO.5 mm x 10M	250	
16.	1 Clip on meter for Max. 300A, AC, 1200V AC (Use lead with probe and plug) with case	220	
17.	1 Insulation test model 3207 with carrying case 100m/500 volt	460	
18.	1 Multirange instrument for measuring AC voltage up to 1200V measuring leakage current test with case	600	
19.	4 Ventilating Fan 200V 10" exhaust only	110	
20.	1 Electric Hand Drill with concrete Drills set	1100	
	B/FORWARD TOTAL	48570	200000

AUXILIARY EQUIPMENT (Contd.)

	Estimate of Cost.FOB	
	US $	Kyats
B/FORWARD TOTAL	48570	200,000
(B) ENGINEERING MACHINE SHOP		
1. 1 Electric Arc Welder Complete set	4400	
2. 1 Oxy-Acetylene Gas Welding Equipment Complete	2200	
3. 1 Heavy Duty engineering vices	880	
4. 1 Mechanical horizontal saw with 50 spare blades	1760	
5. 1 Bench drill + 4 Set of drill bits	2200	
6. Selection of hand tools and equipment	8000	
7. 1 Chain block -2 ton -5.5 meter	110	
8. 1 Single bowl single drainer reversible 82"x 18"	110	
9. Selection of measuring equipment	2200	
(C) SITE EQUIPMENT		
1. 1 Set pallet truck hand operated 2 ton.	330	
2. 1 Lot of steam pipe and accessories	7700	
3. 1 Ventilating Fan 12" Exhaust	440	
4. 1 Force draft fan	2200	
5. 1 Lot electrical cables,cable rack DB and accessories for power distribution	59800	
FOB GRAND TOTAL	140900	200,000
CIF (+16.5%)GRAND TOTAL	164200	

MACHINERY AND EQUIPMENT - INDEPENDENT SITE AREA

D C L T

1. PILOT TANNERY

	Equipment	Specifications	Import (I)/ Local (L)		Estimated Price US $ FOB	Kwat
(A)	**SOAKING/LIMING SECTION**					
1.	1 Stainless Steel Drum for Hides.	80 x 40 cm speed 2 and 4 rpm.	(I)	A	7,100	
2.	1 Stainless Steel Drum for Skins.	60 x 30 cm speed 2 and 4 rpm.	(I)		6,900	
3.	1 Fleshing Machine for Hides/skins	1800 mm width	(I)		48,100	
4.	1 Lime Splitting Machine.	1800 mm	(I)		68,000	
5.	1 Weighing Scale for limed pelt.	5-50 kgs	(I)		600	
6.	1 Marking Punch Set	9 tubes	(I)		60	
7.	4 Thickness Gauges.	Large B.10 mm	(I)		250	
8.	20 Rolls PH Paper.	Lyphan :- 10 x PH 1-11 10 x PH 3-5-1	(I)		100	
9.	2 Calculators		(I)		150	
(B)	**TANNING/RETANNING SECTION**					
10.	1 Stainless Steel Drum for Hides.	80 cm x 40 cm auto- matic speed 6 & 12 rpm.	(I)		7,100	
11.	1 Stainless Steel Drum for Skins.	60 cm x 30 cm speed 6 & 12 rpm.	(I)		6,900	
11A.	1 Sammying machine,	working width 1800mm	(I)		47,000	
12.	1 Shaving Machine	600 mm workin.. width	(I)		28,600	
13.	1 Weighing Scale for Chemicals.	0-01 - 5000 gm.	(I)		1,100	
14.	4 Slickers 4 Slickers	Brass } - Glass }	(I)		60	
15.	Be' Meters	0- 10° Be' (ten)	(I)		70	
16.	Thermometers with wooden cover.	0-100°C (five)	(I)		20	
17.	1 Scudding/Fleshing Beam and Knife		(L)			200

B/FORWARD TOTAL : 222,110 200

Pilot Tannery (Contd.)

Equipment	Specifications	Import (I) FOB Local (L)	Estimated Price US $	Kwat
	B/FORWARD TOTAL :		222,110	200
18. 1 Selection/Trimming Table		(L)		300
19. 5 Plastic Buckets 12 lit.		(L)		500
20. 5 Measuring Jugs 1 lit.		(L)		250
21. 1 Desk and Chair		(L)		250
22. 2 Hand Cutting Knives.		(L)		20
23. 1 Hot Water Boiler 12 lit.		(I)	150	
24. 1 PH Meter. Pocket Type		(I)	170	
25. General Testing Equipment for Pilot Tannery.		(I)	550	
26. One Wacker Apparatus 10 glass drums.		(I)	4,840	
27. 1 Laboratory Table with top shelves and basin.		(L)		20000
28. 1 Desk and Chair		(L)		250
29. 2 Chairs		(L)		110
(C) DRYING TO FINISHING				
29A. 1 Plate Vacuum Dryer, Plate size		(I)	34,900	
30. 1 Staking Machine Molissa Type (for Hides).		(I)	21,200	
30A. 1 Sammying/Setting-machine working width 1800 m/m.		(I)	35,100	
31. 1 Staking Machine. Schoedel Type (for skins).		(I)	11,500	
32. 2 Exhaust Fans		(I)	550	
33. 1 Electric Blower		(I)	900	
33A. 1 Drying Unit : - 4 Toggle Frames, 1450 x 2950 m/m 1 Glass Pasting Plate 1750 x 3000 m/m including 200 clamps.		(I)	16,300	
34. 1 Buffing Machine 600mm		(I)	24,200	
35. 1 Polishing Machine 600mm		(I)	19,400	
36. 1 Vacuum Cleaner		(I)	200	
37. 1 Spray Booth with Exhausts.		(L)		30000
38. 2 Hand Spray Guns with spares ½ Lit. Nozzle 1.0		(I)	330	
39. 1 Compressor. 250 lit./2 outlets		(I)	1,260	
40. 1 Hydraulic Press. 137 x 66 cm Electric Heated.		(I)	36,300	
	B/FORWARD TOTAL ...		429,960	51840

Pilot Tannery (Contd.)

	Equipment	Specifications	Import (I)/FOB Local (L)	Estimated Price US $	Kwat
		B/FORWARD TOTAL :		429,960	51840
41.	4 Embossing Plates	1 - smooth 1 - hair cell (fine) 1 - zug grain 1 - goat grain 1 - upholstery grain.	(I) -	13,200	
42.	1 Weighing Scale for Pigment and Finishing material.	0.01 to 5000 gms.		1,100	
43.	1 Electric Mixer			400	
44.	1 Viscometer	4 mm nozzle		30	
45.	50 Empty Glass Bottles.	500 ml. with conical lid.		200	
46.	50 Empty Plastic Bottles.	1000 ml. with screwing lid.		110	
47.	Paper Stickers and Oil Stick writing pencils.			40	
48.	Miscellaneous Equipment.	Hand tools.		1,100	
49.	1 Place for hang drying (wooden stand) 10 sides or 30 skins (with 10 pole)		(L)		800
50.	1 Place for Reconditioning				
51.	5 Plastic Jugs	(1 liter)			250
52.	5 " Buckets	(12 liter)			500
53.	5 Pallets for conditioning				250
54.	1 Selection/Trimming tables				300
55.	1 Padding Table (Pads + Cloth)				300
56.	2 Wheel for hang drying (12 arms)	Wooden Horses ON WHEELS			3900
57.	1 Table	OS - 4			170
58.	2 Chairs	OS -11			110
59.	10 Pairs Rubber Gloves				200
60.	4 Aprons				
61.	3 Pairs Gum Boots				120
62.	1 Steel Cabinet C-4				960
63.	1 Minimax (Fire Extinguisher)				130
64.	4 Pairs Eye Glasses (for protection)				
65.	2 Boxes Eye Lotion (Boric Acid)				40
66.	1 Table, OS-7				130
	B/FORWARD TOTAL :			446,140	60,000

Pilot Tannery (Contd.)

Equipment	Specifications	Import(I)/FOB Local (L)	Estimated Price US $	Kyats
	B/FORWARD TOTAL :		446,140	56700
67. 1	Glazing machine pneumatic		10,000	
68. 1	Finiflex type through feed Ironing machine		25,000	
	F.O.B. GRAND TOTAL:		481,140	56700
	C.I.F.(+16.5%) GRAND TOTAL:		560,500	

D C L T

2. **Footwear and Leather Products Pilot Plant**

	Equipment	Specifications	Import(I)/FOB Local (L)	Estimated Price US $	Kyat
1.	One Pattern Making & Grading Machine.(See also item 39)		(I)	19100	
2.	One Eyelet Machine		(I)	1300	
3.	One Heal Part Moulding Machine & Lasting Tools.		(I)	6600	
4.	One Toe Pulling & Forepart Lasting Machine with Toe steaming apparatus.		(I)	27300	
5.	One Side Lasting machine.		(I)	8600	
6.	One Head Seat Lasting machine.		(I)	24000	
7.	One Sole Laying Press.		(I)	8800	
8.	One Sole Roughing Machine & Dust Collector.		(I)	13500	
9.	One Heat Activator		(I)	1800	
10.	One Splitting, steady knife Machine. + Grinding Appratus(for heavy Leather)		(I)	5900	
11.	Hand Tools,Miscellaneous Equipment including lasts.		(I)	8800	
12.	Electric Hydraulic Swival Arm Cutting Press (small).	25 tons	(I)	6300	
13.	Eight Sewing machines.	various types	(I)	13200	
14.	One Skiving machine	5 cm	(I)	3900	
15.	One Strap Cutting machine.		(I)	2200	
16.	One Folding machine.		(I)	2600	
			B/FORWARD TOTAL :	153900	-

Footwear and Leather Products Pilot Plant (Contd.)

Equipment	Specifications	Import(I)FOB Local (L)	Estimated Price US $	Kyat
		B/FORWARD TOTAL:	153900	-
17. One Cutting Machine/ Guillotine Cutter		(I)	900	
18. One Waist Belt Skiving Machine.		(I)	2500	
19. One Eye Brushing Machine.		(I)	1200	
20. One Hand Rivetting Machine		(I)	1000	
21. Various locally made items for Footwear & Leather products section.		(L)		12000
22. One combined Finishing Machine.		(I)	4800	
23. One Fortuna Band Knife Splitting Machine working width 47 cm.		(I)	16000	
24. 3 Gloving Former		(I)	1400	
25. 1 Embossing Machine		(I)	9000	
26. 1 Stamping and Marking Machine		(I)	2200	
27. 2 Football Cutting Dies		(I)	900	
28. Machine Model 807/EC12	Automatic loose sole splitting and roughing machine, with motor and exhauster	(I)	5940	
29. Machine Model 408/COBS	Automatic sole reducing machine with one matrix and motor	(I)	2530	
		B/FORWARD TOTAL	202270	12000

Footwear and Leather Products Pilot Plant (Contd.)

	Equipment	Specifications	Import(I)FCB Local (L)	Estimated Price US $	Kyat
			B/FORWARD TOTAL:	202270	12000
30.	Machine Model 482/C11B	Pneumatic loose sole marking machine,with automatic centering and contact,heating,without compressor	(I)	1450	
31.	Machine Model 29/S6	Automatic loose sole heel seat roughing machine for unit sole,by circular cutter with dust extractor	(I)	3300	
32.	Machine Model 600	Loose sole pre-trimming machine by hand,with extractor and motor, without cutter	(I)	1320	
33.	Machine Model 79/S3GL	Rand laying machine for loose prefinish sole,speed variator and cutting device with heating	(I)	1760	
34.	Machine Model 808/G	Pre-trimmed sole edge blending machine,with adjustable guides, exhauster and 2 mortors	(I)	880	
35.	Machine Model 814/GL	Horizontal unit sole scouring machine with pneumatic controlled oscill. movement ,without compressor	(I)	990	
36.	Machine Model 1034	Automatic pretrimmed sole edge Coloring machine,complete with 2 motors	(I)	2530	
37.	Machine Model 501	Automatic tungsten-carbide cutter sharpening machine,with diamond stone and motor	(I)	990	
		B/FORWARD TOTAL		215470	12000

Footwear and Leather Products Pilot Plant (Contd.)

Equipment	Specifications	Import(I)FOB Local (L)	Estimated Price US $	Kyat
		B/FORWARD TOTAL:	215470	12000
38. Machine Model 422/VOR	Brushing machine, with 2 motors, 2 speeds with dust extractor and vertical bag collector	(I)	630	
39.	Pattern Shears, Vice, Binding, Grading + other small items for shoe decoration Locks, Zips, Buttons etc.		1500	
		FOB GRAND TOTAL	217600	12000
		CIF(+16.5%) GRAND TOTAL	253500	12000

D O L T

3. LABORATORY DEPARTMENT

Equipment	Specifications	Import(I)/ Local(L)	Estimated Price US $ FOB	Kyat
(A) Chemical Analytical Section				
1. One Distillation Apparatus.	2 lit/hour	I	260	
2. Two hot water boiler with fittings.	12 lits.	I	[illegible]	
3. Four Soxhlet extractor apparatus with condensers	250 ml.	I	160	
4. One Water Bath Heatable.		I	1000	
5. One Muffle Oven Furnace.	1000°C	I	1040	
6. One Leather Sample Grinding Machine.		I	1600	
7. Three Porcelain (Platimum) Crucibles tongs.	38 ml.	I	30	
8. One Leather Moisture Meter.	8-50%		370	
9. 1000 Round filter paper 100 Sheet 500 Round 40/41/42 for Acid solution.	Ashless and normal		100	
10. 10 (ten) Analytical Funnels and stand.		I	70	
11. 70 Conical flasks	Diff.sizes	I	80	
12. 70 Beakers	-do-	I	90	
13. Two Hot Plate	Combitherm Heating	I	220	
14. 50 Volumetric Pippets.	Diff.sizes	I	60	
15. 40 Measuring Cylinder.	100 ml. 250 ml. 500 ml.	I	100	
	B/FORWARD TOTAL :		5480	

Equipment	Specifications	Import(I)/ Local(L)	Estimated Price US $ FOB	Kyat
	B/FORWARD TOTAL:		5480	
16. 50 Flasks with flat bottom.		I	320	
17. Three Degicators		I	500	
18. 50 Petri Dishes		I	20	
19. Various Chemical		L	-	500
20. Two Calculators		I	120	
21. One Electric PH meter with accessories.		I	930	
22. 40 Volumetric flasks		I	200	
23. 500 Test Tubes and three tube racks.	160 x 16 mm.	I	160	
24. Three Electrical Burners.		I	270	
25. Two Stainless Steel Tripots.		I	10	
26. 20 Watch Glasses for Beakers.	10 - 80 mm. 10 - 100 mm.	I	10	
27. Kjeldal Flasks	Diff.sizes	I	60	
28. Typewriter	Electric	I	1100	
29. 100 Empty Glass Bottles with Conical Lid.	500 ml.	I	550	
30. One Minimax-Fire Extinguisher.		L		130
31. One First Aid Box		L		700
32. One Frigidaire		L		11500
33. One Microscope Laboratory type.		I	880	
34. Two Stop Watch	Precision upto 60 min.	I	220	
35. Spatule spoons and General laboratory Items	120 mm	I	600	
	B/FORWARD	I	11430	12830

Equipment	Specifications	Import(I)/ Local(L)	Estimated Price US $ F.O.B	Kyat
	B/FORWARD TOTAL :		11430	12830
36. Rubber Tubes	10 mm Ø 3 meter 13 " Ø 3 " 16 " Ø 3 "	(I)	110	
37. Filter Sandless	130 x 20 mm	(I)	70	
38. Tongs for Beakers " " Crucibles " " Test Tubes	3 each 3 " 3 "	(I)	110	
39. Indicators : (powder or tablets).	various	(I)	30	
40. Items to be made locally : -		(L)		
- One table OS-7				130
- Two table OS-4				340
- Four tables OS-11				220
- Four Protective Eye Glasses				240
- Five Rubber Gloves				100
- Two Eye Lotion				40
- General Office Equipment				500
- Towels/Cleaning Dusters				500
- One Minimax Fire Extinguisher				130
- One Steel Cabinet C-4				960
- One Typewriter Table C-5				170
- One Revolving Chair OS-8				560
- One Demonstration Table TD-5				440
41. 2 Laboratory tables + Top centre shelves + basin, level tables with tiles as in LF (R) 2.				40,000
42. 6 Buffer solutions 6 "	PH 4.40 PH 6.87		10	
43. 1 Thickness Gauge (table type DM 100.L) 2 " " 200 mm "	B-30406		440 110	
44. 3 Analytical balance : - 1 x 0,0001 - - 2 x 0.01 -	80 Type KERN 810/07 3000 gm Type KERN 810/43		920 2150	
45. 1 Ford Viscosimeter 4 mm Nozzle			30	
46. 10 pH Paper, Lyphan Type : - 5 x pH 1-11, R 111 - 5 x pH 3.0-5.1, L625	} -		30	
	B/FORWARD TOTAL ...		15440	57,160

Equipment	Specifications	Import(I) Local(L)	Estimated Price US $	Kyat
	B/FORWARD TOTAL :		15440	57160
47. 10°Be'	4 x 0-10°	(I)	30	
	4 x 10-30°		40	
	2 x 30-60°		30	
15 Barkometer	5 x 0 - 10°NR.30603	(I)	80	
	5 x 0 - 25°NR.30606		30	
	5 x 0 - 60°NR.30605		30	
48. 10 Thermometer,	- 10°+ 100°C or - 10°C+110°C CAT No.4000 - 06		30	
	5 x -10°C+ 360°C CAT No 4.000 - 18	(I)	50	
49. 1 Liter petroleum ether S.B.P.60 S.B.P. Local		(L)		40
50. 10 Automatic Pellet burettes,complete	CAT No.1230-02	(I)	290	
51. 1 Adhesion of Leather Finishing Testing Machine.		(I)	800	
52. 1 Universal Drying Oven Type U-10	22°C.	(I)	250	
53. 1 Exhaust Ventilator for fume digestor,6" blades		(I)	300	
54. 1 Bally Flexometer Testing Machine	with 12 sample clamps with punch.	(I)	4140	
55. 1 Simple Tensile Elongation Testing machine Type STD 172.		(I)	1240	
56. 1 Penetrometer Testing Machine Standard,	with spares and with 4 sample clamps.	(I)	3900	
57. 1 Tensometer Testing Machine with XY Recorder, all spares.		(I)	5470	
58. 1 Rub-fastness testing Type FEK - Veslic + 5000 Felts + spares.		(I)	4700	
59. 1 Permeometer with new electromics testing machine + spares.		(I)	3700	
60. 1 Lastometer 11 Type STD. 104 + punch.		(I)	2520	
	FOB GRAND TOTAL		43070	57200
	CIF(+16.5%) GRAND TOTAL		50200	

D C L T

4. Information and Library Department.

	Equipment	Specifications	Import(I)FOB Local(L)	Estimated Price US $	Kyat
	(A) Training and Service Aids				
1.	Electrical Stencil Duplicator +Fluid	Gestetner(widely used in Burma)	I	1430	
2.	Electronic Stencil Cutter(Scanner)+ Stencils.		I	1280	
3.	Slide Projector and Film Strip		I	180	
4.	Overhead Projector + Table		I	450	
5.	Screen for item 3 & 4		I	50	
6.	Portable Cassete Recorder,Microphone, Speaker and Amplifier		I	330	
7.	Typewriters (two)	Olympia(widely used in Burma)	I	2200	
8.	Photocopier		I	1900	
9.	Frigidaire		L		11500
10.	2 Exhaust Fans 12"		I	100	
11.	Voltage Regulator:-				
	-4 x 100 KVA, Type SVC 1000W		I	720	
	-2 x 1.5 KVA, Type SVC 1500W		I	480	
	-6 x 5.0 KVA, Type SVC 5000W		I	2400	
12.	Intercom 2 - 11 stations + Adaptor		I	110	
13.	Single Bowl- Double Drainer 50" x 18"		I	210	
14.	35mm Camera,Flash Gun ,Lens and Acessories		I	1650	
15.	Projection TV set with Video Cassette Recorder With adjustable mobile TV/Video stand		I	4400	
		B/FORWARD TOTAL		17870	11500

Information and Library Department(Contd.)

Equipment	Import(I)FOB: Local(L)	Estimated Price US $	Kyat
(B)Locally Available Items for Office, Class Room, Workshop and Others. B/FORWARD TOTAL		17870	11500
1. General Office			
1 Burmese Typewriter 24"	L		4000
4 Tables OS-4	L		560
8 Chairs OS-11	L		440
6 Cupboards OS-13 (Almirah)	L		2820
2 Steel Cabinet C -4	L		1970
Printing Items,Local Letter Head - Papers) Envelopes and) - General Office ")	L		1500
3 Typewriter Table + Chairs OS-5 + OS-8	L		2250
2 Minimax (Fire Extinguisher)	L		130
8 Waste Paper Baskets OS-17	L		150
16 Letter Trays OS - 18	L		280
1 Telephone Switch Board 10 Connections : 4 office) 1 lab.) 1 tannery) 1 Store) 1 Shoe) - center) 1 leather) goods) 1 Kitchen)	L		5200
2. Entrance			
2 Glass Show Case	L		1300
1 Table CT - 18	L		140
6 Setty Chairs (single) SC-16(S)	L		810
Decoration -Flowers	L		1000
3. Director's Office			
1 Chair OS-8	L		560
1 Table OS-1	L		760
1 Table CT-18	L		140
2 Setty Chairs(Single) SC-16(S)	L		260
1 " " (Double) SC-16(D)	L		200
1 Steel Cabinet C4	L		960
1 Cupboard OS-13	L		470
4. Expert's Office:			
1 Chair OS-8	L		560
1 Table OS-1	L		760
1 " CT-18	L		140
2 Setty Chairs (Single) SC-16 (S)	L		260
1 " " (Double) SC-16 (D)	L		200
1 Cupboard OS-13	L		470
1 Steel Cabinet C4	L		960
5. Lecture-Rooms			
2 Platform G 39	L		800
2 Chairs for Lecturer OS-11	L		110
B/FORWARD TOTAL		17870	41740

Information and Library Department (Contd.)

Equipment	Import(I)FOB Local(L)	Estimated Price US $	Kyat
B/FORWARD TOTAL		17870	41740
2 Table for Lecturer			
Demonstration table TD-5	L		880
2 Blackboard 6' x 4 '(wall type)	L		140
45 Desks - Chairs, C- 14	L		3550
4 Erasers/Duster	L		10
4 Packets Chalks	L		10
2 Blackboard-revolving ED-6	L		240
45 Steel Locker + Locks	L		22500
1 First Aid Boxes	L		700
6. Store Room (Tannery Chemicals)			
1 Scale Balance 5 - 50 kg.	I	570	
1 Calculator HR 8	I	60	
5 Plastic Buckets	L		500
3 Plastic Shovels (small)	L		150
4 Pallets	L		400
4 Shelves(chemical samples)6'x5'x1'	L		3000
1 Table OS - 4	L		170
2 Chairs OS - 11	L		110
Office Stationary/Stock List Books	L		300
1 Plier	L		20
1 Hammer 1 lb	L		20
1 Screw Driver	L		10
7. Store Room (Office/Laboratory)Library	L		
1 Table OS-4	L		170
2 Chairs OS-11	L		110
6 Shelves for Laboratory Items	L		730
3 Shelves for Leather bundles	L		360
8 Shelves for Office Items/Library	L		980
8. Work Shop/Spare Parts Store			
1 Vice 6" + Table	L		1200
Pliers,Screw Driver	L		30
1 set Wrenches	L		2400
1 Table OS - 4	L		170
2 Chairs OS-11	L		110
Stationary office items	L		300
Stock list cards/books	L		500
3 Shelves for small spares 6'x5'x1'	L		2250
1 Hammer ,1 lb.	L		20
1 Hand Drilling Machines + drills	L		2000
Screws	L		1000
Nails	L		1000
Lubrication Oils) Hydraulic Oils , Oil frre of resin) - for starting	L		6500
Paints/brushes	L		5000
1 Minimax(Fire extinguisher)	L		120
1 First Aid Boxes	L		700
B/FORWARD TOTAL		18500	100100

Information and Library Department(Contd.)

Equipment	Import(I)FOB Local(L)	Estimated Price US $	Kyat
	B/FORWARD TOTAL	18500	100100
9. Kitchen			
2 Table, OS-7	L		260
1 Cooking hot Plate	L		290
1 Frigidaire	L		11500
3 Tea Set	L		130
24 Cutlery : Forks/Spoons/Knife	L		510
10 Towels,etc	L		510
3 Dining set (4 persons)	L		2100
10. Toilets			
10 Toilet places, wall uriner	L		2500
6 EWC-(Europe Style)	L		3000
Paper Towels Soap) -	L		500
11. Gardening/Plants Inside/Outside	L		1000
12. Cleaning Auxiliaries			
Various Items	L		1000
18 Basins and acessories	L		6300
13. Outside Lighting			
4 Corners-light FA.4142 OGL) - 2 Street lights, FA.4142 OGL)	L		2370
14. Lamps			
300Lamp,fluorescent	L		72000
15. Aircondition			
8 Airconditioner single for window type	L		83000
16. Fans			
26 Ceiling Fans 52"	L		48230
4 Table Fans 12"	L		2900
FOB GRAND TOTAL		18500	338200
CIF(+16.5%)GRAND TOTAL		21600	

D C L T

5. AUXILIARY EQUIPMENT

	Estimate of Cost.FOB US $	Kyats
(A) TRANSFORMER HOUSE		
1. 1 Cubicle complete with protection,metering and main feeder oil cirouit breake with 200/5 CT ratic of oil circuit breaker 6600V-600 amp with scces.ories	5300	
2. 1 Disconnecting switch,3P-7.2KV and Lightning arrester draw out type	8440	
3. 1 6.6KV incoming main cubicle	18250	
4. 1 6.6KV control cubicle for 500KVA,6600/400-230V transformer	15400	
5. 1 500KVA,50Hz 3-phase transformer 6600/400-230V indoor type with accessories	8450	
6. 1 Control cubicle 400V	9700	
7. 1 Cubicle for No.1 500KVA transformer secondry 400V side	11900	
8. 150M-600V CVVDLTZV cable 2 x 2mm^2	240	
9. 2000M-6600V 3-core cross-linked polythylene Insulated PVC covered,Steel Daimantel.Armoured and PVC oversheathed power cable,copper conductor, 80mm^2	41250	
10. 7 cable pot heads for abovecable,Indoor Use	630	
11. 50M-600V 4 core underground power Cable cross sectional area of 3 x 325 mm^2 and 1 x 325mm^2	3550	
12. 45 Power insulation adhesive Tapes for 500volt for tropical climate 19mm W x 5M	50	
13. 1 Cable cutter	120	
14. 1 Cable crimping plier up to 8mm^2	20	
15. 1 Cable crimping plier 14-100mm^2	320	
16. 1 Insulating Polytester	340	
17. 1000 M- Bare copper wire 5mmø	1000	
18. 6 - 600V cable termination for 40-325mm^2 steel armoured cable indoor use	1000	
19. 100 Power insulation self bonding tape for 500V for tropical climate W 19mm x T0.5 mm x 10M	250	
20. 1 Clip on meter for Max. 300A,AC,1200V AC (Use lead with probe and plug)with case	220	
B/FORWARD TOTAL	126430	

AUXILIARY EQUIPMENT (Contd.)

		Estimate of cost FOB	
		US $	Kyats
	B/FORWARD TOTAL	126430	
20.	1 Insulation test Model 3207 with carring case 100m/500 volt		460
22.	1 Multirange Instrument for measuring AC voltage up to 1200V for measuring leakage current test with case		600
23.	4 Ventilating Fan 200V 10" exhaust only		110
24.	1 Electric Hand Drill with concrete Drills set		1100
	B/FORWARD TOTAL	128700	

AUXILIARY EQUIPMENT (Contd.)

	Estimate of Cost. FOB US $	Kyats
B/FORWARD TOTAL	128700	
(B) ENGINEERING MACHINE SHOP		
1. 2 Set Drawing Instruments	130	
2. 2 Set Lettering Guides	220	
3. 2 Set Technical pen	80	
4. 2 Tracing paper 80/85 42" x 20yds.	20	
5. 2 Scientific Calculator	60	
6. 2 Electric Hand drill 13mm chuck	70	
7. 1 Circular Saw	30	
8. 2 Jig - Saw	40	
9. 1 Shear Cutter	80	
10. 1 Soldering Iron	70	
11. 1 Bench Grinder	70	
12. 1 Air-less Spray Gun	30	
13. 1 Electric Arc Welder Complete set	4400	
14. 1 Oxy-Acetylene Gas Welding Equipment Complete	2200	
15. 1 Heavy Duty Engineering Vices	880	
16. 1 Mechanical Horizontal saw with 50 spare Blades	1760	
17. 1 Bench drill + 4 Set of drill bits	2200	
18. Selection of hand tools and equipment	8500	
19. 1 Chain block - 2 ton - 5.5 meter	110	
20. 1 Single bowl single drainer reversible 82" x 18"	110	
21. Selection of Measuring Equipment etc.	2200	
B/FORWARD TOTAL	159160	

AUXILIARY EQUIPMENT (Contd.)

	Estimate of Cost. FOB US $	Kyats
B/FORWARD TOTAL	159160	
(C) SITE EQUIPMENT		
1. 1 Set Fork lift truck 3 ton + spare	9900	
2. 2 Set pallet truck hand operated 2 ton.	660	
3. 1 Set of Oil/Gas fires Boiler and Auxiliary equipment "Instant boiler" up to 1 Ton	58000	
4. 1 Lot of steam pipe and Accessories	7700	
5. Aircompreser with air tank and pipe and accessories	11000	
6. 1 Auto-on/off water pump complete with sensor and check value.	9900	
7. 1 Ventilating Fan 12" Exhaust	440	
8. 1 Force draft Fan	2200	
9. 1 Lot electrical cables, cable rack DB and accessories for power distribution	59800	
10. Effluent treatment plant	44000	
FOB GRAND TOTAL	367760	
CIF/+16.5% GRAND TOTAL	428500	

ANNEX 5

EDUCATIONAL AND PROFESSIONAL BACKGROUND
PRACTICAL FIELD EXPERIENCE/ TERMS OF REFERENCE
FOR DCLT (NATIONAL STAFF)

INTRODUCTION :

While preparing enclosed details, consideration is given to a situation of the functioning of the DCLT at its final stage of operation. Enclosed, Educational and professional background, practical field experience outlined is likely to be achieved after about five years of operation of the DCLT, excluding the time anticipated for training of manpower planned through the UNIDO Fellowship Programmes. Information provided will be a useful guide while selecting candidates for training of personnel included in the DCLT's organization structure.

1. DIRECTOR

Educational and Professional Background :

(a) Degree in Leather Technology or Degree in Chemical Engineering with basic studies in Leather, Footwear and/or Leather Products Technology.

(b) Diploma in Leather Technology.

(c) Diploma in Leather Technology with additional qualifications such as Associateship (ACFI) or Fellowship (FCFI) of the Clothing and Footwear Institution or Diploma in Footwear and/or Leather Goods Technology or Designing.

Practical Field Experience :

In case of (a) - minimum of five years of industrial and/or research and development background working in the Leather and Leather Products Industries. In case with a Candidate having basic studies in Leather Technology, this period will be released to three years.

In case of (b) and (c), minimum of 10 years of Industrial and/or Research and Development Background working in the Leather and/or Leather Products Industries.

Responsible to :

Managing Director of General Industries Corporation (GIC), Ministryof No.1 Industries.

Terms of Reference :

1. Directly responsible for the overall activities of the DCLT including its co-ordination with GIC, Ministry of No.1 Industries, Leather and Leather Products Industries sector throughout the country and carry-out his/her duties as may be directed to him by the Managing Director of GIC.

2. Co-ordinate all the activities, where applicable, in relation to all the aspects of assistance/co-operation received from various international, bilateral or other related agencies to the DCLT, including guidance/directing provided to the Team of Experts or individual, who will be assigned to him/her either directly at the DCLT or through co-ordinating organization.

3. Responsible in guiding, providing and designating various types of activities/information/research and feed-back to and from DCLT to various related organizations.

4. Participate, where necessary in various extension services, seminars etc. to be carried-out by the DCLT including appropriately assigning duties and recruitment of experts, staff and other personnel.

5. Prepare periodic plan of action for DCLT's functioning based on the needs and priorities of the Government policies and sectoral needs including advicing higher authorities about appreciated steps to be taken in the interest of the development of the industry.

2. PROJECT ASSISTANT

Educational and Professional Background

(a) Degree in Leather Technology or Degree in Chemical Engineering with basic studies in Leather, Footwear and/or Leather Products Technology.

(b) Diploma in Leather Technology.

(c) Diploma in Leather Technology with additional qualifications such as Associateship (ACFI) or Fellowship (FCFI) of the Clothing and Footwear Institution or Diploma in Footwear and/or Leather Goods Technology or Designing.

Practical Field Experience :

In case of (a) - minimum of three years Industrial and/or Research and Development Background or alternatively experience related to the general aspects of project planning and appraisal of any institution of recognization.

In case of (b) and (c), minimum of 5 years of Industrial and/or Research and Development Background working in the Leather and/or Leather Products Industries. Experience related to project planning and appraisal will be of value.

Responsible to :

Director of DCLT, under the direct control of the General Industries Corporation.

Terms of Reference :

1. Responsible in co-ordinating all the DCLT activities in relation to its outlined functions and objectives for the Development of Leather and Leather Products Industries sector. He/she will carry-out duties as may be assigned by the Director of DCLT.

2. Assist in co-ordinating and monitoring all the R&D training and other activities including its application for the sector and also various international/bilateral assistance or co-operation extended to DCLT.

3. Assist in co-ordinating the implementation of various operations as well as formulation of all the departmental/sectional activities of DCLT in co-operation with the related heads of the units.

4. Providing desired information/data related to the industrial sector as well as results from the activities carried-out by the DCLT to the Director and other responsible authorities for efficient and effective operation of the institution.

5. Participate, where necessary in various extension services, seminars etc. with a possibility of representing the DCLT whenever such work that may be assigned to him/her by the Director.

6. Assist in the recruitment, monitoring of performance of various experts, staff and other personnel for the DCLT.

7. Assist in preparing periodic plans for DCLT's functioning including providing necessary feed back and advice to the Director on the policy matters.

3. SENIOR LEATHER TECHNOLOGIST

Educational and Professional Background :

(a) Degree in basic Science with additional qualifications or formal training in Leather Technology.

(b) Degree/Diploma in Leather Technology.

(c) Higher Technicians Certificate recognized through institutions such as City and Guilds of the UK in heavy, light leather, leather dyeing and finishing.

Practical Field Experience :

In case of (a) and (b), a minimum three years of Industrial, Training or Research and Development Background related to the Leather Industry with up-to-date methods of tanning techniques.

In case of (c), a minimum of five years experience in the areas mentioned above.

Responsible to :

The Director or DCLT or authorities assigned by the Director to co-ordinate the activities of the departments.

Terms of Reference :

1. Responsible to undertake all the functions of the Leather Technology Department related to extension and support services as outlined in the output functions of the DCLT and related to this department. His activities will include desired outputs related to the basic and applied research standardization carried-out for the Leather Industry including its result oriented practical applications on the production flow. He/she will be responsible towards monitoring the achievements through such activities and assistance to the industry including upkeep of all the records.

2. Responsible in the preparation of various training programmes required for the sector and its effective implementation as well as monitoring the practical use made in the industry

3. Responsibile in co-ordinating all functions of the department with other departments/sections of the DCLT including his/her participation in the preparation of necessary R&D training and other service related aspects for the development of the sector. He/She will further undertake activities as may be assigned to him by the Director or other authorized co-ordinating officials.

4. SENIOR FOOTWEAR AND LEATHER PRODUCTS TECHNOLOGIST

Educational and Professional Background :

(a) Fellowship or Associateship (FCFI or ACFI) of the Clothing and Footwear Institute.

(b) Diploma in Footwear or Leather Products Technology with basic studies in Designing.

(c) Diploma in Footwear or Leather Products Designing Technology with basic studies related to its production techniques.

(d) Higher Technicians Certificate recognized through the institutions such as City and Guilds of UK in Footwear, Leather Products or Designing Technologies.

Practical Experience :

In case of (a), (b) and (c) a minimum of three years of Industrial, Training or Research and Development Background related to the Footwear, Leather Products and/or Designing with up-to-date methods and its appropriate techniques.

In case of(d) a minimum of five years of experience in the areas as mentioned above.

Responsibile to :

The Director or DCLT or authorities assigned by the Director to co-ordinate the activities of the Department.

Terms of Reference :

1. Responsible to undertake all the functions of the Footwear and Leather Products Department related to extension and support services as outlined in the output functions of the DCLT and related to this department. His activities will include desired outputs related to the basic and applied research, modernization carried-out for the Leather Industry including its result oriented practical applications on the production flow. He/She will be responsible towards monitoring the achievements through such activities and assistance to the industry including up-keep of all the records.

2. Responsible in the preparation of various training programmes required for the sector and its effective implementation as well as monitoring the practical use made in the industry.

3. Responsible in co-ordinating all the functions of the department with the other departments/sections of the DCLT including his/her participation in the preparation of necessary R&D, training and other service related aspects for the development of the sector. He/she will further undertake activities as may be assigned to him by the Director or other authorized co-ordinating officials.

5. SENIOR LABORATORY CHEMIST

Educational and Professional Background :

(a) Degree in Leather Technology, Chemical Engineering or Basic Science with Diploma or a formal training in Leather Technology with specific knowledge of Chemical analysis, physical testing of Footwear, Leather and Leather Products and its allied fields including water, effluent treatment, auxiliary products, etc.

(b) Diploma in Leather Technology with specific knowledge or training of Chemical analysis, physical testing of footwear, leather and leather products and its allied fields including water effluent treatment auxiliary products, etc.

Practical Field Experience :

In case of (a), minimum of three years of experience in Leather Industry or Organizations related to basic research and/or analytical work experience in a Laboratory.

In case of (b), minimum of five years or experience in Leather or Organizations related to basic Research and/or analytical work experience in a Laboratory.

Responsible to :

The Director or DCLT or authorities assigned by the Director to co-ordinate the activities of the Department.

Terms of Reference :

1. Responsible in overall operation and control of the laboratory, work related to various aspects of Chemical and Physical tests for end-users including that of various departments/sections under DCLT as well as Leather and Leather Products Industry sector in Burma.

2. Responsible in providing various extension and support services as outlined in the output functions of the DCLT. His/her activities will include support services provided to various departments/sections of the DCLT and monitoring of the achievements for the assistance provided by the Laboratory.

3. Responsible in co-ordinating various functional activities of the section with other departments/ sections of the DCLT including preparation and implementation of necessary R&D, training and other service related aspects to the development of the sector. He/She will further undertake activities as may be assigned to him by the Director or other authorized co-ordinating authorities.

6. ENGINEER (MAINTENANCE)

Educational and Professional Background :

(a) Degrees in Mechanical Engineering with specialized training in Tannery, Footwear, Leather Products and allied industries machinery and equipment. Suitable background training related to project planning, appraisals as well as aspects of factory buildings, maintenance will be of advantage.

Practical Field Experience :

Minimum of three years of practical experience preferably working in the Leather and Leather Products Industries in the areas of maintenance, project planning, installation work.

Responsible to :

The Director or DCLT or authorities assigned by the Director to co-ordinate the activities of the Department.

Terms of Reference :

1. Responsible to undertake all the functions of the Engineering Department/Section related to the extension and support services as outlined in the outputs functions of the DCLT with specific reference to problem solving in plants, improvement and supervision of the overall preventive maintenance, monitoring of the machine outputs to be able to optimizing efficiency, introduction and improvement of proper maintenance and upkeep methods to be carried out on an advisory or ad-hoc basis with planned inputs provided to the industry.

2. Responsible to provide assistance in the preparation of required inputs in the planning and establishment of new projects, rehabilitation of existing units including upkeep of factory buildings and layouts in general.

3. Will be expected to undertake development activities to design and upgrade the establishment of spare parts and consumption materials that can be manufactured within the country with a view to implementing objectives of import substitution.

4. He/She will be expected to design and implement the appropriate training programmes for the engineering personnel in the Leather and Leather Products Industries sector including his participation in the similar activities for other sections.

5. Will be responsible to co-ordinate activities with all the departments/sections of the DCLT and undertake duties as may be assigned to him by the Director or other authorized concerned official.

7. INFORMATION OFFICER

Educational and Professional Background :

(a) Degree in Library or other equivalent subjects.

(b) Diploma in Library Science or other equivalent subjects.

Practical Field Experience :

In case of (a), a minimum of three years of experience working in training or research or similar institutions in Library/Information.

In case of (b) a minimum of five years of experience working in training or research or similar institutions in Library/Information.

Practical field experience may be related in case where the candidate will have a suitable background to operate information unit as planned for DCLT to perform job duties as laid down below.

Responsible to :

The Director or DCLT or authorities assigned by the Director to co-ordinate the activities of the Department.

Terms of Reference :

1. Responsible to the overall and up-to-date information and documentation related to the DCLT's functions and where applicable deciminate such information feed-back to the DCLT's officials, departments/sections as well as to other authorities and industry. Such feed-back information will include materials related to markets, fashion trends, statistical data analysis as well as abstract informations based on various publications received related to the leather, leather products and allied industries.

2. Responsible in overall co-ordination and application of activities in relation to various functional services provided by the DCLT.

3. Responsible to provide assistance in the preparation of required inputs in the planning and development of the DCLT and the sector as a whole and undertake duties as may be assigned to him by the Director or other authorized concerned officials.

8. ASSISTANTS

(i) Junior Leather Technologist.

(ii) Junior Footwear Technologist.

(iii) Junior Leather Products Technologist.

(iv) Junior Footwear/Leather Products: Designer/Pattern Cutter.

(v) Junior Laboratory Chemist.

Educational and Professional Background

(i) (a) Diploma or Certificate in Leather Technology.

(b) City and Guilds Certificate in Heavy, Light Leather and Leather Finishing.

(ii) (a) Diploma or Certificate in Footwear Technology.

(b) City and Guilds Certificate in Footwear Technology.

(iii) (a) Diploma or Certificate in Leather Products (Goods) Technology.

(b) City and Guilds Certificate in Leather Products (Goods) Technology.

(iv) (a) Diploma or Certificate in Footwear/Leather : Products (Goods) Designing/Pattern Cutting

Practical Field Experience :

For above positions, a minimum of two years of practical experience working in the industry or training institutions is essential.

(v) Junior Laboratory Assistant:
Educational and Professional Background :

(a) Degree in Chemistry or Physics or Chemical Engineering.

(b) Diploma in Laboratory Attendants Course with Chemistry and Physics Background.

(c) Diploma or Certificate in Leather Technology.

Practical Field Experience :

In case of (a), minimum of one year of experience working in Laboratory is essential.

In case of (b), minimum of three years of experience working in Laboratory is essential.

9. ATTENDANTS

Educational Background and Work Experience :

Certificate in their respective field of specialization. In case where the candidates have adequate practical experience, educational requirements may be relaxed. However, he/she should be able to reach and follow written instructions in Burmese and preferably in English too.

Note : - Terms of reference in job catagories listed in (8) and (9) will be prepared by the NPD/Government authorities at a later stage. Same applies to all other administrative/Finance and support staff to be undertaken by the NPD/Government authorities in accordance with the procedures in Burma.

ANNEX - 6

GUIDELINE SYLLABUS

FOR

SUGGESTED COURSE PROGRAMMES

(DCLT)

(A) Leather Technology Department
(B) Footwear and Leather Products Department
(C) Engineering (Maintenance) Department/Section
(D) Laboratory Department/Section

INTRODUCTORY NOTES :

Enclosed syllabus provides a general guidelines regarding various aspects and topics that will be covered through different course programmes recommended for the DCLT. These courses, as planned at present, are designed for the people employed in the existing industry. Therefore, detailed information related to the qualification requirements for such a course including objectives on a broad-term is not included at this stage. It may be pointed out that the training functions/services from the DCLT's inputs is calculated at 20 per cent and major outputs reflect on basic and applied R&D activities, and its transfer of know-how to the industry which will also form and fulfil additional objectives of training for the sector.

TRAINING COURSE SYLLABUS FOR DCLT

(A) LEATHER TECHNOLOGY AND LABORATORY

(1) Course Name : Quality Control and Standardization

Duration : Total period 4 weeks : -
2 weeks Theory
+ 2 weeks Practical or Inplant Training

SYLLABI :

Theory : i. Theme of quality control and standardization, their significance and importance in Leather manufacture, i.e. basic chemical analysis, physical testing and other useful practical tests and process control.

ii. Explanation of commonly used chemicals and auxiliary products in the leather production, its common properties, identification of their application, results and commonly used test methods.

iii. Utilization of hides and skins, their common defects with resulting properties on leather produced. Curing practices, grading, their economic advantages, features of different types of leather produced from various types and origin of raw stock including importance of value added product-mix output.

iv. Specific types of leather and their important characteristics and required properties.

v. Analytical study and quality control of various operations in the leather processing. Testing, trials and evaluation of various auxiliaries, chemicals, finishes used in the leather manufacture.

vi. Effluent treatment, solid waste disposal and its importance in an economic operation of the tannery and envoirnmental aspects.

vii. Interpretation of data obtained both from physical grading and interoperation controls and chemical and physical testing of leather to be able to achieve desired standards for marketing of leather produced.

viii. Factory safety, health and fire hazards, importance and storage of raw materials, chemicals, their handling as well as application of first aid.

Practical :

i. Preparation of standard solutions of acids, alkalies and salts.

ii. Simple titration and testing of commercial acids, alkalies and salts.

iii. Study of the reactions of the radical, flame and charcoal tests related to : carbonate, sulphate, sulphide, chloride, thiosulphate, chromium, aluminium, lead,iron, etc.

iv. Determination of percentage purity of common salt, available lime, sulphide, etc.

v. Simple determination of lime in limed pelt, sulphide present in used lime liquor, acid and salt in used pickle liquors, chrome salts in chrome liquors, etc.

vi. Simple tests for identification of defects and its origin at various processing stages.

vii. Physical testing of various types of leather such as tensile strength, elongation, stick tear, flexing, etc.

viii. Production of various types of leather and their up-dated techniques using cattle and buffalo hides, goat and sheep skins to include wet work upto WBC, post tanning operations, dyeing and finishing including knowledge of the specific characteristics and usages of various machinery and equipment, required in different operation of leather manufacture.

ix. Elements of quality control in the tannery and leather manufacture in general.

(B) FOOTWEAR AND LEATHER PRODUCTS TECHNOLOGY AND LABORATORY

(1) Course Name : Leather Cutting, Preparation and Stiching Course for Footwear and Leather Goods

Duration : 3 weeks Theory/practical
1 week - in-plant or DCLT Training

SYLLABI

Theory :

i. General introduction to leather, types and their varieties, common defects and sequence of operations involved in the difference methods of tanning.

ii. Relative values of leather linked with various types of footwear and leather products produced. Relation of size tc pattern looks and effects on product costs.

iii. The importance of properties, their tests and techniques used in economic use for the various types of footwear and leather products manufacture.

iv. Importance and application of hand cutting prior to pattern and/or knife placement taking into consideration tightness, substance, degree of stretch, surface texture, pattern look, colour match, etc.

v. Techniques used related to multi-layer cutting of fabrics and other materials.

vi. Assessment and practical yields based on the area issued and calculation of the percentage cutting value of various type of leather, fabricks etc.

vii. Detailed introduction to skiving techniques, knife splitting machines and other edge shaping equipments. Methods of edge treatment, folding, pleating scanning and joining component.

- staff relation, organizational chart, duties and responsibilities including co-ordination. Staff relation and communications/periodic meetings;

- importance related to safety and first aid standards in the tannery;

- materials managements beginning with its ordering, procurements, consumption/usage/ordering levels, storage as well as physical aspects of issues, stock taking, related records, sample and bulk testing, self life and its importance etc;

- topics related costing, financial and general administrative management in the tannery.

Practical : Practicals will be restricted to few important types of leather on experimental scale in a pilot tannery with a possibility of providing necessary appreciation to the theoratical and group discussions.

(4) Course Title : Production, Middle Management Staff, Foremen Level Course including material/financial management.

Duration : Total period 2 weeks : -

1½ week Theory

½ week Practical or Inplant Training

SYLLABI

Theory : Principles of Leather Manufacturing to include following topics : -

- raw hides and skins histology, properties, preservation and various types of leather produced;
- basic technological applications and their practical controls in the leather manufacturing;
- common chemicals/auxiliary chemicals as well as consumption materials used the leather production including their calculations in relation to requirements and costing;
- common terms and terminologies used in the leather manufacturing;
- different types of tanning methods, their principles and resultant leather produced;
- appreciation of various characteristics and properties required of wet blue, crust, ready-to-finished and finished leather.
- knowledge of the specific characteristics, usages and performance of the machinery and equipment used in the leather production;
- basic elements of quality control and production procedures its monitoring and analysis of results from the production flow and performance.
- cost appreciation, economic use of materials, direct/indirect costs related to labour, fuel, power and other fixed overheads. Choice of chemicals and auxiliaries in relation to end marketable product output;

Practical : Practicals will cover the following important areas of operations with specific training/ instructions to the candidates field of specialization : -

- sorting, selection and grading;
- general tannery handling;
- various machine operation, their basic control, handling, preventive - cleaning maintenance;
- importance in various practical aspects of handling of materials related to specific types of leather to be produced.
- a detailed briefing about chemical inputs in various wet and dry operations in the leather production including its application, and their analysis of results on the quality of leather.

(3) Course Title : Machine Operative and Production Supervisoring Course

Duration : Total period 3 weeks : -
1 week Theory
+2 weeks Practicals or Inplant Training

SYLLABI

Theory : Course may be designed in the following alternative sections to correspond to the major departments of processing : -

- Beam house
- Tanning Department
- Retanning, dyeing, fathiquoring and post operation covering the operations upto crust/ready-to-finished leather.
- Finishing
- Sole, heavy, industrial and other leather products specialized types of leather.

Following topics of general nature will be covered : -

i. Process flow chart and importance/objectives of machinery operations in each stages, commonly used terminologies in the leather manufacture.

ii. Description of various types of hides and skins, kinds of leather produced and importance of physical handling of hides and skins and leather at various interoperation and finished stages.

iii. Specific knowledge in drum operations such as importance of float ratios, temperature, pH, Be'/ barkometer, drum speeds and duration, additions of chemicals as well as basic tests and their records during drum operations.

iv. Cost conciousness resulting from various machinery/ equipment operations, handling of materials including basic safety and first aid guidelines in the tannery.

Practical :

i. Examination and inspection of leather at various stages of processing and also at finished stage.

ii. Analysis of selection/grading results in respect to inputs, overall quality control aspects as well as costing.

iii. Visits to various leather, footwear and leather products and allied industries.

(2) Course Name : Training in Grading and Assortment

Duration : Total period 3 weeks : -
1 week Theory
+ 2 weeks Practical or Inplant Training

SYLLABI

Theory : i. Main features of different types of hides and skins in relation to : -

- the production of leather and leather products manufacturing;
- defects and damages with specific reference to its origins and causes, preservation, process defects including machinery damages, their possible improvements through appropriate actions consequential to the grader's/ assorter's duties;
- standards related to leather and leather products as finished leather or product or interoperation stage controls;
- importance of parameters such as substance, thickness, area/weight, pattern, colour, etc. Non-destructive and basic evaluation tests such as general appearance, uniformity of colour and grain, fullness, break, tear strength, cracking, dry and wet rub fastness, adhesion of finish, level dyeing chrome penetration, shrinkage temperature, etc;
- classification of tannages of various types of leather including grain and suedes;
- importance of practical aspects in conducting selection/grading such as light and basic basic auxiliary facilities such as tables, horses, etc;
- packing and its effects on prolong transport or shipment on leather.

ii. Factory safety, health and fire hazards, importance and storage of raw materials, chemicals, their handling as well as application of first aid.

(C) ENGINEERING (MAINTENANCE)

(1) Course Name :

Training in Preventive and Regular Maintenance of Leather Machinery

Training in Preventive and Regular Maintenance of Footwear and Leather Products Machinery

Duration : 2 weeks (each)

Both the course syllabus are taken together at this stage for the Engineering (Maintenance)

SYLLABI

Theory and Practical :

i. Procedure and techniques in supervision of maintenance techniques, execution of and general application, planning and control in the tannery/footwear - leather product machinery.

ii. Study of various types of machinery and equipment used in the production of leather/ footwear - leather products industry and their applications.

iii. Formulation, erection, dismanteling the parts for overhaul, repairs, renewal including alignment of machines and its settings, identification of functioning defects related to mechanical, hydraulic, pneumatic and electrical systems, reading of drawings related to the equipment, spare parts, circuit diagrams, etc.

iv. Maintenance procedures and its physical control including upkeep of records.

v. Programming and planning of ordering, storage of spare parts, accessories and consumables, their coding and classification, inventory including preparation of manuals, training and guidance to machine operators.

vi. Importance of repairs, renewals, etc. on production performance and its programming.

vii. Importance of safety measures, identification of areas of accident occuring for various types of machines, prevention and precautionary methods including introduction of preventive guards, mechanical, electrical or pneumatic safety methods. First aid, fire prevention kits and training for its use.

viii. Training background of the maintenance and upkeep of effluent treatment, waste disposal and other support facilities in the tannery/footwear and leather products factories.

(4) Course Name : Refresher Training Course For Small Scale Co-operative Footwear And Leather Products Manufacturers

Duration : 3 weeks : -

2 weeks Theory

1 week Practical

SYLLABI

Theory and Practical :

i. Improved sandal and slipper design and making to include decorations techniques, stiching, perforation, embossing, carving, plaiting, weaving, tinting, polishing, etc.

ii. Hand stitched and hand finished soles, channeling, sewing and stitching with improved methods and design.

iii. Introduction of suitable techniques of bottom scraping, buffing, finishing to include items of motifs and folk art embossing effects.

iv. Footwear and leather products with decoration stitching techniques with an aim to develop practical skills, progressing from the simple to the more complex designed practices.

v. The value and increased use of wood, cork and thermoplastics as components in the footwear as components.

vi. General workflow and briefing about the various types of modern and up-dated methods and practices in the footwear and leather products manufacturing.

(3) Course Name : Production, Middle Management Staff Course To Include Production And Financial Management Related to Footwear And Leather Products Technology

Duration : 2 weeks : -

1½ week Theory

½ week Practical

SYLLABI

Theory and Practical :

i. Importance and demonstrate continueing need to maintain quality standards in respect to developed specifications through Designing/Pattern cutting, compilation of schedules for material component.

ii. Appraisal and interpretation of datas related to materials utilization, production and its output, economic and financial control levels in the factory.

iii. Percentage and consignment checks and comparison with the standards and original standards.

iv. Machine operation and its output quality tolerances within the acceptable standards, its importance in the footwear and leather products industry.

vi. Routine and regular inspection and servicing and general briefing about various operations in the production of footwear and leather products.

vii. Basic important laboratory tests and its application in the production flow.

viii. Importance of safety and first aid in the factory.

(2) Course Name : Design, Pattern Cutting and Grading Course for Footwear and Leather Products Manufacturing

Duration : 4 weeks

SYLLABI

Theory and Practical :

i. Sources and types of new designs, materials in use such as for uppers and forms as leather and simulated materials, canvas, fabriks and non wooven materials. Fashion influences of such materials and designs in fashion amd marketing.

ii. Forme cutting methods and their effects on the final pattern of footwear and its comparative methods. Trial pattern based on proto-type mock-up in paper and card-board production and preparation of standard patterns and sectioning into component for different styles and master patterns. Preparation of markers, materials and information connected to edges, seams, linings and methods of assembly etc.

iii. Principles of methods of grading to include sole and insole pattern cutting.

iv. Evaluation of tooling costs for pattern knife production, pattern saling methods, procedures for estimation and assembly of the cost of upper and other cost component.

v. Instructions and demonstration related to small leather goods, sports goods and other hard wearing items.

vi. Range building, bulk production based on samples and relative pricing and marketing methods.

viii. Detailed introduction to various types of sewing machines i.e. flat, post, cylinder and other common types used in the footwear and leather products manufacture, their use, importance in quality performance, incorporation of various metalic decoratives or functional items.

x. General importance in the departmental work scheduling, importance and practices of safety and first aid.

Practical :

i. Practical will be based on the above theory courses providing the trainees with the facilities and knowledge leading to standardized product results with specific importance to quality and economic output.

ii. Development of practical skills in stiching from simple to more complex types through practical training.

(D) LABORATORY DEPARTMENT/SECTION

(1) Course Name : Chemical and Physical Analysis of various types of Leather, its application and control in the production operation scale

Duration : Total period 4 weeks : -

3½ weeks at DCLT Theory/Practical

½ week inplant as a short project in application of results obtained from DCLT training.

SYLLABI

Theory and Practicals (DCLT)

i. Theme of quality control and standardization, their significance and importance in leather manufacture. Practical usefulness of Chemical and Physical Analysis, interpretations of results on the quality aspects of leather produced and other useful practical tannery tests.

ii. Specific types of leather and the quality, important characteristics and properties required.

iii. Sampling preparation and analysis of various types of leather at its finished as well as at various interoperation stages including basic principles of such a analytical work concerning both chemical and physical tests.

iv. Analysis and principles of various interoperations samples of items such as lime liquor, pickle, chrome exhaust and vegetable tanning liquors, etc.

v. Useful simple tests for identification of the defects, stains in the processing stages.

vi. Microscopic Study for visual study of histology of hides and skins, grain pattern, fibre structure of leather and changes seen through the microscopic study during various processing stages.

vii. Fundamentals of bacteriology, their culture with specific reference to bacterias, moulds, problem of "red-heat" etc. in the leather processing.

viii. Analysis of water, effluent treatment including importance of fire and other environmental hazards.

Inplant Study :

i. The trainees will be given topics to prepare a case-study in a tannery of their practical application on the production line, based on the knowledge gained at the DCLT for evaluation and final discussions at the DCLT.

(2) Course Name : Chemical and Physical Testing of Footwear and Leather Products, its Application and Control in the Production Operation Scale

Duration : Total period 4 weeks : -

3½ weeks at DCLT Theory/Practical

½ week inplant as short project on application of results obtained from DCLT Training.

SYLLABI

Theory and Practical (DCLT)

i. Characteristics and properties of leather and other materials used, sampling and its positions.

ii. Interpretation of physical tests in footwear and leather products both as laboratory and practical application examinations on the production line and its theoratical background.

iii. Detailed chemical tests in the footwear and leather products industries.

iv. Considerable number of tests which are covered in leather analysis are common and should be included in such training programme.

v. Physical testing of auxiliary fittings such as toepuffs, platform materials, shank, heel, eyelets, zip fasteners and other metallic components.

vi. Importance and application of fire and other environmental hazards from the factories.

Inplant Study :

i. The trainees will be given topics to prepare a case study in a footwear or leather goods factory of their practical application on the production line based on the knowledge gained at the DCLT for evaluation and final discussions at the DCLT.

(3) Course Name : Testing of Chemical and Consumption Materials used in (A) Tanneries and (B) Footwear and Leather Products Industries

Duration : Total period 4 weeks : -

3½ weeks at DCLT Theory/Practical

½ week in-plant as a short project on application of results obtained from DCLT training.

SYLLABI

Theory and Practical (DCLT)

i. Principles and methods employed for various chemicals and auxiliary materials in tannery, footwear and leather products industries

ii. Analysis of effluent, water and importance of environmental problems such as solid waste disposal as well as factory fire and safety hazards.

iii. Analysis of locally available materials, such as oils and fats, vegetable tanning materials etc. and application of results in practical use of such materials in the production as a possible exercise to undertake import substitution programmes.

iv. Presentation of standards required in the characheristics and properties of leather, leather boards, textile, rubber etc. and their analytical methods and practices.

v. Interpretation of analytical datas on the production flow including usages reflecting on its purchases and acceptability of standards delivered.

Inplant Study :

i. The trainees will be given topics to prepare a case study in a tannery footwear or leather goods factories of their practical application on the production line, based on the knowledge gained at the DCLT for evaluation and final discussions at the DCLT.

Note : - This course is planned jointly as there are numbers of common factors concerning the use of material in the tanneries, footwear and leather products industries and such a training will provide a better understanding of the problems. In case, where, the trainees will require specialized training such as chemicals etc.,groups may be split to their sections accordingly.