3-3-2 Contents of activities

Activities that are being planned accompanying the expansion of FDC are roughly as follows.

* Quality evaluation of food required by export markets and the food industry, and research for preparation and development of standards
* Development of a quality control system for all areas from production to processing to distribution
* Trial production of product samples and development of new products
* Training in food production, processing and distribution
* Collection and analysis of various information and data, and public relations activities.

The above five are FDC's basic activities; and in order to attain its target of upgrading the quality of export foods, FDC palns to systematically link each of its functions, namely, the function of identifying specific problems (quality analysis and tests), the function of studying improvement measures (Processing tests) and the function of offering specific technical guidance based on the results of study (extension service), each as a part of the flow, in order that quality control, sanitation control, quality improvement, product improvement and process improvement may be implemented by every enterprises (Refer to Fig. 3-3-2). It is from such a viewpoint that FDC to expand its activities in such a way as to have each function balance with the other. Proportionately, it assumes 40% of quality analysis and tests, 40% of processing tests and 20% of technical guidance (extension service) and training.

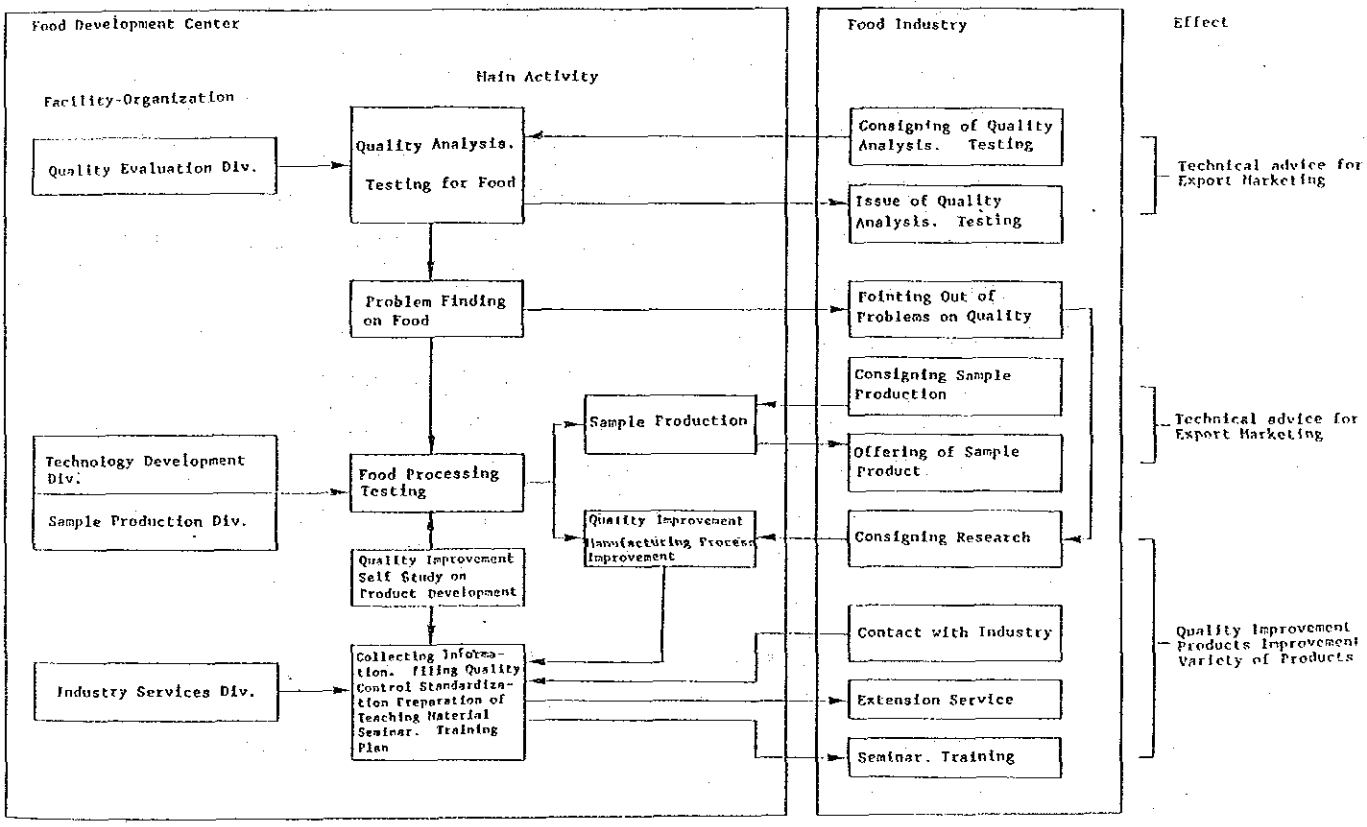
FDC plans to expand its workload as follows.

Processing tests

①	Trial production for product samples	30 cases/year
②	Tests for quality improvement, product improvement and process improvement	25 cases/year
③	Tests for standardizing quality control	15 cases/year
	Total	70 cases/year (about 2.5 times the present level)

Quality analysis and tests	3,000 cases/year (about 1.5 times the present level)
Extension services	50 cases/year (about 2.5 times the present level)
Training	24 cases/year (about twice the present level)

Fig. 3-3-2 Flowchart of FDC's Main Activities



Each of the four divisions of Quality Evaluation, Technology Development, Sample Production and Industry Services will respectively take partial charge of these activities. The specific contents of the activities that each division will perform are as follows.

(1) Quality Evaluation Division

For the benefit of the Philippine small and medium scale enterprises, it will analyze and inspect the quality of processed foods manufactured by them upon their requests to improve the quality of processed foods. The Division will also engage in research on food sanitation standards.

1) It will undertake the following quality analysis by commission of each enterprise.

* Chemical analysis:
  Total soluble solids, water activity, pH, acidity, crude protein, salt, water content, crude fat, sugar, ash, free fatty acid, crude fiber, vitamin C aflatoxin, soluble benzoate, peroxide value, hardness of water, purity of nitrite acid, chromaticity, chlorine concentration, sulfite acid, sciff's test (acetaldehyde), anhydrous sodium borate, cooper concentration, etc.
* Microbiological analysis:
  Aerobic bacteria count, Salmonellae, Coliform bacteria, yeast and mold, Staphylococcus, Cholera vibrio (NAG=Non-Agglutimable vibrio), thermophilic and mesophilic anaerobic bacteria, flat sour anaerobic bacteria, Vibrio *parahaemolyticus, etc.*
* Microanalysis:
  The aim is to analyze light contaminants.
* *Physical and sensory evaluations:*
  Degree of vacuum, drained weight, net weight, label evaluation,
  cutting test, *dimensional measurement, volumetric capacity,* etc.

2) Quality analysis and evaluation of *food trial produced by the* Technology Development Div.

3) Commissioned tests and voluntary tests on shelf life and food deterioration

4) Commissioned tests and voluntary tests on quality of packaging materials

5) Research activities for the development of technically pertinent and internationally acceptable standards for foods produced in the Philippines.

(2) Technology Development Division

The Division will engage in the development and application of new technologies for food industry using the agricultural and fishery products produced in the Philippines, and at the same time, attempt to improve the postharvesting storage and transportation technologies.

1) Research and development of applied products such as the following which can be technically and economically commercialized by the food processing enterprises

* Frozen and dried products of vegetables and spices
* Development of extracting technology for spices and seasonings
* Products such as condensed juices
* Various canned and bottled products

2) Research and development of practical techniques for handling and treating, storing and conserving, loading and shipping fresh food, and development of a quality control system

(3) Sample Production Division

It is a Division new to FDC. It will manufacture sample processed foods on a trial basis by commission of the small and medium scale enterprises and study their market values. The Division will also provide guidance on production technology in order to improve the production technology of the small and medium scale food processors and expand the variety of their export products.

1) This division was not in existing FDC activity. Trial production of the following product samples, tests on quality upgrading and product improvement, tests for improvement of processing procedures by commission of enterprises. And expand the variety of Exporting products.

- Frozen food: Frozen fruits (mango, pineapple, banana)
  Frozen vegetables (okra, carrot)
  Frozen fish (shrimp, squid)
  Frozen fruit purees, frozen coconut milk, etc.
- Dried food: Dried fruits (pineapple, papaya, mango, etc.)
  Dried vegetables (onion, garlic, carrot, etc.)
- Canned and bottled food:
  Coconuts and bananas in syrup, bottled pulse crops, jams of mango and pineapple, coconut milk, fruit purees, fruit juices, etc.

2) Offering the enterprises individual guidance on operation of processing equipment, processing procedures, quality control and sanitation control of applicable foods.

(4) Industry Services Division

Industry Services Division will offer various information services and training programs to the agricultural extension workers, processed food producers and relevant government employees to upgrade agricultural production and improve processed foods of the Phillipines.

1) The following three types of training in quality control, product improvement, food processing technology, and laws and regulations related to food shall be offered. Lecturers who are specialized experts shall be recruited from within FDC or invited from related organizations.

* Training for the private sector by commission of the food enterprises
* Travelling to each locality to offer training by commission of producers, food enterprises and related government institutions.

* Dispatching of lecturers for the training programs on food inspection and evaluation for PTTC in order to improve export inspection and quality control techniques on inspection of processing of frozen foods, canned and bottled foods and fruit drinks. And offering of practical training in highly advanced technique related to the foregoing at FDC.

2) Implementation of quality control on procurement, processing, processing sanitation, storage and preservation and distribution of perishable raw materials by commission of enterprises.

3) Expansion of analyzing test service for export foods (FDC is authorized by the United States Food and Drug Administration --USFDA-- to conduct analyzing tests on foods exported to the United States).

4) Collection, analysis and provision of data and information on recent standards, technological development and trends of industrial which related to food processing methods, products, marketing, packaging and quality and which have a bearing upon the food processing industry and markets.

5) Acquiring a grasp of the needs of the food processing industry circles and evaluation of whether the technology development and quality control activities undertaken by FDC are in keeping with those needs or not.

Following training program will be held after completion of this project for the small and medium enterprises which are mainly processing agriculture and fishery products. There is not this kind of training facility in the Philippines, therefore it is expected for food processing industry and agriculture and fishery to improve quality of products, enlarge market by executing these training course.

Table 3-3-1 Training Program

Course title	Major contents	Frequency (per year)						Class size (persons)		Duration
		'87	'88	'89	'90	'91	'92	'88-'89	'90-	(days)
1. Quality Control in the Production, Processing and Marketing of Frozen Shrimps for Export	Basics of ecology, nutrition and aquaculture; essentials for export; practice in processing, physical and sensory evaluation; theory of quality analysis	1	2	2	3	3	3	20	50	10
2. Quality Control in Mango Postharvest Handling and Processing for Export	Treatment and handling of harvested mangoes; essentials of quarantine, export market and transportation; practice in weighing, packaging, dewatering and freezing, etc.	1	2	2	2	2	2	20	50	10
3. Most Common Technical Problems in the Export of Foods to the U.S.	Food classification; processing product identification and labelling of weakly acidic and acidic food; matters under the jurisdiction of USFDA	1	2	2	3	3	4	100	200	2
4. Quality Control, Sanitation and Hygiene	Quality control, organizational system standards, sampling and inspection methods, public health, hygienics, analytical instruments	1	2	2	3	3	4	50	150	3
5. Octopus, Squid and Cuttlefish Processing for Export	Cold storage, freezing, handling of putrefied goods, analytical methods for quality evaluation, processing of marine products, quality control, hygienics, essentials of export quality, practice in cold storage, freezing, packaging, inspection and sorting by grade	-	2	2	3	3	3	20	50	10

Course title	Major contents	Frequency (per year)						Class size (persons)		Duration
		'87	'88	'89	'90	'91	'92	'88-'89	'90-	(days)
6. Canning of Foods (Retort Operators Course)	Bacteriology in canning, acidity of canned food, principles of heat treatment, handling of retort, analysis and inspection of hazardous materials, container sealing evaluation, laws, regulations and standards related to food, practice in handling of retort and voltage? divider, practice in canning of weakly acidic food	-	-	2	3	3	3	20	50	10
7. Optimum Product Shelf-life Estimation (Accelerated Shelf-life Testing)	Food preservation and degeneration, aspects and signs of degeneration, effect of temperature during storage, tests on shelf life, experiments on shelf life under accelerated conditions, collection and utilization of test data	-	-	2	2	2	2	20	50	15
8. Macroscopic and Ficroscopic Filth Analysis for Foods	Contamination of food by impurities during export, causes, types and aspects of contamination, methods for preventing contamination, microscopic analysis according to USFDA and FTI procedures, practice in analysis of impurities	-	-	2	2	2	2	20	50	10
9. Meat and Poultry Products Processing	Natures of beef, pork and chicken meat, chemical, biochemical and bacteriological changes of meat, principles of preservation and processing, processing costs, methods for evaluating processed food, GMP in processing, practice involving the foregoing	-	-	2	2	3	3	20	50	12
10. Principles of Quality Control and Quality Assurance	Role of quality control and quality assurance, procedures, method for inducement, relationship with research and development relationship with production sales and purchasing, relationship with management, quality determination criteria, sampling methods, classification of quality attributes	-	-	2	3	3	4	100	200	2

Course title	Major contents	Frequency (per year)						Class size (persons)		Duration
		'87	'88	'89	'90	'91	'92	'88-'89	'90-	(days)
11. Food Hygiene and Sanitation	Biochemistry, pests and food sanitation, staff sanitation, facility sanitation, types and generation of bacteria, inspection and control at the bacterial level	-	-	2	2	3	3	50	50	10
12. Sensory Analysis of Foods	Sensory evaluation methods, attributes and physiological base, essential items of facilities and research laboratories, statistics of sensory tests, practice in basic tests and various evaluation procedures	-	-	1	2	2	2	50	50	10
13. Processing and Packing of Fish Paste and Sauce for Export	Principle of fermentation of fish meat, processing procedure, critical point in quality control, essentials of packaging and storing, causes and types of quality deterioration, quality standards, sanitation, quality inspection of raw meat materials samples in which fermentation is in progress, evaluation of food products	-	-	-	2	2	3	20	50	10
14. Food Laws and Regulations	General provisions of the Food Act and regulations, packaging regulations of each country, regulations on food additives, necessary conditions of GMP (Good Manufacturing Practice)	-	-	-	2	3	4	100	200	2
15. Postharvest Fruit and Vegetable Technology	Physiology of fruits and vegetables, diseases, harvesting and packaging, storage, essentials of quarantine, practice in quality inspection and grading, etc. confirmation of physiological, entomological and bacterilogical contagion, storage and control under modified atmosphere	-	-	-	-	2	3	50	150	10

Course title	Major contents	Frequency (per year)						Class size (persons)		Duration
		'87	'88	'89	'90	'91	'92	'88-'89	'90-	(days)
16. Basic Food Microbiology in Relation to Quality Control	Natures and classification of microbes, symptons and confirmation of pathogenic bacteria, public health concerning bacteria, sanitation of food industry contamination, antisepsis, putrefaction, plans for and handling of food specimen, various tests	-	-	-	-	2	2	20	50	15
17. Aflatoxin Analysis of Foods and Factors Affecting its Occurrence	Putrefaction by fungus, aflatoxin in human and animal bodies, chemical and bacteriological aspects, guide to analysis, preparation of specimen, applicable laws, control and detoxication, safety and prevention, qualitative and quantitative analysis by TLC method	-	-	-	-	1	2	20	50	10
18. Fish Processing	Tissue structure of fish meat, processing and quality control, processing cost factors, processing equipment and implements, practice in freezing, drying and canning	-	-	-	-	-	2	20	50	10
19. Postharvest Fish and Marine Products Technology	Biochemical changes after catching, handling, packaging, transportation, quality deterioration, cold storage, pathogenic bacteria and method of controlling them, environmental pollution and method of controlling same, causes and control of histamine, cold storage and freezing of shrimp, quality evaluation of frozen products, analysis of pathogenic bacteria, heavy metals and histamine	-	-	-	-	-	2	20	50	5
20. Principles and Applications of Irradiation to Food Preservation	Guide to heat treatment of food, cost comparison with other methods of preservation, consumers' opinions, quality control, applicable laws, packaging materials, practice in heat treatment	-	-	-	-	-	2	100	200	2

FDC is planning to organize following training course by sending lecturer to anywhere in the Philippines. Having training course not only Metro Manila but anywhere in the Philippines is very important to diffuse these technology.

(Itinerant Field Training Program)

Target trainees / Title of Training course	Primary product producers (about twice month)	Food enterprises (about once a month)	NFA and other relevant government agencies (about twice a month)
Training in handling of fruit and vegetable products	o	o	o
Training in handling of fishes and shellfishes	o	o	o
Training in GMP (Good Manufacturing Practices)		o	
Training in quality control		o	
Training in sorting by grade and inspection	o	o	o
Training in sanitation		o	
Training in storing methods		o	o
Study on product shelf life		o	o
Training in methods of sensory evaluation		o	

PTTC's operating program has been established on premise that its advanced training courses on inspection of food would be implemented by FDC. Following training courses will be held at FDC by using FDC facility and equipment.

(PTTC-Related Training Program)

Title of training course	Target participants	Major contents	Annual frequency	Participant size	Duration (days)
Training in food inspection	Government agency food inspectors, private sector R & D staff, factory managers	Packaging inspection, chemical analysis, contaminant examination, microbiological inspection, method of determining acceptance or rejection, quality indicators	three times	20 persons	10 days
Training in inspecting food processing steps	Same as above	Quality control, sampling, key points of standards, rules and control and method of inspection, factory sanitation, insect control	three times	20 persons	10 days

3-3-3 Location and condition of the project site

(1) Location of the project site

The proposed construction site for FDC is located within the FTI complex at Taguig in the southern part of Metro Manila, the National Capital Region of the Philippines. The said complex, which faces the South Superhighway originating from Manila City, is conveniently located, being about 26 kms from the center of Manial, about 11kms from the center of Makati and at a point east-southeast of Manila International Airport.

The project site is located at a most favorable place within the complex, being easily accessible from the main gate of said complex and lying contiguous to the FTI administration building. (See Figure 3-3-3)

The land on which the FTI complex stands is state-owned, on which FTI has a fifty year lease agreement with the National Government, effective from October 1968 until September 2018. In view of this, NFA, which is the superior organ of FDC, has concluded a lease agreement with FTI for a period of 31 years starting in October 1987 and ending in September 2018. (See Appendix 5)

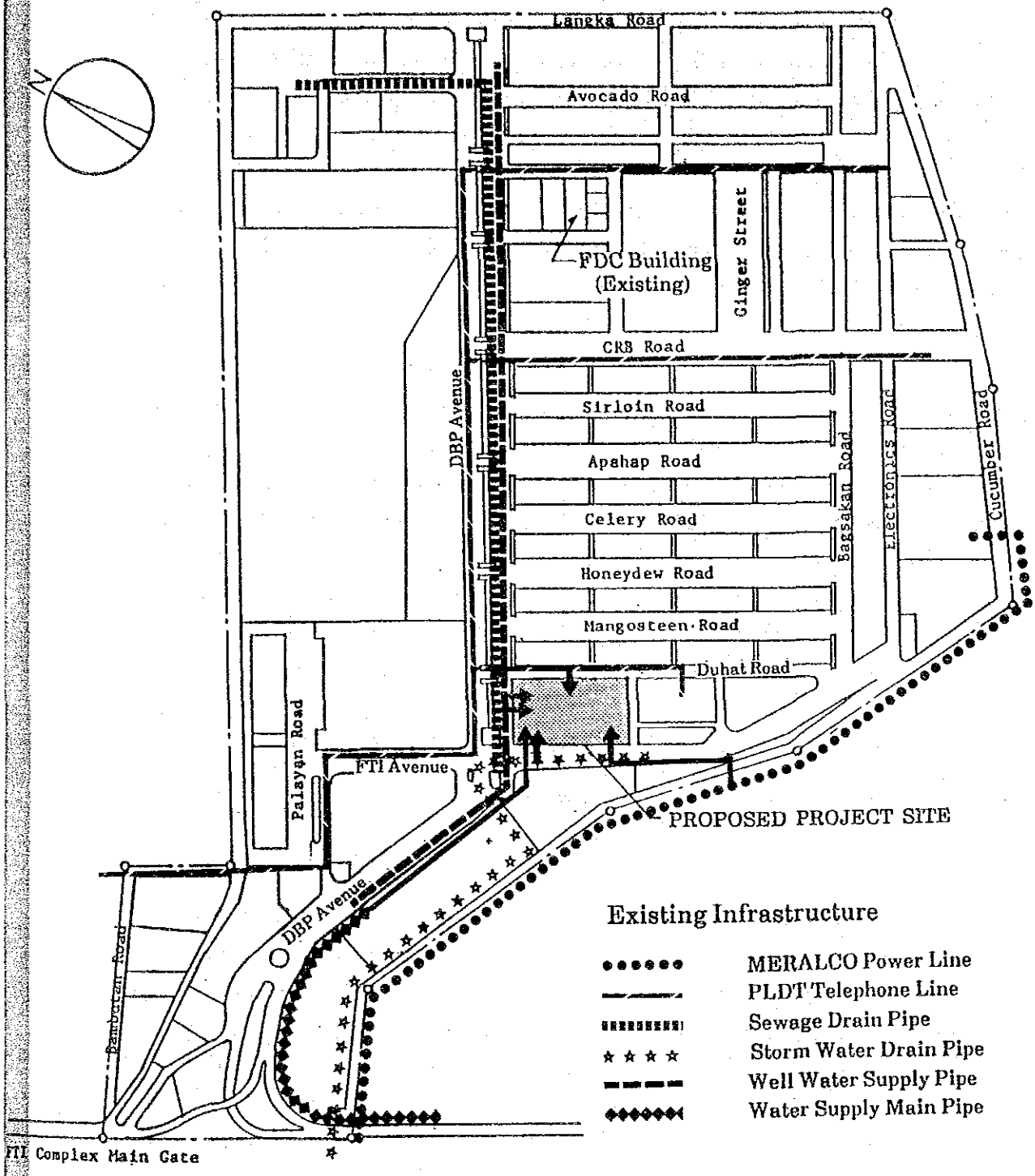
(2) Condition of the site and its surroundings

The FTI complex is an industrial and commercial estate covering a land area of 120 hectares, within which are FTI's own facilities as well as FTI's facilities which are rented to private enterprises either as factory or as office.

The site of FDC is rectagular in shape, about 153m wide and 96m deep, covering an area of about 1.47 hectares. (See Figure 3-3-3)

The southwestern side of the site borders on FTI Avenue which is about 30m wide. The northwestern side borders on DBP avenue, about 65m (about 14m on one side) wide. These two are the arterial roads of the complex. The northeastern side of the site borders on Duhat Road (about 24m wide) and faces the two-story building used by FTI which stands across said road. The southeastern side faces the four-story FTI administration building which stands across a road about 8m wide.

Figure 3-3-3 Map of FTI Complex and Existing Infrastructure



The land surface is generally flat but slopes downward from south to northwest so that there is a gap in elevation of 1.0 to 1.5m between the southern tip and northern tip. The environment is quite favorable for construction as 7 to 8 m high deciduous trees are planted around the site.

Outdoor lamp poles, the foundation for the flag pole and underground water drainage pipes on the site must be removed or relocated for preparation of the land.

(3) Geology

According to the geological survey of the project site, the proposed site consists of clay, silt, sand layer, sandstone and siltstone. A standard penetration test showed that a ground of more than 50 in N value exists at a relatively shallow place (at a depth of around 0.5 to 3.0 m) (refer to Appendix 5) which can be used as the foundation on which to support the buildings. However, as each of the foregoing ground layers differs in depth and layer thickness at each survey point, adequate care is necessary in determining the depth at which the foundation shall be laid.

(4) Condition of infrastructure facilities

Infrastructure facilities developed around the site are as follows.

Water supply

At present, FTI pumps up water from six deep wells to six elevated tanks from where water is supplied to each building. The main distributing pipe is an asbestos pipe (300ϕ) laid along DBP Avenue. The current water quantity supplied to FTI is around $3m^3$/min which falls short of its total requirements. Because of this, the metropolitan Waterworks and Sewerage System (MWSS) has already laid a pipeline (400ϕ) close to the gate of FTI in order to supply city water (the hydraulic pressure is assumed to be 0.7 to 0.8 kg/cm^2). Some parts of this pipeline are still unconnected but will be completed this June. FTI plans to connect the MWSS's water pipe to the existing pipeline so that it can use both well water and city water.

If water supply to FDC is branched from the FTI pipeline, however, it is possible that well water and city water will become commingled. When one considers the nature of FDC, which is to perform trial production of processed foods, it is preferable to draw water directly from MWSS's water pipe whose water quality is more satisfactory (See Table 3-3-2) although it is about 350m away from the site which is a bit far.

Drainage

FTI's drainage system consists of two separate lines, sanitary sewer and storm drainage.

All sanitary sewer within the FTI compound is led into the Imhoff tanks (combined treatment capacity; 960m^3/day) located in the northwestern corner of the FTI complex and, after treatment, is discharged into Laguna Lake about 1.5km from FTI via a creek. However, this treatment facility is not in perfect working condition due to breakdown of the chlorine contact chamber and the sludge collecting pump. If this treatment facility is to be utilized, it is necessary to make sure that it is completely rehabilitated. Also, permission to discharge the treated effluent into Laguna Lake will have to be obtained from the Laguna Lake Development Authority.

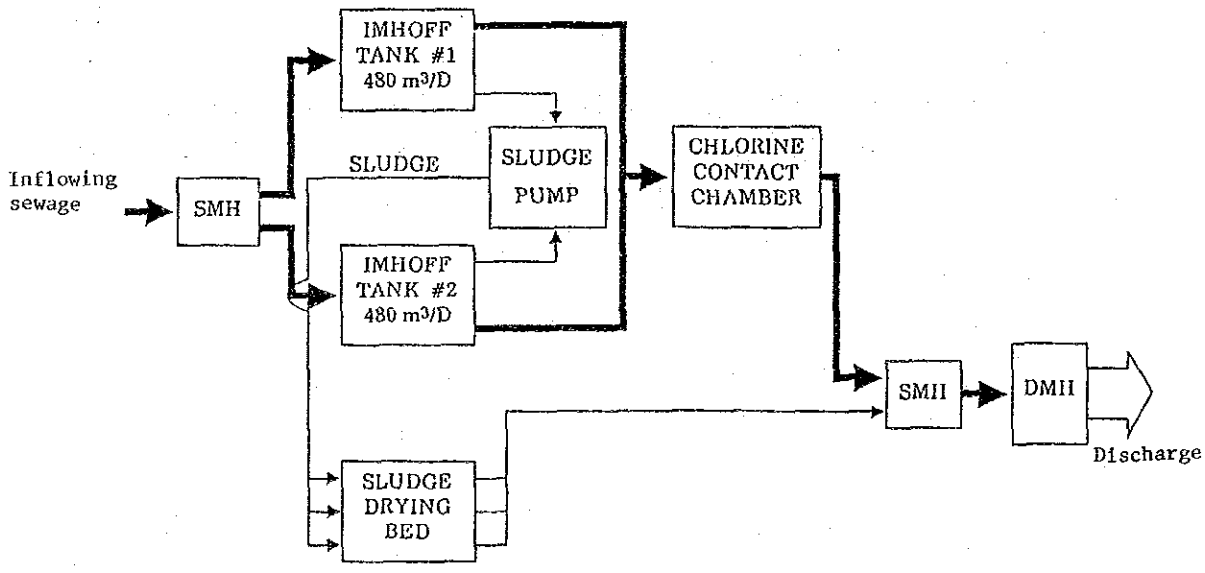
The storm sewage system within the FTI complex consists of two lines, one on the eastern side and the other on the western side. The storm sewage from the eastern side is discharged into Laguna Lake and the sewage from the western side into Manila Bay. The storm drain pipe around the site is laid along the road and connected to the western side drainage system. (See Fig. 3-3-4)

Table 3-3-2
Comparison of the Quality of FTI Well Water and MWSS City Water

		Philippine Standard (WHO Standard)	FTI Well Water (June 19,'86)	MWSS City Water (Mean, Oct.'86)	Japanese Standard
pH		7.0-8.5 *(6.5-9.2)	6.55	7.00(6.25-7.55)	5.8-8.6
Taste		No anomaly	No anomaly	No anomaly	No anomaly
Oder intensity	index	"	Faint smell of earth	"	"
Chromaticity	index	5> *(50>)	10	5.0(5.0-5.0)	5>
Turbidity	index	5> *(25>)	5.35	3.1(1.5-7.85)	2>
Total alkalinity	mg/l		277.20	56.6(42.4-89.2)	
Hydrogencarbonate	mg/l		388.20	69.0(51.7-108.8)	
Acidity	mg/l		132.00	24.8(18.0-36.0)	
Free carbonic acid	mg/l		116.20	21.9(15.8-31.7)	
Chlorine ion	mg/l	200> *(400>)	63.00	4.8(3.0-8.0)	200>
Iron ion	mg/l	0.3> *(1.0>)	0.1	0.06(0.05-0.10)	0.3>
Hardness ($CaCo_3$)	mg/l	Desired:100> Permisible:500>	169.00	53.0(30.0-62.0)	300>
Residual chlorine	mg/l			0.3(0.2-0.6)	0.1<
No.of coliform groups	mg/l	MPN 10>			Not to be detected in 500 ml

Note: Figures in *() are unavoidable exceptions

Fib. 3-3-4 FIT's Sanitary Sewage Treatment System



Power supply

At present, FTI receives 34.5 KV power from two lines (Malibay Line and Gardner line) of the Manila Electric Company (MECO) which is dropped to 13.8 KV at the Central Substation before supplying to each substation. So, even in the event of power failure of one line, power can be supplied from the other line by simply switching over. The emergency captive generator facility (800 KVA) is used only for emergency lighting. Power failure occurs a few times a year which generally lasts for less than 30 minutes each time. As the voltage fluctuates by around $\pm$ 13%, special care is necessary for installing average voltage regurator (AVR). FTI's electric rates are about 20% higher than the general commercial electric rates.

It is desirable to lead in power to FDC directly from the nearby Malibay line(34.5KV) in view of the independent nature of FDC and because it is more economical.

Telephone

At present, 40 telephone circuits are led into the FTI compound along DBP Avenue from the Taguig Telephone Exchange of the Philippine Long Distance Telephone Company (PLDT), but all of these are used up by FTI and yet still not enough to satisfy total demand. In view of this, 400 new circuits are scheduled to be installed from the Makati Telephone Exchange, which has some spare capacity, sometime during this fiscal year so that it will be possible to draw in telephone circuits into FDC also from this source.

Waste disposal

FTI does not have a waste disposal facility of its own. All wastes discharged from each FTI building are currently collected by a private company truck to be disposed outside of FTI. FDC will not require any disposal facility either as it can likewise entrust the collection of its waste to an outsider.

3-3-4 Outline of facilties and equipment

Followings are the outlines of whole facilities and equipment.

(1) Outline of facilities

1) Story 2 stories building (a part is 3 stories)
2) Structure Reinforced concreate structure
3) Contents of Facility

Food Science and Training Building

* Office of Directors and Administration Division
  - ..... Directors room
  - ..... Library
  - ..... Data processing room
  - ..... Administration cashing room
  - ..... Conference room
* Quality Testing Division
  - ..... Chemical analysis laboratory
  - ..... Aflatoxin room
  - ..... Microanalysis laboratory
  - ..... Clean room
  - ..... Filth experimental laboratory
* Industrial Service Division
  - ..... Multipurpose lecture hall
  - ..... Training room 1-2
  - ..... Training experimental laboratory
  - ..... Physical sensory evaluation laboratory
* Public Space
  - ..... Entrance hall
  - ..... Toilet
  - ..... Storage

Dormitory Building

- ..... Dormitory 1-15
- ..... Office room
- ..... Lounge
- ..... Storage

Food Technology Building

* Technology Development Division
  - ..... Sample production laboratory
  - ..... Quality control system experimental laboratory
  - ..... Postharvest experimental laboratory
  - ..... Self life experimental room
* Sample Production Division
  - ..... Processing room 1-2
  - ..... Preparation room
  - ..... Freezing room
  - ..... Heat processing room
  - ..... Packaging room
* Public and Machine Space
  - ..... Entrance hall
  - ..... Electric room
  - ..... Boiler room
  - ..... Toilet
  - ..... Corridor

(2) Outline of Equipment

1) Quality Evaluation Division

* Chemical Analysis Sec.
  - ..... Fluorescencie spectrophotometer
  - ..... Gas chromatograph
  - ..... High performance liquid chromatograph
* Microbiology Sec.
  - ..... Clean bench
  - ..... Electric top loading balance
  - ..... Incubator
* Microanalysis Sec.
  - ..... Sample splitter
  - ..... Fume hood
  - ..... Water aerator

* Physical & Sensory Evaluation Sec.
  ..... Macbeth-munsel disk colorinetry
  ..... Electric sheive shaker
  ..... Triple beam balance

2) Technology Development Division
   * Fruits & Vegetalbe Production Development Sec.
   * Meat, Fish & Poultry Production Development Sec.
     ..... Upright freezer
     ..... Fermentor
     ..... Postharvet technology room
   * Quality Control System Development Sec.
     ..... Texturo meter
     ..... Fruit pressure test
     ..... Refractmeter

3) Sample Production Division
   * Equipment Operation Sec.
     ..... Cabinet dryer
     ..... Spray dryer
     ..... Drum dryer
   * Equipment Maintenance Sec.
     ..... Tool

4) Industry Service and Administration Division
   * Training Sec.
     ..... Slide projector
     ..... Video system
   * Quality Control Service Sec.
   * Industry & Liaison Sec.
     ..... Optical disk file system
     ..... Word processor
     ..... Personal computer

5) Others
   ..... Vehicle
   ..... Maintenance equipment

CHAPTER 4. BASIC DESIGN

CHAPTER 4 BASIC DESIGN

4-1 Design Principles

The basic design will place primary emphasis on functional performance, economics and durability, and it shall be based on the following principles which shall take into full consideration the planned contents of the project as described in the preceding chapter.

* A facilities configuration that is functional and easy to use

  As a wide range of activities, including analysis and inspection of foods, research on product development, sample production, training and public relations are to be carried out at FDC. And its facilities shall be planned so as to be able to functionally cope with the diverse activities of each department. Particularly the configuration of facilities of the training department which will be used by the many trainees coming from the outside shall be designed so that the trainees can easily find their way among the buildings.

* A facilities plan that gives the impression of cleanliness

  As FDC will deal with food, it is particularly important that its facilities give the impression of cleanliness. This point must be kept in mind in designing every detail of the building from its facade to finishing materials to every other minor details. Particularly the product development and sample production division requires special attention even to the minutest of detail like easy to mash and not lie the dust in order that the facilities may be used in the most sanitary way as to set an example for all other facilities in the Philippines.

* A building parts design suited to the local climate

  The facilities shall be designed with due regard to the tropical climatic conditions. Not only shall measures be taken to counter the strong sunshine and torrential squalls but architectural

ingenuity shall be exercised to control these while positively taking in natural light and natural ventilation without the use of mechanical systems (for example, pent roofs and louvers) and makethe facilities as comfortable and well-suited to the local climatic conditions as possible.

* Independence of infrastructure facilities

Although FDC will be built in the FTI complex, it is not considered desirable for FDC to depend heavily on FTI in view of the fact that FDC is a public institution. Particularly since FTI is scheduled to switch to a private management, FDC's own infrastructure facilities should be developed to the extent possible from the standpoint of securing stable infrastructure facilities.

* Ease of maintenance and reduction of running cost

Energy conservation shall be planned in order to reduce maintenance and operating costs. Locally available construction materials and equipment shall be positively used to reduce construction costs and to make maintenance easier. Materials and equipment which must inevitable be procured in Japan shall be selected with due regard to durability and ease of maintenance. As most of the analytical apparates and equipment, in particular, which will be used for trial production of product samples will presumably be procured in Japan, those of manufacturers whose agents in the Philippines can offer maintenance and repair services shall basically be selected.

4-2 Basic Plan

4-2-1 Site and facilities layout plan

1) Site conditions and zoning plan

The site is located at a place about 250m on a straight line from the main gate of the FTI complex and faces the intersection of DBP Avenue and FTI Avenue, the two arterial roads which respectively cut across the complex longitudinally and transversally. DBP Avenue is the commuting bus route for the FTI employees now and will be used by most of the FDC staff too when FDC is completed. The main approach to FDC, therefore, should be provided near the western corner where these two arterial roads intersect. As this corner is located on the extension from the main gate of FTI, it is the most desirable place for providing the main approach to the facilities for the benefit of those wishing to gain access from the outside.

As the eastern side the site faces a group of FTI factories across Duhat Road, the use of this road is appropriate for hauling in and out of raw materials used for trial production of food samples and processed products.

Many trees and flowers are planted on the periphery of the site. The layout plan should utilize these vegetation as much as possible.

2) Layout plan

When FDC's divisional composition and the interconnections among divisions are taken into account, FDC may be broadly divided into the following two zones.

* Quality evaluation and industry services zone

  Consists of laboratories for conducting chemical analysis and various other analysis which accompany quality evaluation, training laboratories and training rooms. The zone also includes general administration facilities.

* Sample production and technology development zone

  It is where trial production of samples and product development will sometimes be carried out by the unit of lots, which will necessitate vehicles to come and go frequently in order to haul in raw materials, seasoning and packing materials required for trial production, and to take up parking space for long hours at a time for hauling out products. It is also the section from where various wastes will have to be frequently hauled out and, therefore, where also noise and odor are likely to be generated. So this zone should be constructed separately from other zone.

In order to come up with the best layout, three types of block layout models were assumed and studied. (Refer to Fig. 4-2-2).

As a result of study, it has been decided that FDC will be designed according to proposed Alternative C. (Refer to Fig. 4-2-3)

Fig. 4-2-1 Present condition of site

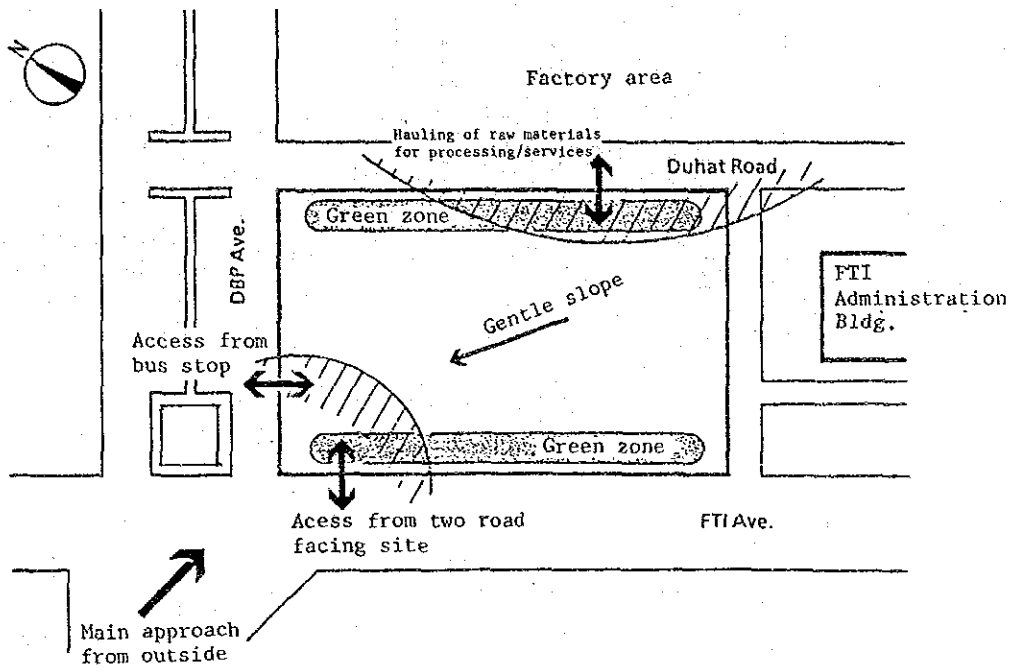


Fig. 4-2-2 Block Layout Concept

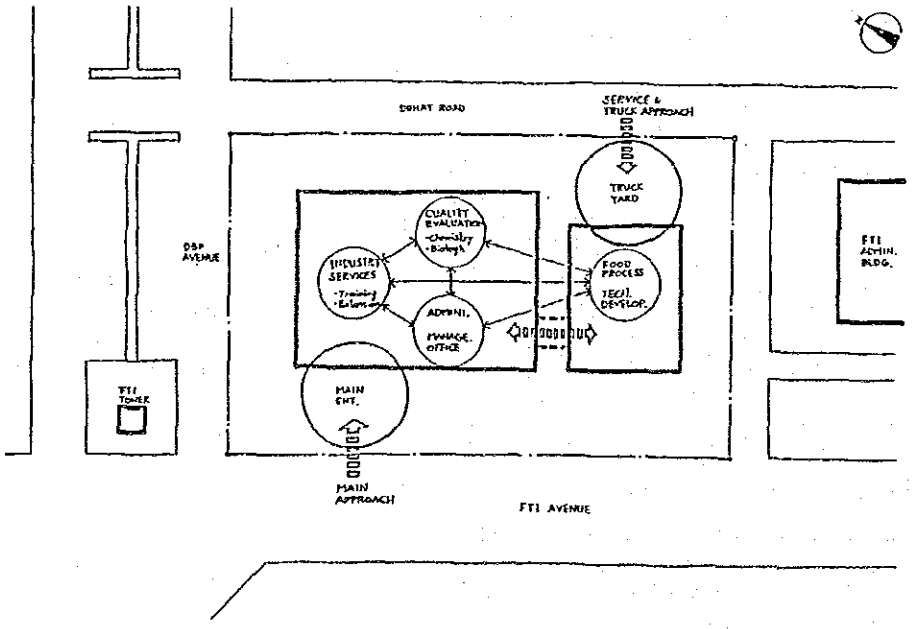
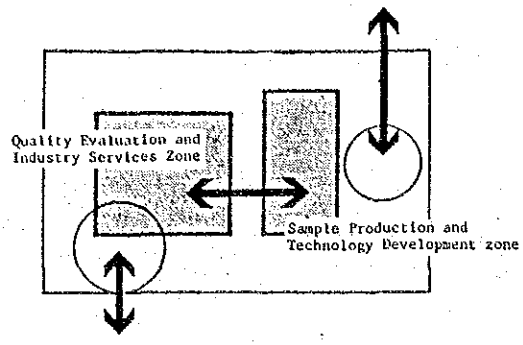


Fig. 4-2-3 Examination of Alternative Layout Plans

Alternative A

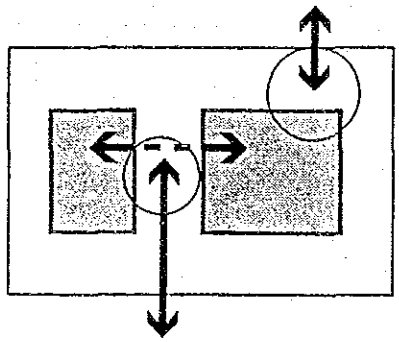


The plan proposes to locate the truck yard for the sample production and technology development zone on the south side.

(Merit)
* Linkage between the two zones can be easily secured.

(Demerit)
* The view from the FTI Administration Building will not be good as it will face the truck yard.

Alternative B

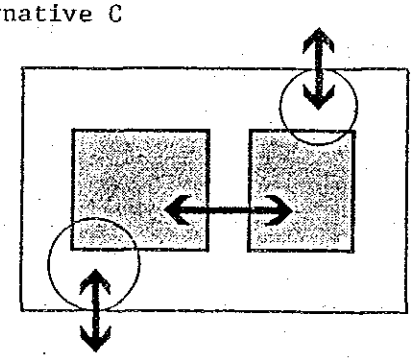


The plan proposes to locate the truck yard for the sample production and technology development zone between two zones.

(Merit)
* Influence on FTI Administration Bldg. is small.

(Demerit)
* Difficult to secure linkage between the two zones.
* The quality evaluation zone is likely to be adversely affected by the noise coming from the truck yard.

Alternative C



The plan proposes to locate the approach to the sample production and technology development zone and the truck yard on the eastern corner.

(Merit)
* Easy to secure linkage between the two zones.
* Influence on FTI Administration Bldg. is small.

(Demerit)

4-2-2 Building design

As stated before, FDC's facilities may be roughly divided into two divisions. The dormitory for the trainees of the quality inspection and industry services section will be planned as an independent building as it will demand living comfort. Said section, therefore, will consist of two building. The sample production and technology development section will be planned to be housed in the same building, namely, the food technology building, because of the close linkage between said two functions.

(1) Design for each building and floor area of each room

The floor area for each room shall be determined based on the number of persons to be assigned to each room with due consideration to the following matters.

The floor area shall be estimated for each room by refering to the floor area requested by the Philippine side and taking the general standard values in Japan into account as follows:

* Office space ... for executive staff: 25 - 50 m^2/person
  for ordinary staff: 8 - 10 m^2/person
* Conference space ... for executive staff: 2.5 - 2.8 m^2/person
  for ordinary staff: 1.8 - 2.0 m^2/person
* Training space ... Training room: 1.5 - 1.8 m^2/person
  Seminar room: 1.8 - 2.0 m^2/person
* Multi-purpose training space ... 1.2 - 1.5 m^2/person
* Library space ... Open access book shelves: 150 - 160 books/m^2
  Reading space: 1.8 - 2.0 m^2/person
* Canteen space ... Canteen: 1.2 - 1.5 m^2/person,
  Kitchen: (Mess hall space) x 30-35%
* Trainees' lodging space ... Bed room: 6 - 8 m^2/person, or
  10 - 15 m^2/person (if with bath and toilet)
* The floor area for each of quality analysis rooms, processing test rooms and other rooms for experiments and tests as well as rooms attached to those shall be determined according to the layout of various equipment and apparates.

1) Food Science and Training Building

Room Name	Planning Area (m^2)	Remarks
Office of the Manager		
Dep.Manager Room	50	Office and reception room
Asst.Deputy Manager Room	30	- ditto -
Secretary Room	15	Secretary and waiting space. 1.5 - 2.0m^2/person
Consultant Room 1	26	A consultant office and consulting space
Consultant Room 2	26	- ditto -
Consultation Room 1-2	52 (26 x 2rooms)	Set up by 5-10 peaples consultation room
Conference Room 1	50	Set up by 20 manager's conference room
Conference Room 2	50	Set up by 20-30 peaples conference
General Affairs Div.		
Administrative and Accounting Office	82	Office Room for administration of FDC (10 staffs)
Casher Room	18	2 staff rooms
Communication Room	18	Set up by surrounding room layout. Communication boothes are Two (3-4m^2/room)
Data Processing Room	40	Set up by surrounding room layout. A personal computer and 5 key boards
Typing Room. Record Room	41	Set up by 3 typist. 1 recording staff and bookshelf for filing
Driver Room	10	Set up by 2 drivers
Quality Evaluation Div.		
Division Chief Room	26	Set up by division chief and secretary
Chemistry Staff Room	57	Set up by 1 engineer in charge and 5 researchers
Chemistry Laboratory	109	Set up by equipment layout
Instrument Room 1	30	- ditto -
Instrument Room 2	30	- ditto -

Room Name	Planning Area (m^2)	Remarks
Aflatoxin Room	35	Set up by equipment layout
Sample preparation Room	25	- ditto -
Solvent Extraction Room	20	- ditto -
Solvent Storage	12	- ditto -
Acid Storage	15	- ditto -
Physical and Sensory Eva. Staff Room	47	Set up by engineer in charge and 4 researchers
Physical Eval Lab.	62	Set up by teaching materials layout
Sensory Eval Lab.	38	Set up by equipment layout and 7 sensory testing booth
Kitchen & Preparation Room	32	Set up by equipment layout
Microbiology Staff Room	40	Set up by engineer in charge and 4 researchers
Microbiology Lab.	90	Set up by equipment layout
Incubator Room	20	- ditto -
Clean Room	20	- ditto -
Sterilization Room	21	- ditto -
Microanalytical Staff Room	40	Set up by engineer in charge and 4 researchers
Filth Lab.	60	Set up by equipment layout
Industrial Service Div.		
Division Chief Room	26	Set up by division chief and a secretary
Information Service Staff, Training Staff Room	50	Office room for 6 staffs
Training Material Dev. Room	34	Set up by equipment layout
Multipurpose Training Hall	222	Set up by 150 trainees training room
Training Room 1	91	Set up by 50-55 trainees training room
Training Room 2	91	- ditto -

Room Name	Planning Area (m^2)	Remarks
Training Lab. 1	121	Set up by 20-25 trainees and equipment layout. Use for PTTC training
Training Lab. 2	121	- ditto -
Quality Control Staff Room	73	Set up by engineer in charge and 7 staffs office room
Library	93	Set up by 2 staffs, 8-10 persons reading space and 8,000-10,000 books storing
Division Chief Room (Sample Production Division)	26	Set up by division chief and 2 secretaries office room
Reception (Sample Production)	20	Set up by 2 staffs office room
Division Chief Room (Technical Development Division)	26	Set up by division chief and 2 secretaries office room
Canteen	123	Set up by 80 staffs and trainees seats
Kitchen	57	Use it both for Canteen and dormitory building
Staff Room	19	Resting room for 4-5 cooks
Hall Corridor, Strage	1,789	
Toilet		
Balcony	330	
Sub Total	4,649	

2) Dormitory Building

Room Name	Planning Area (m^2)	Remarks
Dormitory Room	345 (23 x 15)	Use it for trainee and FDC staff's quaters. 2 persons in one room and shower and toilet
Office Room	9	Reception staff 1
Lounge, Corridor, Storage	262	
Balcony	77	
Sub Total	693	

3) Food Technology Building

Room Name	Planning Area (m^2)	Remarks
Technology Development Div.		
Product Development Staff Room 1	50	Set up by engineer in charge and 6 researchers
Product Development Staff Room 2	50	- ditto -
Product Develop Lab.	140	Set up by equipment layout
Quality Control Ssytem Develop Room	50	Set up by engineer in charge and 6 researchers
Postharvest Lab.	50	Set up by equipment layout
Shelf Life Test Room 1	25	- ditto -
Shelf Life Test Room 2	25	- ditto -
Rocker Room	53	Install shower and rocker
Packaging Lab.	45	Set up by equipment layout
Sample Production Div.		
Staff Room	15	Office for 3 staffs
Workers Room	31	Rocker, Shower and resting space for 20 staffs.
Tool Room	40	Set up by equipment layout

Room Name	Planning Area (m^2)	Remarks
Washing Room 1-3	99 (33 x 3rooms)	Storage for raw materials
Processing Room 1	156	- ditto -
Processing Room 2	209	- ditto -
Quick Freezer Room	13	Set up by -40°C
Freezer Storage	24	Set up by -20°C
Cooler Storage	21	Set up by 10°C-20°C
Freezer Storage	38	Set up by 0-5°C
Thermal Process Room	151	Set up by equipment layout
Dryer Room	58	- ditto -
Packaging Room	42	- ditto -
Production Strage	46	- ditto -
Packaging Material strage	46	- ditto -
Engineer Room	21	Resting room for 5 staffs
Electoric Room	80	Capacity of equipment is 1,000 KVA. Capacity of generator is 200 KVA.
Boiler Room	22	Set up by 1 ton of hot water tank
Freezer equip. Room	418	Material room for freezers
Corridor, Toilet Storage	701	
Sub Total	2,719	
Total (1)-(3)	8,061	

4) Other Facilities

Garage and Storage $196m^2$ ..... Set up by 8 vehicles

Guard Room $16m^2$

(2) Floor plan

The floor plan of each building shall be planned based on the following principles with due consideration to the linkage among sections.

* Food science and training building

  This building is the core facility of FDC. The first floor will accommodate the rooms that will be utilized by many outsiders, such as the training facility of the Industry Services Division, the General Administration Division, canteen, the multi-purpose training room, etc. The second floor will accommodate the various research rooms of the Quality Evaluation Division with a separate traffic line for the researches and quality analysis. Accordingly, the first floor and the second floor will respectively consist of the following rooms.

  First floor ..... Training room, multi-purpose training room, canteen, administration and accounting offices, rooms for the Industry Services Division personnel

  Second floor .... Quality analysis and testing rooms, room for inspection personnel, library and data rooms, FDC Manager's office, FDC Assistant Manager's office, conference room, etc.

  In designing the plane composition of the rooms of each section on the first and second floors, a courtyard shall be provided at the center, and the rooms surrounding it shall be connected by a corridor to synergetically enhance their functional linkage.

  As the multi-purpose training room will not only be used for training activities but for NFA's annual conferences, various lecture meetings and exhibitions of processed foods, it shall have a parquet with movable seats.

* Dormitory building

  15 twin rooms will be planned for the benefit of trainees coming from the local provinces and also as temporary quarters for the FDC

staff who will be required to carry out continuous quality analysis and other activities which extend into the night. The first and second floors will be composed of the following rooms.

The dormitory building will be a separate building from the Food science and training building, and due consideration will be given to creating a comfortable atmosphere.

First floor ..... Office, launge, 7 rooms for lodging, etc.

Second floor ..... 8 rooms for lodging, etc.

* Food technology building

This building will be mainly used for various research and development activities on processed foods, handling of agricultural crops and development of products. Each floor of this building will respectively accommodate the following rooms.

First floor ..... Processing room, packaging room, drying room, heat application and treatment room, freezer room, machine room, room for mechanics, room for trial production staff, various storages

Second floor ..... Product development laboratory, post-harvest treatment laboratory, shelf-life laboratory, staff room, etc.

The second floor of this building shall be connected whith the Training and Laboratory building by an overbridge to enhance systematic linkage among functions.

(3) Section and elevation plan

Section and elevation plan of facilities shall be planned in accordance with the following principles with emphasis placed on functional performance, cost and beauty.

* Story height of buildings

To accommodate the building area and the space for outdoor facilities necessary for effective utilization of the buildings within FDC's site of 1.47 ha (about 14,700 m^2), the buildings should preferably be two stories high. This is also most effective in terms of the horizontal and vertical traffic lines of the people who will utilize the facilities. Although it is also possible to make the buildings higher, it will necessitate an elevator which will make both the construction cost and maintenance expense too high. Accordingly, every building at FDC shall be either two stories high or single storied.

* Facade and Indoor environment

As a basic principle, the indoor environment shall be designed with emphasis on the effective utilization of natural ventilation. Accordingly, each room shall be designed with windows and transoms on the outer wall and along the corridor to let in fresh air. Latticeworks and louvers shall be provided on the periphery of the buildings. They shall be decorative and also serve to prevent the direct rays of the sun from reaching the outer walls and inside the rooms.

* Story height plan

The height of each story of the buildings shall be determined from the combination of ceiling height, size of ceiling space for utilities, size of cross section of structural beam, thickness of finishing material, etc. The height of each story of the training and laboratory building and the sample production building was determined as follows to accommodate the most typical rooms.

	Food science and training Bldg.		Food technology Bldg.	
	First floor	Second floor	First floor	Second floor
Ceiling height	3.2m	3.0m	3.5m	2.8m
Story height	4.2m	4.0m	4.5m	3.8m

(4) Structural plan

As a basic principle, emphasis shall be placed on making the building-frame strong but economical. Accordingly, the policy of respecting the local structural design standards and local common practice shall be adopted as much as possible in assuming the design external forces and selecting materials and construction methods.

1) Structural design

The structural design shall basically be in conformity to the National Structural Code for Buildings of the Philippines and be supplemented by the design standards of Japan for details. As the design external forces that affect the buildings, the following shall be taken into account.

* Dead load

All of the dead weight of structural materials for building, finishing materials and major equipment to be placed inside the building shall be calculated.

* Live load

The following figures shall be adopted as the live load for each room in accordance with the National Structural Code for Buildings of the Philippines.

Room	Live load (Pa)	Live load (Kg/m^2)
Office room	2,400	(245)
Research room	2,900	(298)
Experiment room	2,900	(296)
Training room	2,900	(298)
Multi-purpose training room	4,800	(490)
Bed room	1,900	(194)

* Wind pressure

According to the National Structural Code for Buildings of the Philippines, Metro Manila belongs to the strong wind designated area II where the following figures shall be adopted for design wind velocity and wind pressure in accordance with the height of each building.

Height of building (ft.)	Wind velocity (km/h)	Wind pressure (kg/m^2)
0 - 30'	175	150
30'- 100'	175	200

* Seismic force

Like Japan, the Philippines belongs to the circumpan-Pacific earthquake belt where occurrence of earthquake is reported a few times a year. Accordingly, aseismic structure must be adopted in designing the building frame.

The design seismic force shall be calculated according to the following formula in conformity to the National Structural Code for Buildings of the Philippines.

$$V = Z \times I \times K \times C \times S \times W$$
$$= 1.0 \times 1.0 \times 0.67 \times 0.14 \times W = 0.094\ W$$

wherein:

V = Design seismic force
Z = Numerical coefficient for seismic zone
I = Occupancy importance factor
W = total dead load
K = Numerical coefficient for building structure type
C = Numerical coefficient for vibration period
S = Numerical coefficient for site-structure resonance
($C \times S \leq 0.14$)

2) Structural system

Since the Food science and training building and the Food technology building are different in shape and size, they shall be separated by providing an expansion joint in the over

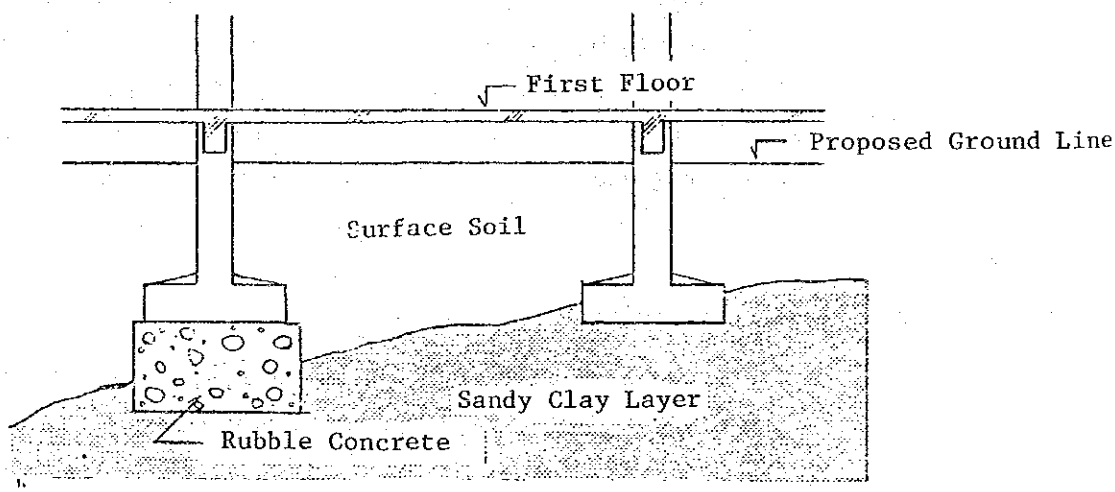
bridge. Columns placed in the direction of the girder of each building shall be spaced uniformly at intervals of 6.4m to simplify the structure. The local construction method shall be used as a rule. The general construction of each building shall be as follows.

Building	Number of stories	Type of construction
Food science and training building	Two stories above ground (single-story in part)	Reinforced concrete construction for both the beams and columns
Dormitory building	Two stories above ground	- ditto -
Food technology building	- ditto -	- ditto -

3) Type of foundation

The project site is geologically composed of clay, silt, sand layer, sandstone and siltstone. Since a ground of more than 50 in N value was found to occur at a relatively shallow place (at a depth of 0.5 to 3.0 m) as a result of the standard penetration test, the foundation of buildings shall be directly supported by the said ground. Where the bearing ground layer becomes deeper, the bottom level of the footing shall be made uniform by placing rubble concrete underneath it.

Fig. 4-2-4 Supporting system of foundation



4) Structural materials

Reinforcement concrete structure which is most standardizing method in the Philippine will be used for main structure of each building. Concrete strength F=210kg/cm^2 and portland cement will be use SD 35 or 30 of Japanese products or GRADE 60 or 40 of Philippine products.

The roof of multi-purpose training hall, entrance hall and processing room are long span structure, so the prestressed concrete beam will be used to support those strucrures.

(5) Air-conditioning and sanitary facilities plan

1) Air conditioning and ventilation plan

In order to reduce the running costs and to allow ease of maintenance, natural ventilation and pen roofs to shield the sun and heat will be utilized to the maximum extent in planning for air conditioning.

* Design conditions for air-conditioning

The following outdoor conditions were assumed on the basis of the mean maximum temperature and mean absolute humidity in May which is the hottest month in Manila according to annual meteorological data, and the indoor conditions most comfortable to the human body under such outdoor conditions were selected.

* Outdoor conditions Temperature 33.9°C Humidity 60%
* Indoor conditions Temperature 26°C Humidity 50-60%

* Air-conditioning system

The individual type of air conditioning system which can be operated or stopped at will be provided in each room of the executive staff and in laboratories and other rooms which functionally, utilization form and protection of equipment demand air-conditioning. Following rooms will be installed air conditioning system.

* Executive staff room

Director's Room, Deputy Director's Room, Secretary Room, Chief Division Room, Each Staff Room, Cashing Room, Consultant Room, Meeting Room.

* Functionally

Physical Sensory Evaluation Room, Chemical Analysis Laboratory, Micro Analysis Laboratory, Solvent Collection Room, Filth Analysis Laboratory, Data processing Room, Postharvest Technology Room, Processing Room, Clean Room.

* Utilization Form

Dormitory, Library, Type Recording Room, Multipurpose Training hall, Training Room, Training Experiental Laboratory, Canteen.

* Ventilation

As a rule, every room shall resort to natural ventilation, but mechanical ventilation devices will be provided in rooms, which due to functional or architectural reasons, cannot be naturally ventilated.

* Boiler

As a heat and hot water supply source, a steam boiler will be installed. Fuel oil A will be used as fuel.

2) Plumbing system design

* Water supply

An independent service pipe will be drawn into FDC from MWSS's main distributing pipe near the guard post on DBP Avenue.

* Rough estimate of water consumption

General domestic water	7,200 m^2 x 0.5 x 0.075 persons/m^2 x 100 l/day = 27,000 l/day
Water for testing	16 faucets x 20 l/min x 20 min x 4 times/day = 24,000 l/day
Processing experiments, washing, etc.	50 faucets x 20 l/min. x 30 min. x 4 times/day = 120,000 l/day
Total	171,000 l/day --- 170m^3/day

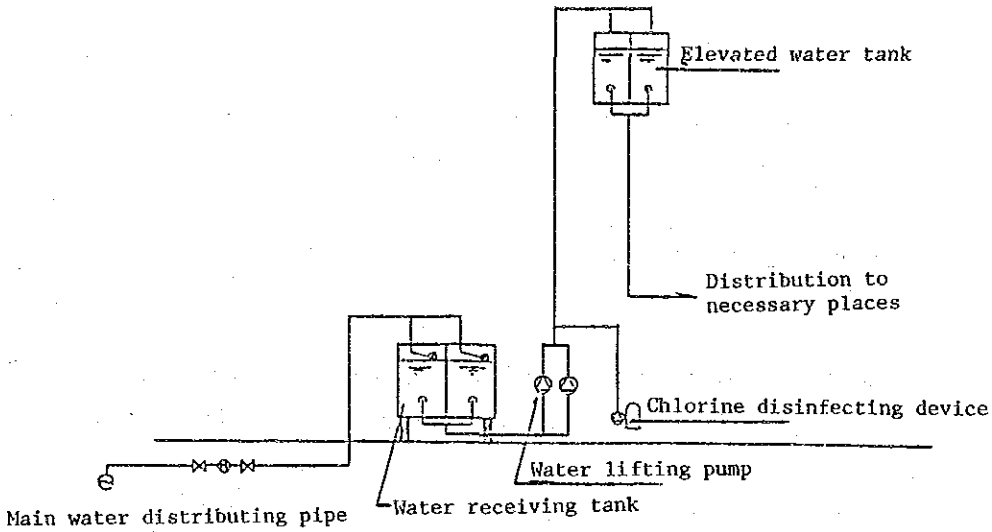
* Water receiving tank

A 100 m^3 water receiving tank capable of storing half day's supply of water will be constructed. It will be constructed to prevent contamination from the outside.

* Water supply system

Water will be pumped up from the receiving tank to the elevated tank and from there, supplied to the necessary places by gravity flow. Consideration will be given to supplying sanitary water by injecting chlorine, which performance will be interlocked with the operation of the water lifting pump.

Fig. 4-2-5 Water Supply Diagram



* Hot water supply

Hot water will be supplied to the kitchen, and laboratories that functionally require hot water. The hot water supply system will be utilized.

* Drainage

Waste water discharged from buildings are domestic sewage, effluent from scientific laboratories, technological experiment laboratories and storm sewage.

Domestic sewage

Domestic sewage discharged from various places will be collected within the site and discharged via FTI's existing intercepting chamber.

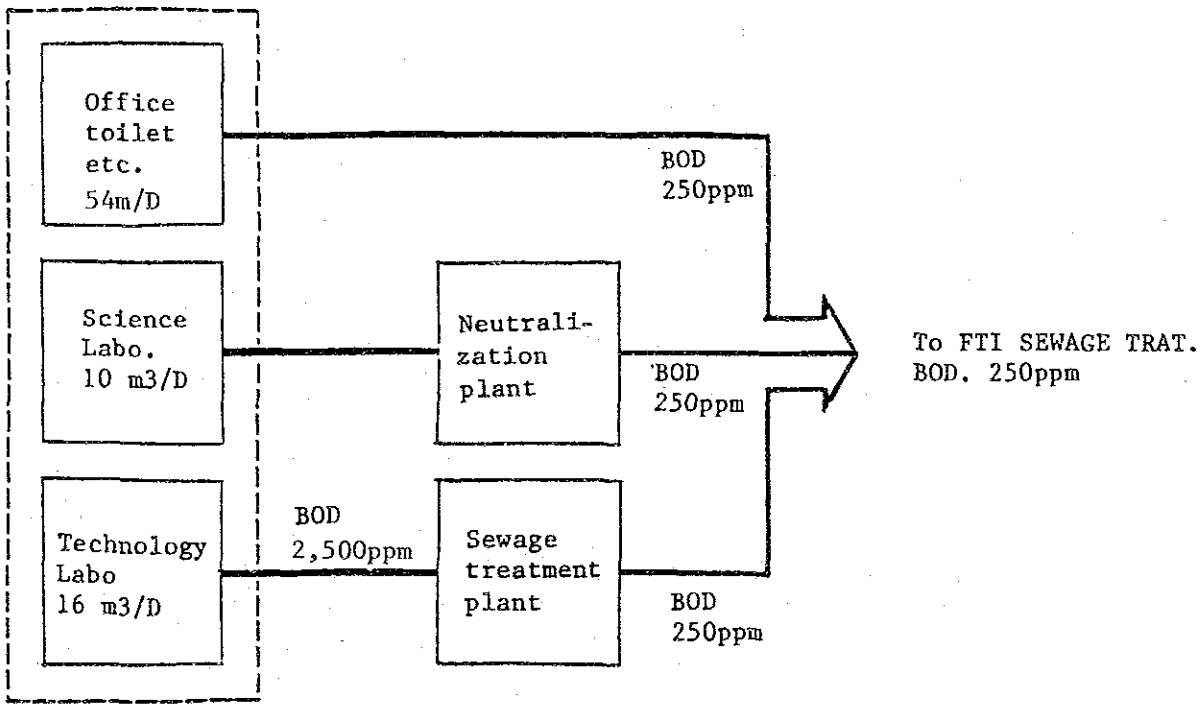
* Effluent from scientific laboratories

Effluent from various laboratories will be collected and led into the neutralization plant, and the neutralized effluent will be joined with the aforementioned domestic sewage to be discharged. Undiluted solution of various chemicals and noxious heavy metals are collected separately and treated.

* Effluent from technological experiment laboratories

As effluent from this segment is anticipated to be extremely high in BOD concentration, a pretreatment system to reduce the concentration to the level of 250 ppm, which is comparable to that of general waste water, will be provided, and the treated effluent will be joined with general effluent to be discharged. (See Figure 4-2-6)

Fig. 4-2-6 Sewage Treatment System



SEWAGE TREATMENT SYSTEM

* Storm sewage

Storm sewage from roofs and other parts of the site will be collected and discharged via the existing gully.

* Fire-fighting equipment

Indoor fire-hydrants will be provided at necessary places within each building, and fire-fighting pumps will be planned so that they can be actuated in the event of a fire to facilitate fire fighting.

* Gas supply

LPG cylinders will be installed as heat source for the kitchen and for hot water supply where necessary.

* Piping for supplying special gases

Piping to provide compressed air, hydrogen, nitrogen, acetylene, argon, helium, etc.to the laboratories will be provided as necessary.

(6) Electric systems plan

1) Receiving and transforming facilities

Power will be led into FDC from the existing power line 3ϕ 4W 34.5kv 60Hz aerial cable by connecting it to the leading-in pole on the site.

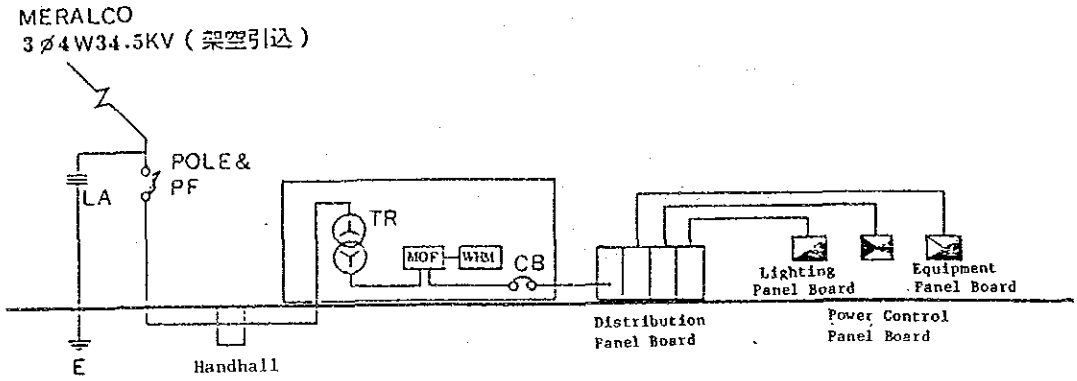
After receiving the aerial cable by the leading-in pole, power will be transmitted to the transformer of the sub-station via underground line.

From the secondary side of the transformer, power will be dropped to 3ϕ 3W 220V and supplied to each load.

Major installed loads will be as follows.

(1)	General lighting and outlets	.....	265 kw
(2)	Power for air-conditioning units and pumps	.....	420 kw
(3)	Power for laboratory and training equipment	.....	445 kw
(4)	Power for freezer storage and cold storage	.....	70 kw
		Total	1,200 kw

The overall installed transformer capacity of the entire FDC is estimated to be 1,000 KVA by simultaneous using ratio suppose 70 parcent and power factor of load suppose 80 parcent. (See Figure 4-2-7, 3-3-3)



2) Main power system

Power will be supplied from the substation to each distribution board and power board in 3φ 3W 220V. Voltage classification shall be as follows.

General lighting and outlets	1φ 2W 220V
Power load	3φ 3W 220V
Various equipment	1φ 2W 220V, 3φ 3W 220V

3) Generating set

In consideration of the local power situation, a stationary, indoor type, diesel engine-driven captive power generating set will be installed to secure power at times of power failure (for about 30 minutes) which occur four to five times a month. The capacity of the generating set will be about 200 KVA in

order to be able to supply power in 3φ 3W 220V 60Hz to water pumps, refrigerated storage and cold storage which must be operated round-the-clock and to major laboratory equipment. Fuel oil A will be used to operate the set, and a quantity necessary to operate it for 24 hours (about 1,000 l) shall be stored at all times.

The capacity of the generating set was determined on the following basis.

Water pump	10 kw
Freezing storage, cold storage	70 kw
Laboratory equipment	48 kw
Security lighting	10 kw
Total	138 kw

Generating efficiency 85%, power factor of load 0.8

138 kw ÷ (0.85 x 0.8) = 202.9 KVA --→ 200 KVA

4) Wiring for lighting circuit

Lighting fixtures, switches and outlets will be wired on the secondary side of the distribution board. Lighting in each room will be planned so that the lights can be turned on and off in small blocks, and lights in the corridors will be planned so that they can be sparsely lighted at intervals. Both the conduit wiring method and the cable wiring method will be employed. An AVR of around 75 KVA will be provided for laboratory equipment and the like to cope with voltage fluctuations. The capacity of AVR was designed to cover one half of the laboratory equipment. (Efficiency: 85%)

184 KW x 0.38 ÷ 0.85 = 75.7 KVA --→ 75 KVA

5) Lighting fixtures

The light source for illumination will mainly be fluorescent lamps, but depending on use and function, incandescent lamps may also be used.

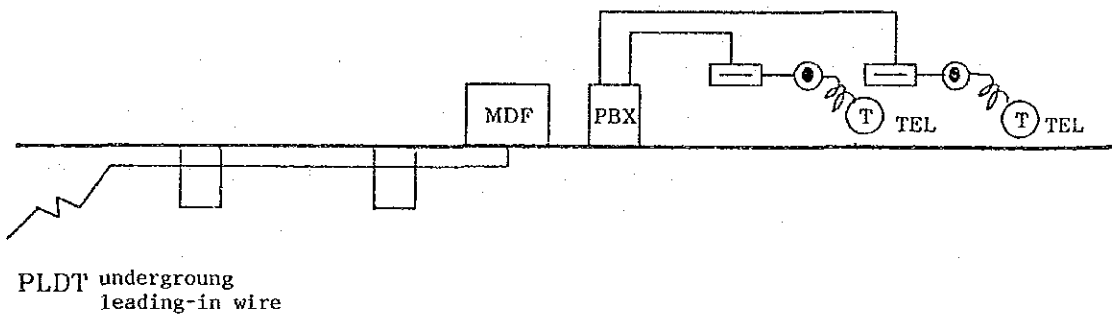
Intensity of illumination of major rooms will be as follows:

Office rooms and conference rooms:	350 Lx - 400 Lx
Training rooms and research offices:	300 Lx - 350 Lx
Laboratory	500 Lx
Corridors and lobby:	100 Lx - 150 Lx
Dining hall:	200 Lx

6) Main telephone line

The existing telephone line will be extended to the MDF board inside the building through underground conduit wiring. Telephone conduit up to MDF board and all facilities beyond MDF will be constructed by the Japanese side. The conduits from MDF board to IDF board and for extensions up to each telephone outlet will be of metal. (See Figure 4-2-8, 3-3-3)

Fig. 4-2-8 Telephone Loading Line



7) Telephone exchange

For telephone, the automatic private branch exchange system with about 16 extension sets will be installed. The PBX will accommodate 6 exchange lines plus a few extra lines on reserve. Dept. Manager room, each division chief room, consultant room, conference room, training room, lecture hall, library and administration and casher room are provided telephone.

8) Public address system

An amplifier will be installed in the administration office to be used for paging and broadcasting background music.

9) TV community system

A TV antenna will be installed on the roof and conduit piping to the terminal outlet will be installed. Training room, lecture hall, library and cnference room are install outlets.

10) Fire alarm system

A system which can sound the alarm bell operated manually, will be installed in the buildings to help the occupants evacuate in the event of a fire.

11) Outdoor lighting

For security on the premises, outdoor lights which will automatically turn on and off will be installed minimum numbers with underground wiring.

12) Lightning conductors

Lightning conductors will be provided on the roofs to protect the people and the buildings from lightning hazards.

For protecting building and peoples from lightning, lightning rod will be installed.

(7) Building Material Plan

Finishing material should be selected by the suitability of local climate and based on local material and method. Also, priority should be given to materials that will ensure early construction, low construction costs, and low maintenance costs.

1) External Finishing Material

For the external walls spray tile is recommended because it will create a clean appearance which is appropriate for the Center since it is to promote food development. Besides, the spray tile suits local climate and the taste of the local people. For the subdued atmosphere that the Center is to create in its role in promoting analysis and training, lodging and sample production, galvanized metal roofing is recommended. Aluminium sash is recommended for the windows in preference to the frequently used steel sash because of its durability (Aluminium sashes are gaining popularity in the Philippines).

2) Internal Finishing Materials

Considering the role that each room is to play, the rooms are classified into eight types to select the material for their internal finish.

Group A These are to be used by the staff for the different jobs and are, to be given the finish used in general office rooms. This group will include the administrative office, staff room, accounting and casher room, resting room and others.

Group B Rooms belonging to this group are intended for large numbers of persons. Accordingly, they are required to be durable and also to be sanitary.
The group includes preparation room, experiment room, training room, preparation room for teaching material, dormitory, etc.

Group C The senior staff rooms will have a better finish than general office rooms. These will include the Dep. Manager room, Asst. deputy manager's room, senior staff room, consultant room, conference rooms, etc.

Group D Rooms of Group D will be designed to absorb noise and prevent reverberation.
The group will include multipurpose training hall, library, radio communication room, typing and recording room, data processing room, etc.

Group E This will include public space and must withstand frequent uses in addition to facilitating maintenance. Corridor, canteen, entrance hall and etc., will come under this category.

Group F These will involve frequent use of water and must be made of materials easy for cleaning. Cooking room, preparation room, processing room, drying room, sample production room , etc. are included in this category.

Group G Highly durable equipment rooms will belong to this category. The possibility of becoming sources of excessive noise will be carefully considered.
The machine room and electric room are in this group.

Typical materials classified in each group are listed in the following table:

Table 4-2-3 Finishing Materials

Group Name	Floor	Wall	Ceiling	Remarks
Group A	PVC sheet	Painting	Rockwool board	
Group B	PVC sheet	Painting lodging room Vinyl leather finishing	Rockwool ,boards, asbestos board paint finish	In case water is used upper floor
Group C	Parquet floor	Vinyl leather	Rockwool board	Carpet floor for confe-rence room
Group D	Parquet floor	Painting or accoustic board	Rockwool board	Parquet floor for audito-rium only. Particle board for wall of multi-purpose lecture room only
Group E	Terazzo tiles	Painting	Rockwool board	
Group F	Mosaic tiles	Tiles	Asbestos board paint finish	
Group G	Harders	Glass wool mat	Glass wool mat	

4-2-3 Equipment plan

The equipment which are to be provided and installed at FDC under grant aid may be broadly divided into the two major categories of equipment for quality analysis and evaluation and equipment for product development and sample production. The equipment will be selected with due regard to the following.

(1) Criteria for selection of equipment for quality analysis and evaluation

1) Conformity to international food evaluation standard

If Philippine foods are to become internationally acceptable, they must be subjected to analysis which conform to international food evaluation standards of, for instance, AOAC (Association of Official Analytical Chemists) or of USFDA (the United States Food and Drug Administration)(See Remarks). Equipment necessary for analysis which conform to such standards must therefore be selected.

Remarks:

USFDA: Short for United States Food and Drug Administration. It oversees safety and sanitation of food by conducting inspection of foods including those imported or exported, with the exception of meat, fowl and egg based on the Federal Food, Drug, and Cosmetic Act.
Meat, fowl, etc. fall under the jurisdication of the United States Department of Agriculture (USDA).

AOAC: Short for Association of Official Analytical Chemists.
It was originally established for the purpose of standardizing the methods for analyzing agricultural products in the United States, but today, it issues the "Official Methods of Analysis (14 editions as of 1984)" which cover chemical analysis and are also utilized for analysis of foods in the United States. The contents covered are quite extensive, including

methods of analysis related to agricultural products, fishery products, water and chemicals. They also stipulate the methods of analysis, test produses, apparates, and measurement methods.

2) Analyzing quickly and at low cost

As food analysis by FDC will be conducted by commission of enterprises, they must be conducted quickly and at a low cost. The equipment specifications must be selected with due regard to these points.

3) Ease of handling

As the FDC staff on the whole seem to have a high level of technical ability to handle equipment, the equipment that will be installed will be of the type that any one of the staff would be able to handle instead of the highly computerized type which only a few would be able to operate.

(2) Criteria for selection of equipment for product development and sample production

1) Installation of production facilities for research

As trial production of food at FDC will basically be carried out on a laboratory scale, the equipment to be selected must not be too large as production facilities for research purpose and yet they must be of the scale useful for resolving complaints against products which are exported by the food processing industry of the Philippines, especially by the small and medium scale enterprises.

2) Effective operation of facilities

Items slated for test production are quite diverse, ranging from canned fruits, vegetables and fishes to frozen and dried foods. To manufacture such a wide variety of products, it means that the equipment would have to be made flexible enough or otherwise they would have to be forever expanded, which

would only take up a lot of space and yet fail to operate effectively. It is therefore important to select the multi-purpose type of equipment best suited to the situation of the food industry of the Philippines.

Every equipment will be used continuously for a long time, and some of them will be highly advanced ones. In selecting them, emphasis will be placed on after-care service. In other words, the equipment for which spare parts and expendables can be readily procured and for which maintenance service is locally available will be selected.

Equipment for FDC may be classified into the following four categories.

1) Equipment for Quality Evaluation Division
2) Equipment for Technology Development Division
3) Equipment for Industry Services Division
4) Equipment for Sample Production Division

Of the equipment selected, those for which dispatching of technical experts from Japan is necessary, in view of the technical level of FDC's staff are as follows.

①and②were marked in the remarks of equipment list.

① Installing instruction is needed.
② Technical instruction is needed.

The list of equipment which are to be provided to each division is shown on the following page. Existing and requested equipment lists are attached Appendix 6 and 7.

Equipment List

1. Quality Evaluation Div.

Room	Item No.	Equipment	Q'ty	Remarks
1) Chemical Analysis ··· Analysis of nutrient ingredients food additives, harmful metals, and chemicals for the evaluation of food				
Instrument Room-1	FS-001	Single-Beam Spectrophotometer	1 unit	②
	-007	Titration Assembly	1 set	②
	-026	Water Activity Meter/Hygrometer	1 unit	②
Instrument Room-2	FS-037	Fluorescence Spectrophotometer	1 unit	②
	-038	Gas Chromatograph	1 set	②
	-040	High Performance Liquid Chromatograph	1 unit	②
Chemistry Lab.	FS-014	Flask Heater or Heating Mantle	3 units	
	-022	Thermoelectric Cold Plate	1 unit	
	-030	Vacuum Pump	1 unit	
	-031	Vacuum Oven	1 unit	
	-034	Hydrometer Set	1 unit	
	-041	Water Distilling Apparatus	1 unit	②
Solvent Extraction & Recovery Room	FS-004	Extraction Assembly	1 unit	
	-005	Solvent Recovery System	2 sets	②
	-009	Kuderna Danish Concentrator	1 set	②
	-039	Rotary Evaporator	2 units	
Sample Preparation Room	FS-006	Vertical Cutter/Mixer	1 unit	
	-019	Shaker-Water Bath Incubator	1 unit	
	-024-1	Refrigerator	1 unit	
	-035	Waring Blendor(Explosion Proof)	1 unit	
Aflatoxin Room	FS-013	Glove Box	1 unit	
	-017	Long Wave UV Lamp	1 unit	
	-024-2	Freezer	1 unit	
	-033	Block Heater	1 unit	
	-036	Fume Hood	1 unit	

Room	Item No.	Equipment	Q'ty	Remarks
2) Micro Analysis ··· Analysis of filth in food relating to the hygiene and quality.				
Filth Lab.	FS-101	Sample Splitter	1 unit	
	-102	Blender	1 unit	
	-106	Water Bath	1 unit	
	-107	Butter Stirrer	1 unit	
	-111	Refrigerator/Freezer(combined)	1 unit	
	-112	Lamp (Magnifying Lamp)	3 units	
	-113	Fume Hood	1 unit	
	-114	Dissecting and Mounting Equipment	3 sets	
	-115	Cabinet for Molding Specimen	1 unit	
	-318	Portable Heat Sealer	1 unit	
	-319	Water Aerator	2 units	
	-352	White Enameled Pan	6 pcs	
3) Microbiology ··· Analysis of vibrio parahaemolyticus, salmonella,thermophilic and mesophilic anaerobes etc. for the evaluation of safety.				
Sterilization room	FS-259	Sterilizer	1 unit	For PTTC
	-260	Autoclave	1 unit	- do -
Clean Room	FS-240	Clean Bench	3 units	
	-245	Stomacher Lab Blender	1 unit	
	-247	Biological Cabinet	1 unit	For PTTC
	-251	Electronic Top Loading Balance	3 units	- do -
	-261	Water Bath	1 unit	- do -
Incubation Room	FS-201	Incubator	3 units	
	-204	Water Bath (High Performance)	3 units	
	-205	Low Temperature Incubator	1 unit	
	-253	Incubator Bath	1 unit	

Room	Item No.	Equipment	Q'ty	Remarks
Microbiology Lab.	FS-206	Portable Refrigerator	2 units	
	-207	Portable Freezer	2 units	
	-208	Refrigerator	1 unit	
	-209	Laboratory Upright Freezer	1 unit	
	-215	Glassware Drier	1 unit	
	-216	Magnetic Stirrer Hot Plate	1 unit	
	-217	Maxi-mix Shaker	2 units	
	-219	Digi-Sense Digital pH Meter Kit	2 units	
	-221	Biotest RCS Centrifugal Air Sampling System	4 units	②
	-222	Timer	2 units	
	-232	Hydrophobic Grid Membrane Filter	2 units	
	-238	Water Grab Sampler	3 units	
	-242	Fluorescent Microscope	1 unit	②
	-249	Refrigerated Incubator	1 unit	For PTTC
	-252	Pharmacy Refrigerator	1 unit	- do -
	-254	Shaker Bath	1 unit	- do -
	-256	Petri Dish Turntable	3 units	
	-257	Colony Counter	1 unit	
	-258	Blender	1 unit	For PTTC
	-318	Portable Heat Sealer	1 unit	

4) Physical and Sensory Evaluation ··· Evaluation of physical and sensory matters such as color, shape, taste ,and oder.

Physical Eva. Lab.	FS-303	Macbeth-Munsell Disk Colorimetry Equipment and Diagram	1 set	②
	-310	Electric Sieve Shaker	1 unit	
	-315	Dial Caliper	3 units	
	-318	Portable Heat Sealer	1 unit	
	-319	Water Aerator	2 units	
	-320	Thermometers	10 units	
	-322	Triple Beam Balance	2 units	

Room	Item No.	Equipment	Q'ty	Remarks
Kitchen & Prep. Room	FS-310	Electric Sieve Shaker	1 unit	
	-325	Microwave Oven	1 unit	
	-333	Upright Freezer	1 unit	
	-335	Automatic Rice Cooker	2 units	
	-336	Airpot (Hot & Cold)	4 units	
	-337	Pressure Cooker	2 units	
	-341	Casseroles	11 pcs	
	-344	Sampling Scoop	24 pcs	
	-345	Steamer	8 pcs	
	-349	Dcapper	5 pcs	
	-350	Manual Vegetable Peeler	4 pcs	
	-351	Wiss Shears	2 pcs	
	-352	White Enameled Pan	4 pcs	
	-355	Corning Ware	36 pcs	
	-359	Drinking Glass	38 pcs	
	-360	Pitcher	10 pcs	
	-363	Teflon Cookware	1 set	
	-364	Teflon Turner and Ladle Set	2 sets	
	-365	Polypropylene Basket	12 pcs	
	-367	Sample Container	50 pcs	
	-368	Utility Basin	6 pcs	
	-369	Glass Carrying Rack	4 pcs	
	-370	Hand Cutlery	1 set	
	-372	Electric Knife	1 pc	
	-380	Stretch Film	50 rolls	
	-381	Boilable Bags	5,000 pcs	
	-382	Lab-Lyter	23 pcs	
Package Testing Lab.	FS-406	Mercury Manometer	2 units	
	-408	Can Enamel Rater	1 set	
	-410	Vacuum Leak Test Set	1 set	
	-411	Electronic Tinplate Coating Analyzer	1 set	
	-412	Can Seam Projector and Accessories	1 set	

Room	Item No.	Equipment	Q'ty	Remarks
5) General Laboratory Accessories				
	FW-001 ~ 069	Glasswares	1 lot	
	FW-101 ~ 140	Metalwares	1 lot	
	FW-201 ~ 239	Porcelainwares and Plasticwares	1 lot	
	FW-301 ~ 313	Rubberwares, Woodwares and Utilities	1 lot	

2. Technology Development Div.

Room	Item No.	Equipment	Q'ty	Remarks
Sample	TD-601	Handy Thermometer	10 units	
Production Room	-602	Upright Freezer	1 unit	
	-603	Refrigerator Freezer	1 unit	
	-604	Food Processor	2 units	
	-605	Can Opener	5 units	
	-606	Gas Stove	3 units	
	-607	Electric Stove	3 units	
	-609	Cooking Pot	4 sets	
	-610	Fermentor	1 unit	
	-611	Ice Maker	2 units	1 unit added
	-612	Potentiometer 10 Channel	1 unit	
	-613	TDT Equipment	2 sets	
	-614	Post Harvest Treatment	2 rooms	
	-615	Low Temperature Incubator	1 unit	
	-616	Constant Temperature Incubator	1 unit	
	-617	Washing Sink	6 units	
Postharvest Lab.	FS-025	Thermistor Thermometer and Probe	1 unit	
	-304	Egg Haugh Unit Tester	1 unit	
	-305	Fruit Pressure Tester	1 unit	
	-306	Texturo Meter	1 unit	
	-307	Refractometer	1 set	
	-308	7-Speed Blender	1 unit	
	-311	Electric Top Loading Digital Balance	2 units	
	-328	Electric Cooking Range	1 unit	
	-350	Manual Vegetable(Potato)Peeler	2 units	

3. Industry Services Div.& General Affairs Div.

Room	Item No.	Equipment	Q'ty	Remarks
1) Trainings and Seminars				
Multi-Purpose Trainig Hall	FT-001	Slide Projector	1 set	
	-002	Overhead Projector, Portable	1 set	
	-019	16 mm Projector	1 set	
	-020	Video System Monitor	2 sets	②
Training Material Develop. Room	FT-005	Copying Machine	1 set	
	-006	Punch Binder	1 set	
	-007	Lettering System	1 set	
	-011	Assorted Training Aids	1 set	
	-014	Photographic Equipment	1 set	
	-015	Drafting Table	1 set	
	-021	Multigraph/ Plate Maker	1 set	Additon for training material preparation
Training Room	FT-009	Projection Screen with Tripod	1 set	
	-012	Video System	1 set	
	-022	Overhead Projector, Portable	1 set	
	-023	Slide Projector, Portable	1 set	

Room	Item No.	Equipment	Q'ty	Remarks
Training Lab.-1	FS-043	Top Loading Balance	1 unit	For PTTC
	-044	Van Slyke Set	1 set	- do -
	-045	Electric Furnace	1 unit	- do -
	-046	Hot Plate	1 unit	- do -
	-047	Semi-Micro Kjeldahl Digesting Apparatus	1 set	- do -
	-048	Semi-Micro Distillation Apparatus	1 set	- do -
	-049	Manual Buret	2 units	- do -
	-050	pH Meter	2 units	- do -
	-051	Centrifugal Separator	1 unit	- do -
	-052	Magnetic Hot Plate Stirrer	2 units	- do -
	-053	Motorized Stirrer	1 unit	- do -
	-054	Quick Crude Fat Analyzer	1 unit	- do -
	-055	Quick Crude Fiber Analyzer	1 unit	- do -
	-056	Conway Microdiffusion Vessels	24 units	- do -
	-057	Recording Thermometer	2 units	- do -
	-058	Moisture Meter	2 units	- do -
	-060	Rheometer	1 unit	- do -
	-061	NaCl Meter	1 unit	- do -
	-106	Water Bath	1 unit	- do -
	-112	Lamp(Magnifying Lamp)	1 unit	
	-114	Dissecting and Mounting Equipment for Insects	2 sets	
	-116	Biological Microscope with Camera	1 set	For PTTC
	-117	Widefield Stereoscopic Microscope	5 units	- do -
	-118	Stirrer with Hot Plate	1 set	- do -
	-119	Top Loading Balance	1 unit	- do -
	-120	Vacuum Pump	1 unit	- do -
	FW-131	US Sieve		
		a. No. 140, 8" Dia.	3 units	
		b. No. 140, 12" Dia.	3 units	
		c. No. 230, 8" Dia.	5 units	
	FW-131	US Sieve Receiver		
		a. 8" Dia.	5 units	
		b. 12" Dia.	5 units	

Room	Item No.	Equipment	Q'ty	Remarks
Training Lab.-2	FS-248	Biological Microscope (Bright Field)	5 units	For PTTC
	-250	Mini Electric Bone Saw	4 units	- do -
	-251	Electronic Top Loading Digital Balance	1 unit	- do -
	-253	Incubator Bath	1 unit	- do -
	-255	Magnetic Stirrer, Hot Plate	1 unit	- do -
	-256	Petri Dish Turntable	2 units	- do -
	-257	Colony Counter	1 unit	- do -
	-258	Blender	1 unit	- do -
	-307	Refractometer	2 sets	- do -
	-308	7-Speed Blender	1 unit	
	-312	Vacuum Gauge	2 units	
	-315	Dial Caliper	2 units	
	-319	Water Aerator	1 unit	Addition Need for activity
	-320	Thermometers, Glass and Dial Types	5 pcs	
	-323	Can Seam Test Kit	5 sets	
	-341	Casseroles	1 pc	
	-345	Steamer, (Small & Big)	2 pcs	
	-352	White Enameled Pan, Rectangular	2 pcs	
	-359	Drinking Glass	12 pcs	
	-382	Lab-Lyter	1 pc	
	-413	Torque Meter	1 unit	For PTTC Reduced 1
	-414	Mullen's Bursting Tester	1 unit	For PTTC
	-415	Tensile Strength Tester	1 unit	- do -
	-416	Pouch Air Burst Tester	1 unit	- do -
	-417	Thickness Gauge	2 units	For PTTC Reduced 3

2) General Affairs Div.

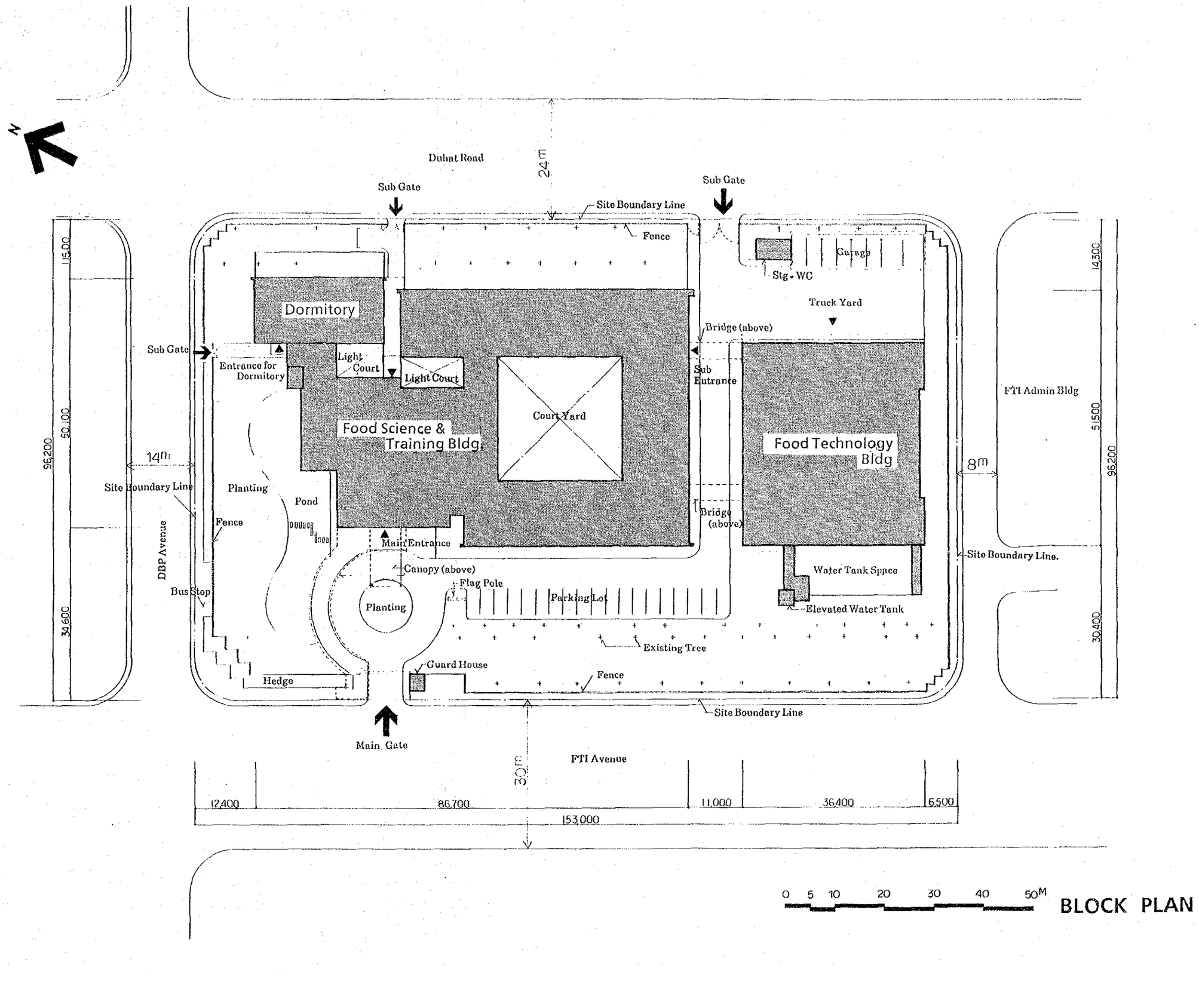
Room	Item No.	Equipment	Q'ty	Remarks
Typing & Recording Room	FT-125	Typewriter, Electric	1 unit	
	-127	Optical Disk File System	1 set	② changed from Microfiling System
	-128	Word Processor	2 units	②
Data Processing Room	FT-004	Personal Computer	1 set	②

4. Sample Production Div.

ROOM	ITEM NO	Equipment	Q'TY	REMARKS
Freezing Room	TD-001	Freezer Trolleys	25 units	①
	-002	Tray for Shrimp	600 pans	Reduced 1,600
	-003	Tray for Mango	300 pans	Reduced 400
	-004	Rack in Freezer Storage Room	3 units	①
	-005	Rack in Chiller Storage Room	2 units	①
	-006	Rack in Chilled Room	3 units	①
	-007	Freezer Room Uniform	24 sets	
Dryer Room	TD-101	Cabinet Dryer	1 unit	①
	-102	Trolleys and Trays for Cabinet Dryer	4 units	① Reduce 6
	-103	Spray Dryer	1 unit	②
	-104	Drum Dryer	1 unit	②
	-105	Laboratory Freezer Dryer	1 unit	② Addition for Sample Producton
	-106	Washing Sink	1 unit	
Heat Processing Room	TD-201	Vacuum Can Seamer	1 unit	①②
	-202	Vacuum Can Seamer for Institutional	1 unit	①②
	-203	Parts of Seamer	10 kinds of can size	
	-204	Can Coder	1 unit	①
	-205	Horizontal Retort with Pressure Cooling	1 unit	①②
	-206	Plate Heat Exchanger with Deaerator	1 unit	①
	-207	Exhaust Box with Conveyor	1 unit	①
	-208	Vacuum Pan Concentrator with Essence Recovery	1 unit	①
	-209	Fryer	2 units	①
	-210	Filling and Capping Machine	1 unit	①
	-211	Torque Meter	1 unit	①
	-212	Steam Jacketted Kettle with Agitator	4 units	①
	-213	Sanitary Pump	2 units	①
	-214	Hoist and Rale	1 set	①
	-215	Storage Tank	2 units	①
	-216	Platform	1 unit	①
	-217	Basket	10 units	①
	-218	Washing Sink	2 units	

ROOM	ITEM NO.	Equipment	Q'TY	REMARKS
Processing Room	TD-301	Gas Blancher	1 unit	①
No.1	-302	Expeller	1 unit	①
	-303	Pulper and Finisher	1 unit	①
	-304	Pineapple Peeling Decoring Machine	1 unit	①
	-305	Pineapple Ring Slicing Mold	1 unit	①
	-306	Fruit and Vegetable Cutter Dicer	1 unit	①
	-307	Vegetable Tuber Peeler	1 unit	①
	-308	Brine Injector With Pump	1 units	① Reduced 2
	-309	Raw Material Carts	5 units	
	-310	Jacklifts	2 units	
	-311	Platform Truck	4 units	
	-312	Aluminum Dolley	33 units	
	-313	High Density Polylug	200 units	
	-314	Plastic Crate	140 units	
	-315	Plastic Utility Drum	25 units	
	-316	Plastic Platter	50 units	
	-317	Plastic Nesting Tray	50 units	
	-318	Band Saw	1 unit	①
	-319	Curing Tank	1 unit	
	-321	Shrimp Sizer	1 unit	①
	-322	Bacon Hanger	24 pcs	
	-323	Basket Centrifuge	1 unit	①
	-324	Washing Tank	3 units	2 added
	-325	Weighing Scale	19 units	
	-326	Washing Sink	1 unit	

ROOM	ITEM NO.	Equipment	Q'TY	REMARKS
Processing Room	TD-401	Preparation Table	18 units	
No.2	-402	Mango Preparation Conveyor	2 units	①
	-403	Weigher Table	10 units	①
	-404	High Pressure Cleaning Equipment	2 units	①
	-405	Spray Equipment	2 units	①
	-406	Cutter and Knife	50 units	
	-409	Storage Cabinets	10 units	
	-410	Power Consumption Meter	1 unit	
	-411	Mass Flow Meter	1 unit	
	-412	Air Flow Meter	1 unit	
	-413	PH Meter	3 units	
	-414	Thermometer	35 units	
	-415	Room Hygrometer	5 units	
	-417	Washing Sink	3 units	
Packaging Room	TD-501	Impulse Sealer	5 units	
	-502	Heat Sealer for PVC Tray	1 unit	
	-503	Vacuum Packaging Machine	1 unit	
	-504	Washing Sink	1 unit	
Other Equipment				
1. Vehicles	FT-103	Coaster, 25 seater	1 unit	
	-105	Wagon-Jeep, 5~6 seter	2 units	Reduced 3
	-124	Bus, 50 seater	1 unit	
2. Maintenance	FT-107	for Vehicle	1 set	
	-108	for Electronic/Electric Equipment in Food Technology and Food Science Laboratories	1 set	
3. Laboratory Furniture	FT-111	Center Table, Side Table, Balance Table, Shelves, Sink	1 lot	①
	-123	White Laboratory Uniform : gown, shoes, gloves	100 sets	Reduced 200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Duhat Road
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Sub Gate
Sub Gate
Site Boundary Line
Fence
Garage
Stg - WC
Truck Yard
Dormitory
Bridge (above)
Sub Gate
Entrance for Dormitory
Light Court
Light Court
Sub Entrance
Court Yard
Food Science & Training Bldg
Food Technology Bldg
FTI Admin Bldg
14m
8m
Site Boundary Line
Planting
Pond
Fence
DBP Avenue
Bus Stop
Main Entrance
Canopy (above)
Flag Pole
Planting
Parking Lot
Bridge (above)
Water Tank Space
Elevated Water Tank
Site Boundary Line.
Existing Tree
Guard House
Fence
Hedge
Site Boundary Line
Main Gate
30m
FTI Avenue
12,400
86,700
11,000
36,400
6,500
153,000
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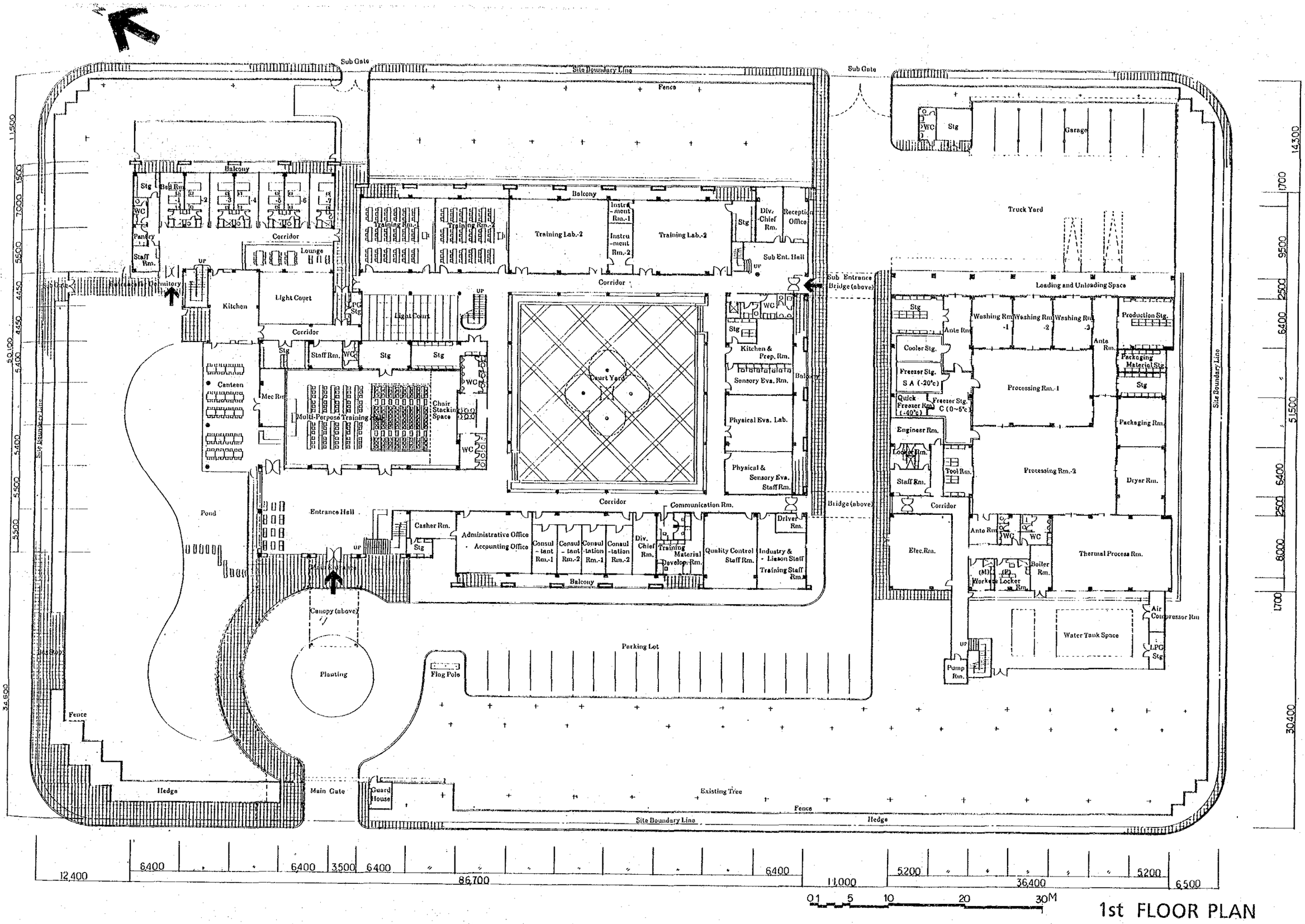
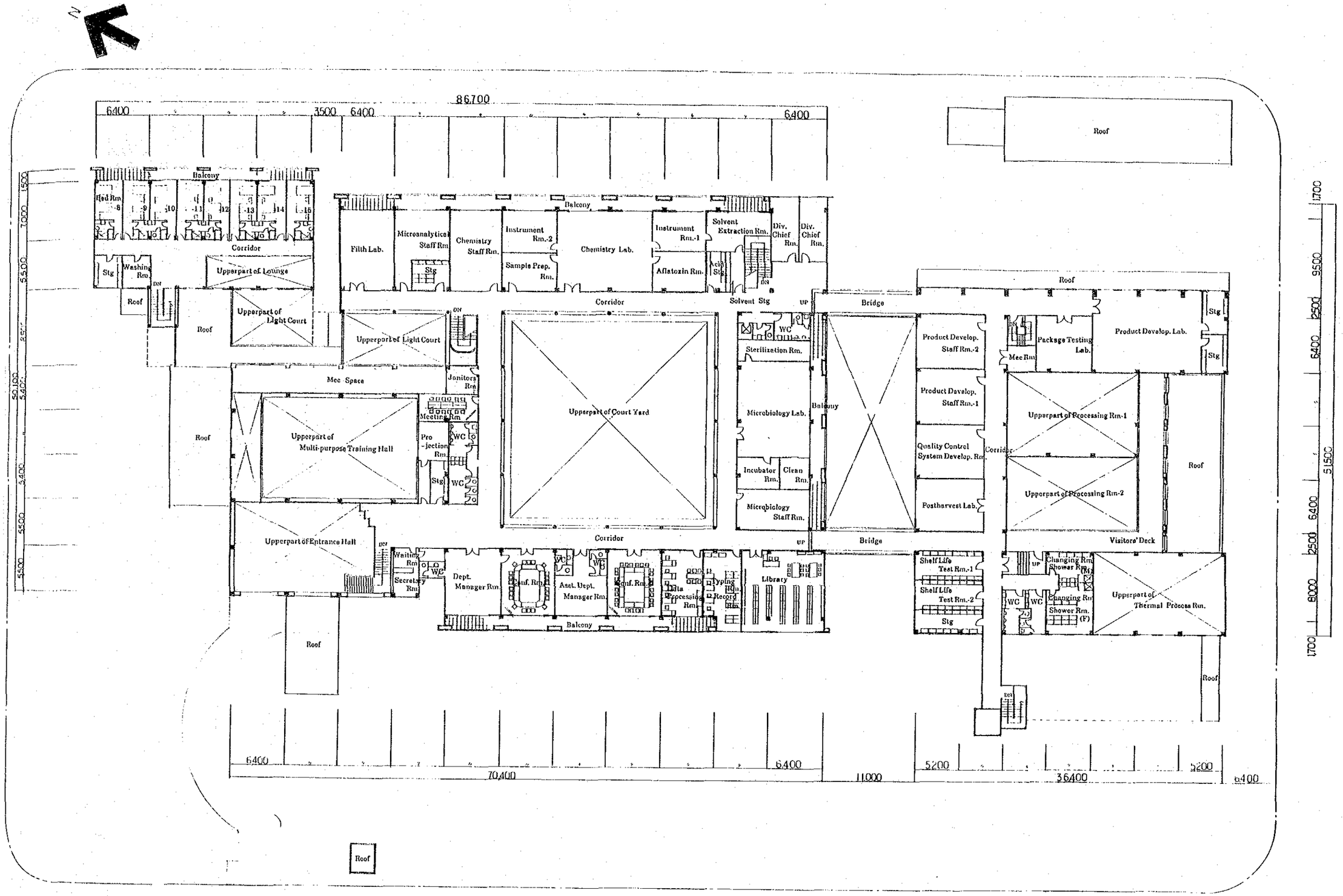
BLOCK PLAN

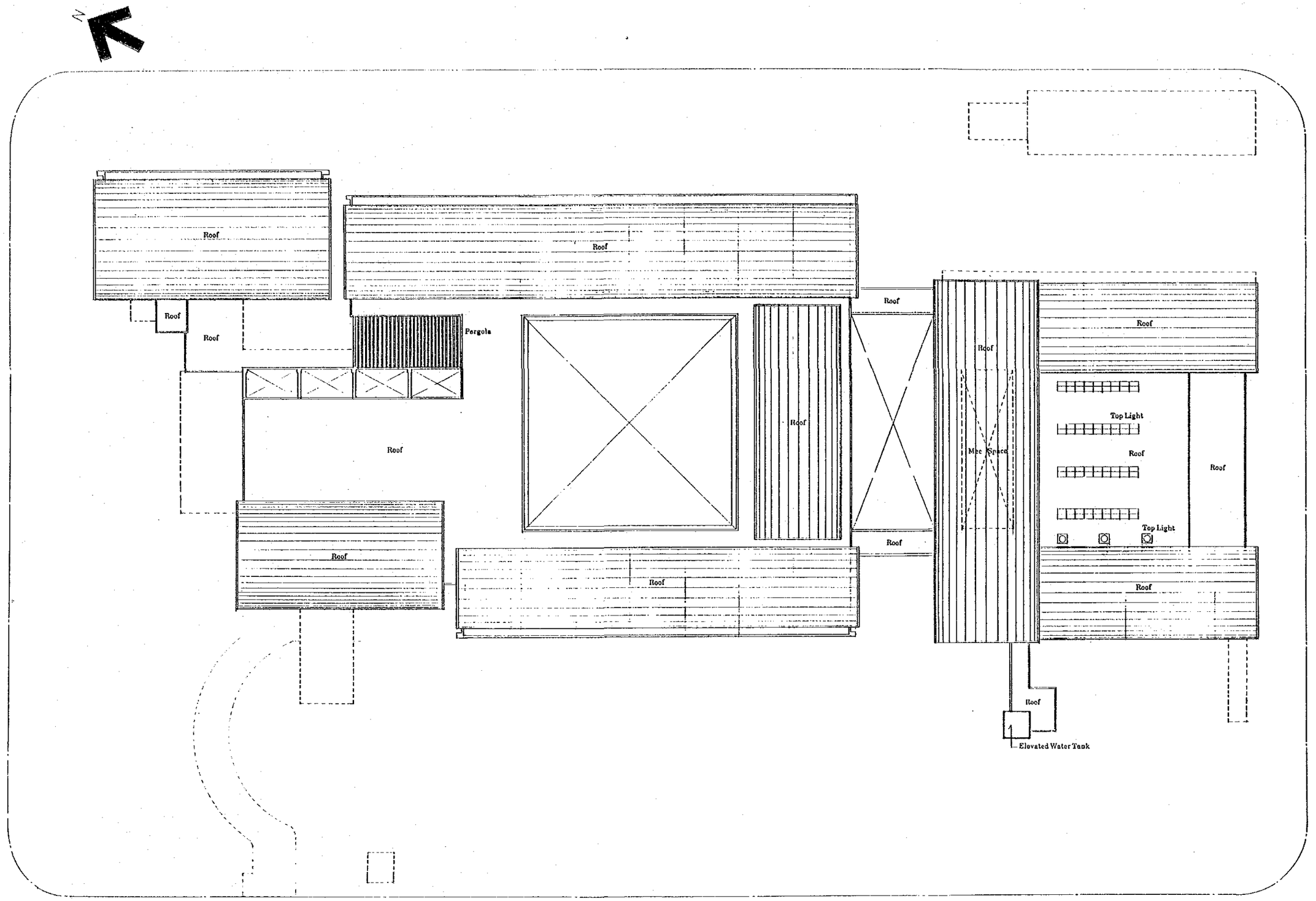


1st FLOOR PLAN



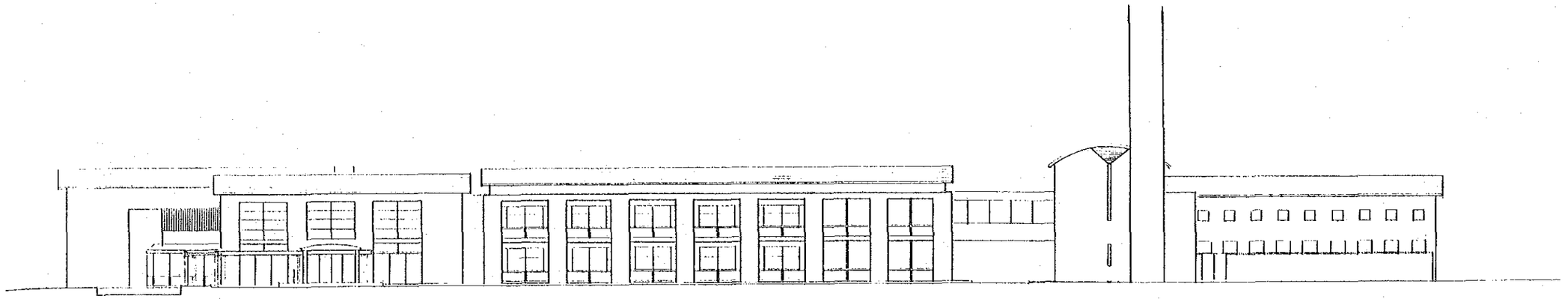
01 5 10 20 30M

2nd FLOOR PLAN

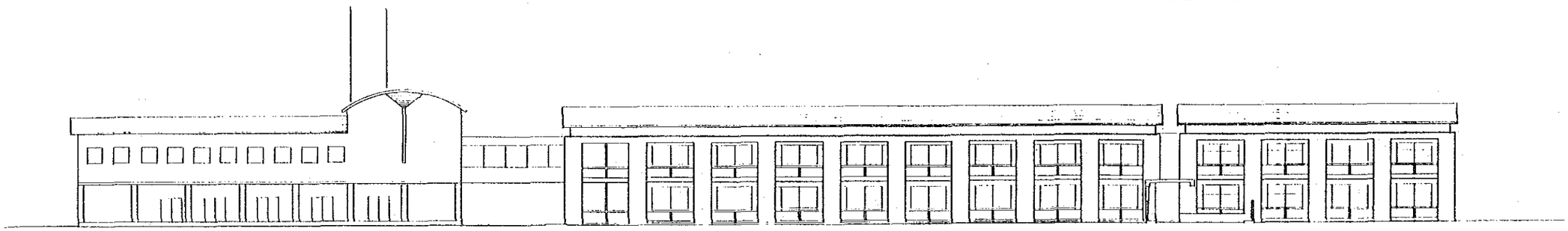


01 5 10 20 30M

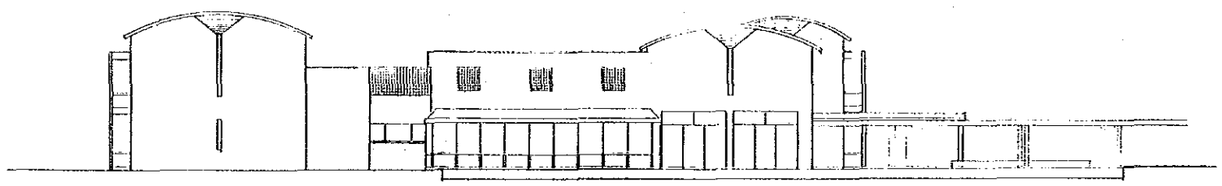
ROOF PLAN



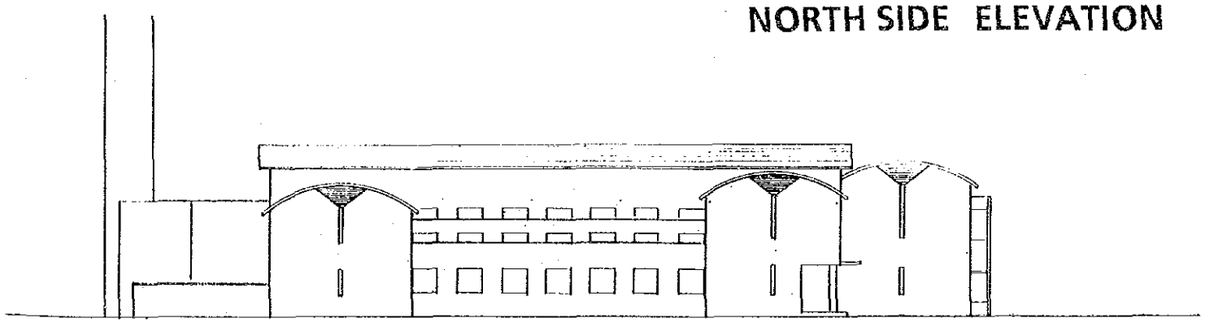
WEST SIDE ELEVATION



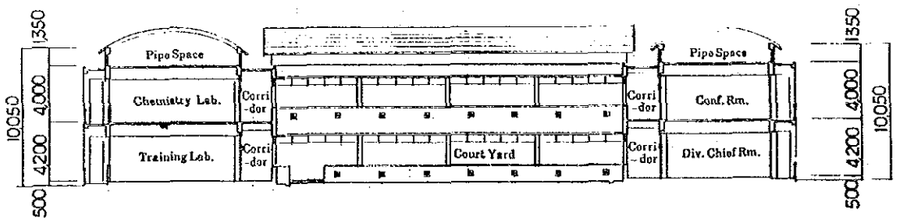
EAST SIDE ELEVATION



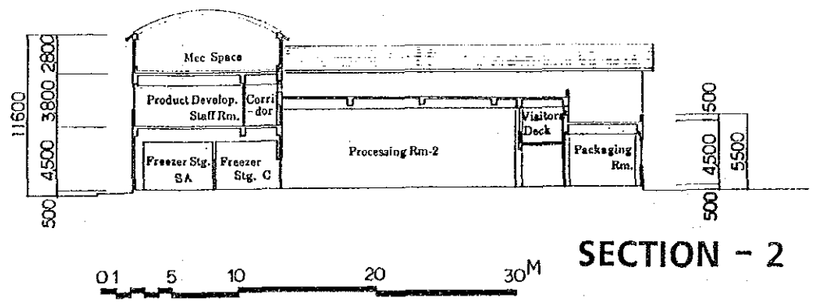
NORTH SIDE ELEVATION



SOUTH SIDE ELEVATION

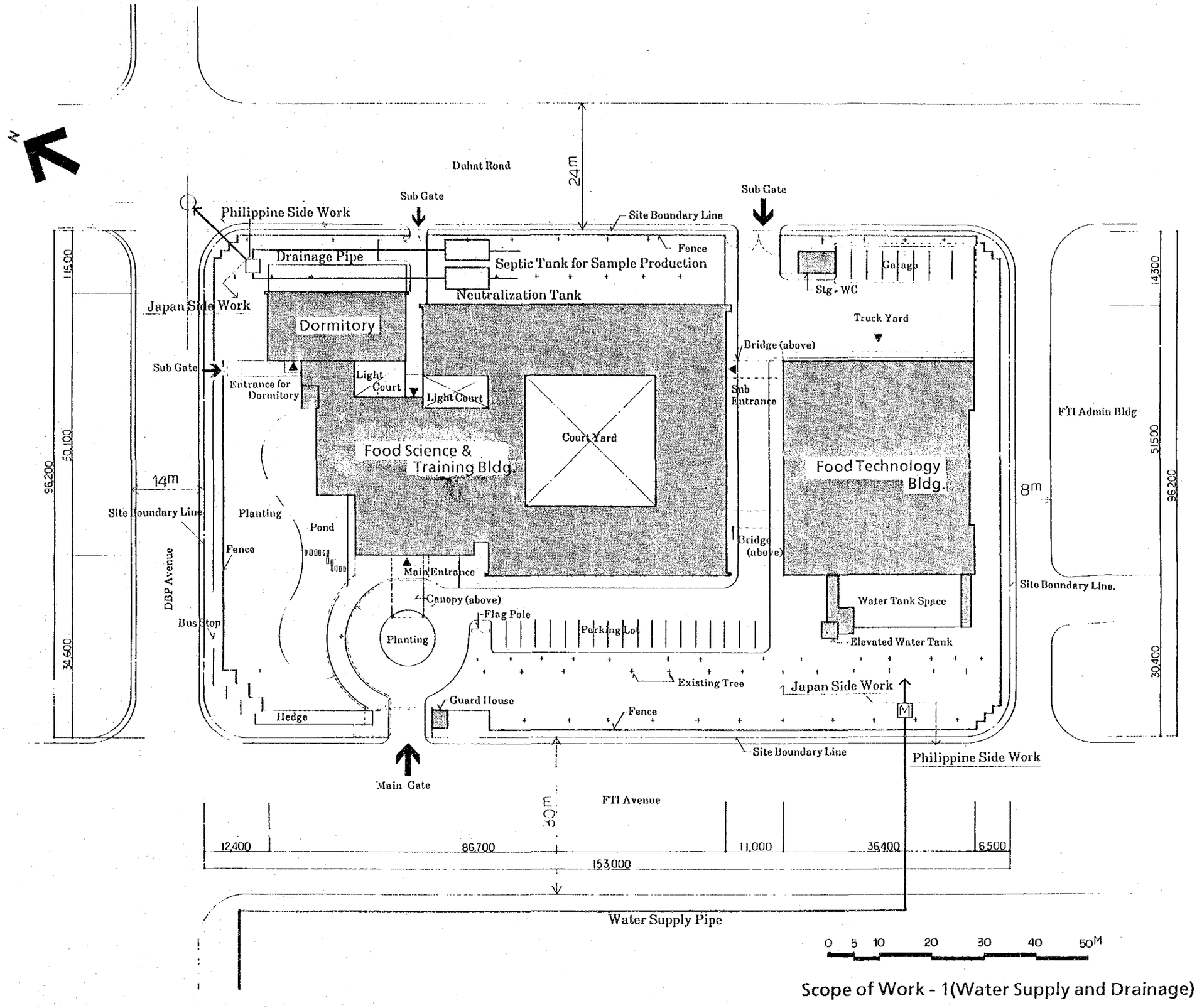


SECTION - 1

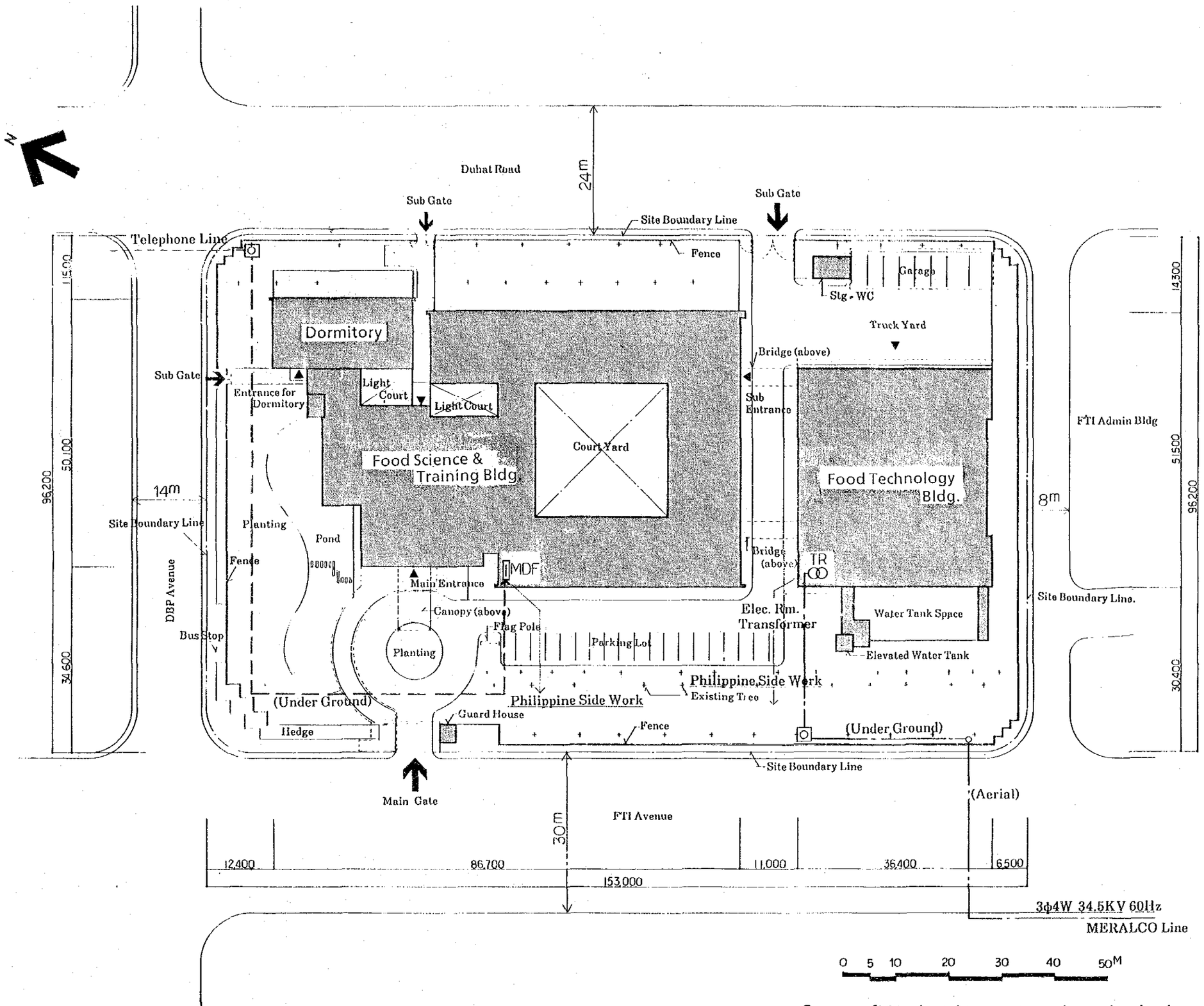


SECTION - 2

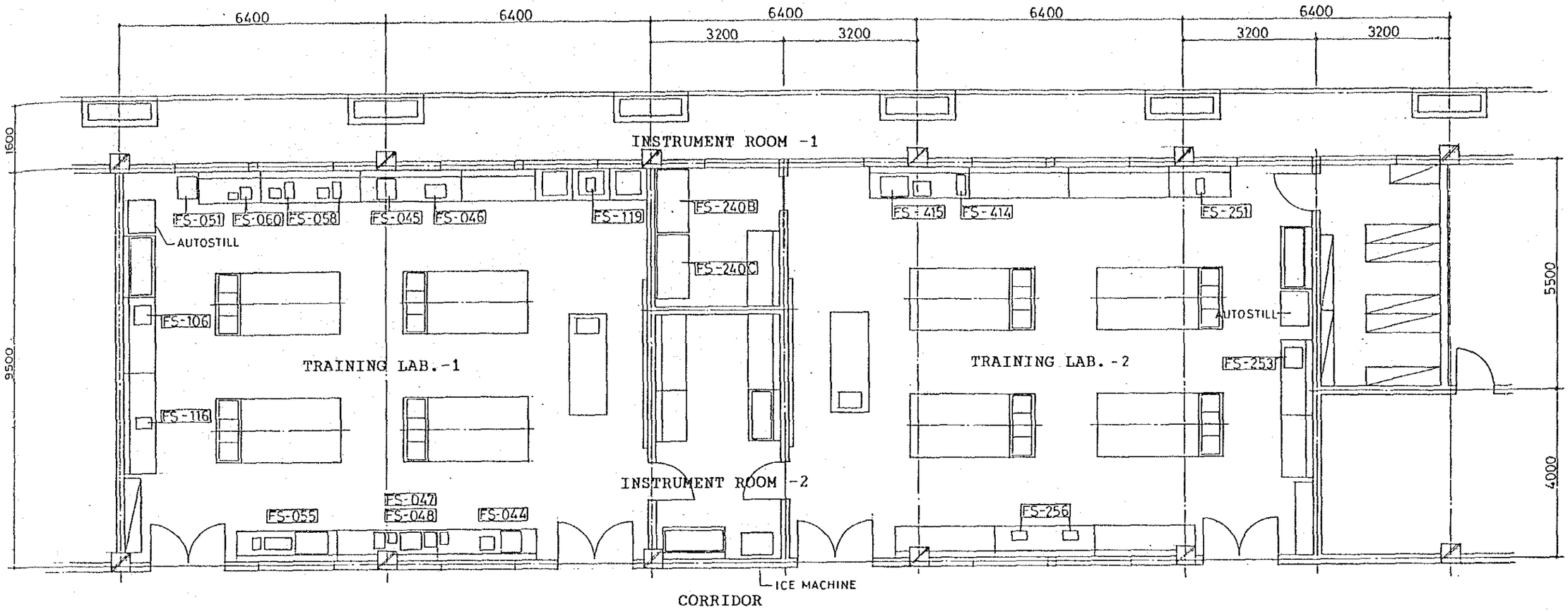
0 1 5 10 20 30M



Scope of Work - 1(Water Supply and Drainage)



Scope of Work - 2(Power Supply and Telephone Line)



TRAINING LABORATORY -1

ITEM NO	DESCRIPTION	Q'TY
FS-044	VAN SLYKE SET	1
FS-045	ELECTRIC FURNACE	1
FS-046	HOT PLATE	1
FS-047	SEMI-MICRO KJELDAHL DIGESTING APPARATUS	1
FS-048	SEMI-MICRRO DISTILLATION APPARATUS	1
FS-051	CENTRIFUGAL SEPARATOR	1
FS-055	QUICK CRUDE FAT ANALYZER	1
FS-058	MOISTURE METER	2
FS-060	RHEOMETER	1
FS-106	WATER BATH	1
FS-116	BIOLOGICAL MICROSCOPE WITH CAMERA	1
FS-119	TOP LOADING BALANCE	1

TRAINING LABORATORY -2

ITEM NO	DESCRIPTION	Q'TY
FS-251	ELECTRONIC TOP LOADING DIGITAL BALANCE	1
FS-253	INCUBATOR BATH	1
FS-256	PETRI DISH TURNTABLE	2
FS-414	MULLEN'S BURSTING TESTER	1
FS-415	TENSILE STRENGTH TESTER	1

INSTRUMENT ROOM

ITEM NO	DESCRIPTION	Q'TY
FS-240-B	CLEAN BENCH	1
FS-240-C	CLEAN BENCH	1

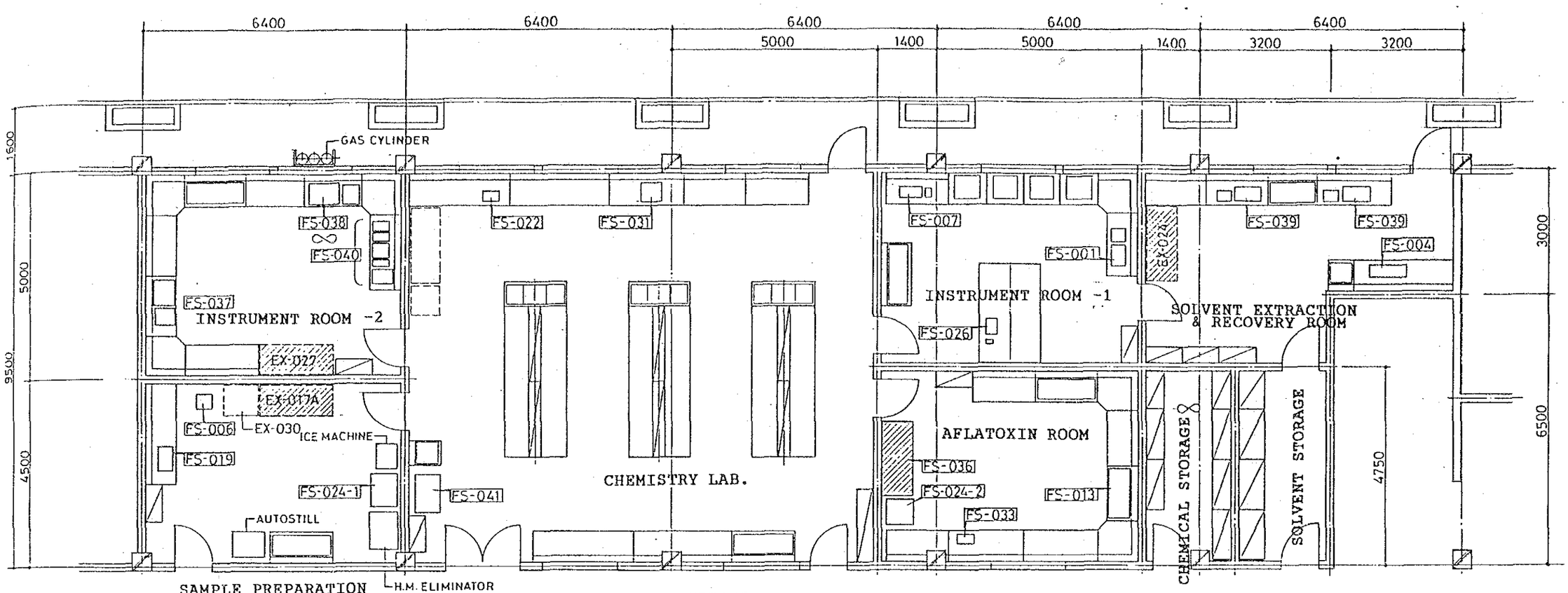
REMARKS

- : CENTER TABLE. SIDE TABLE. BALANCE TABLE
- : SHELF, CABINT
- : FUME HOOD
- : FAN
- EX : EXISTING ITEM
- FS : NEW ITEM

FOOD DEVELOPMENT CENTER

研修課
TRAINING LAB.

SCALE: 1/100 | DRAWING NO.



INSTRUMENT ROOM -1

ITEM NO	DESCRIPTION	Q'TY
FS-001	SINGLE-BEAM SPECTROPHOTOMETER	1
FS-007	TITRATION ASSEMBLY KARL FISHER	1
FS-026	AW-METER/HYGROMETR	1

INSTRUMENT ROOM -2

ITEM NO	DESCRIPTION	Q'TY
FS-037	FLUORESCENCE SPECTROPHOTOMETER	1
FS-038	GAS CHROMATOGRAPH	1
FS-040	HIGH PERFORMANCE LIQUID CHROMATOGRAPH	1

CHEMISTRY ROOM

ITEM NO	DESCRIPTION	Q'TY
FS-022	THERMOELECTRIC COLD PLATE	1
FS-031	VACUUM OVEN	1
FS-041	WATER DISTILLING APPARATUS	1

SOLVENT EXTRACTION & RECOVERY ROOM

ITEM NO	DESCRIPTION	Q'TY
FS-004	EXTRACTION ASSEMBLY	1
FS-039	ROTARY EVAPORATOR	2

SAMPLE PREPARATION ROOM

ITEM NO	DESCRIPTION	Q'TY
FS-006	VERTICAL CUTTER/MIXER	1
FS-019	SHAKER-WATER BATH INCUBATOR	1
FS-024-1	REFRIGERATOR	1

AFLATOXIN ROOM

ITEM NO	DESCRIPTION	Q'TY
FS-013	GLOVE BOX	1
FS-024-2	FREEZER	1
FS-033	BLOCK HEATER	1
FS-036	FUME HOOD	1

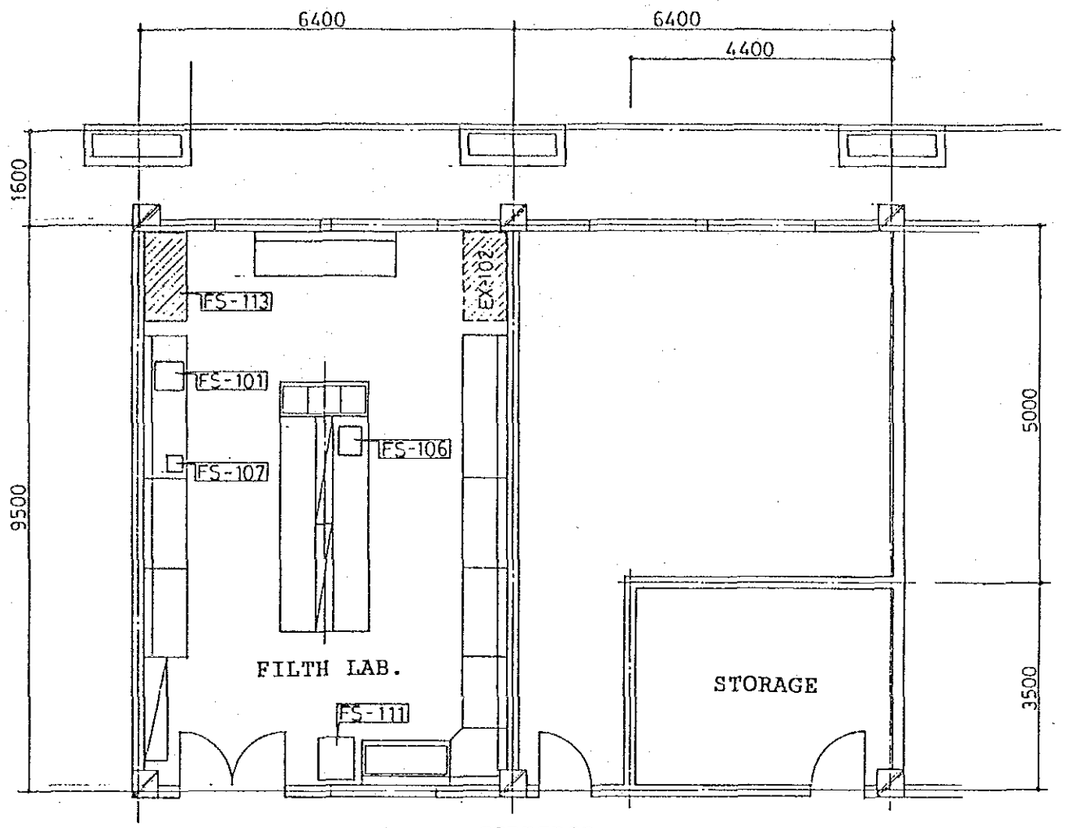
REMARKS

: CENTER TABLE, SIDE TABLE, BALANCE TABLE
: SHELF, CABINT
: FUME HOOD
∞ : FAN
EX : EXISTING ITEM
FS : NEW ITEM

FOOD DEVELOPMENT CENTER

化学分析課
CHEMICAL ANALYSIS

SCALE: 1/100 | DRAWING NO.



FILTH LABORATORY

ITEM NO	DESCRIPTION	Q'TY
FS-101	SAMPLE SPLITTER	1
FS-106	WATER BATH	1
FS-107	BUTTER STIRRER	1
FS-111	REFRIGERATOR/FREEZER(COMBINED)	1
FS-113	FUME HOOD	1

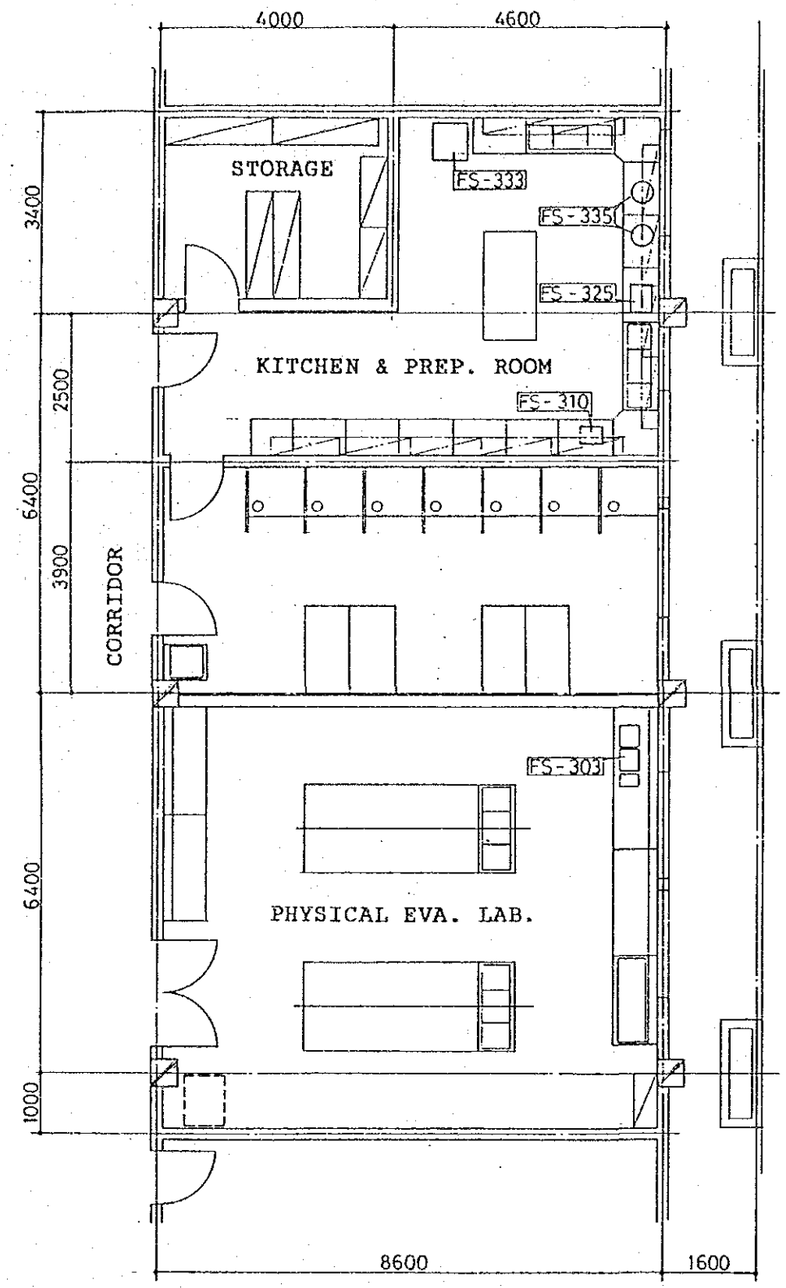
REMARKS

: CENTER TABLE, SIDE TABLE, BALANCE TABLE
: SHELF, CABINT
: FUME HOOD
: FAN
EX : EXISTING ITEM
FS : NEW ITEM

FOOD DEVELOPMENT CENTER

微量分析課
MICRO ANALYSIS

SCALE: 1/100 | DRAWING NO.



PHYSICAL EVALUATION LABORATORY

ITEM NO	DESCRIPTION	Q'TY
FS-303	MACBETH-MUNSELL DISK COLORIMETRY EQUIPMENT AND DIAGRAM	1

KITCHIEN & PREPARATION ROOM

ITEM NO	DESCRIPTION	Q'TY
FS-310	ELECTRIC SIEVE SHAKER	1
FS-325	MICROWAVE OVEN	1
FS-333	UPRIGHT FREEZER	1
FS-335	AUTOMATIC RICE COOKER	2

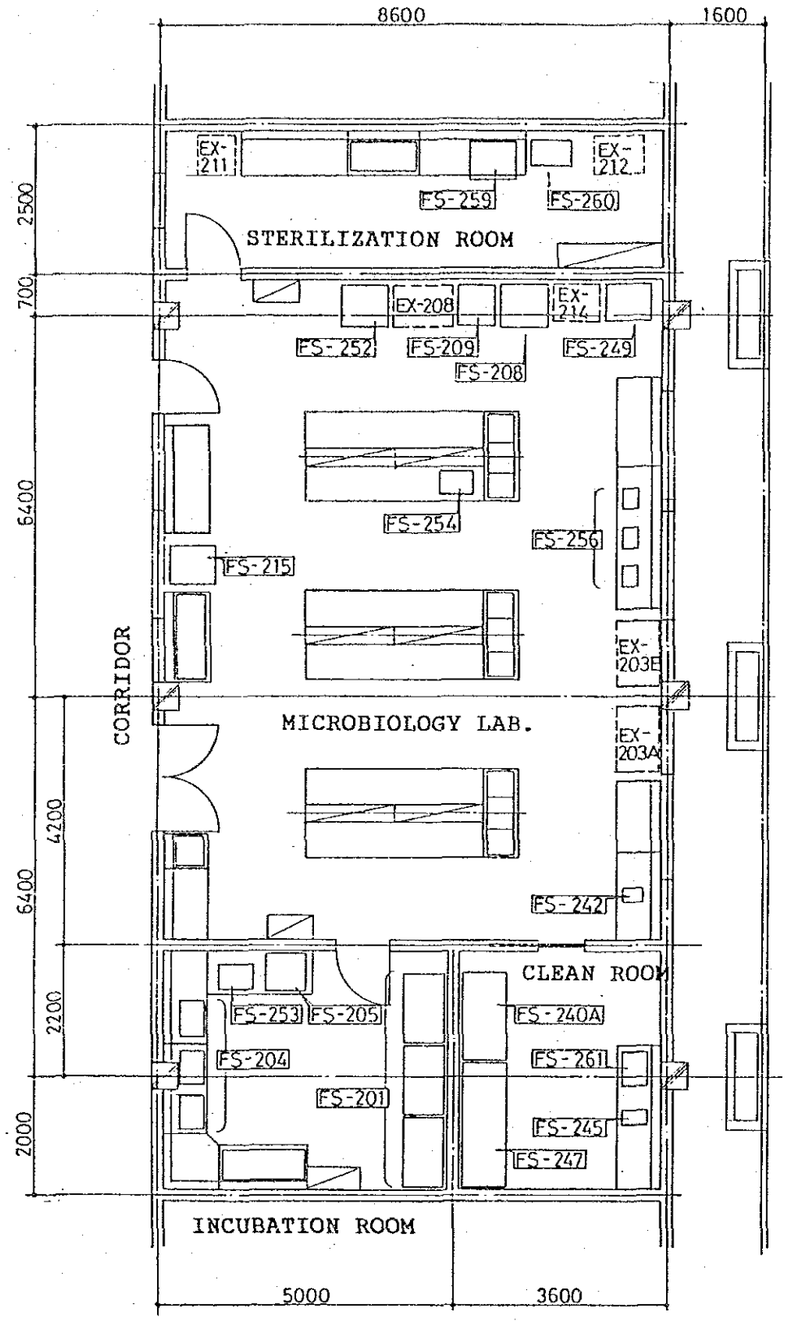
REMARKS

: CENTER TABLE. SIDE TABLE. BALANCE TABLE
: SHELF, CABINT
: FUME HOOD
: FAN
EX : EXISTING ITEM
FS : NEW ITEM

FOOD DEVELOPMENT CENTER

物理官能試験課
PHYSICAL.&.SENSORY.EVALUATION

SCALE: 1/100	DRAWING NO.



STERILIZATION ROOM

ITEM NO	DESCRIPTION	Q'TY
FS-259	STERILIZER	1
FS-260	AUTOCLAVE	1

MICROBIOLOGY LABORATORY

ITEM NO	DESCRIPTION	Q'TY
FS-208	REFRIGERATOR	1
FS-209	LABORATORY UPRIGHT FREEZER	1
FS-215	GLASSWARE DRYER	1
FS-242	FLUORESCENT MICROSCOPE	1
FS-249	REFRIGERATED INCUBATOR	1
FS-252	PHARMACY REFRIGERATOR	1
FS-254	SHAKER BATH	1
FS-256	PETRI DISH TURNTABLE	3

INCUBATION ROOM

ITEM NO	DESCRIPTION	Q'TY
FS-201	INCUBATOR	3'
FS-204	WATER BATH (HIGH PERFORMANCE)	3
FS-205	LOW TEMPERATURE INCUBATOR	1
FS-253	INCUBATOR BATH	1

CLEAN ROOM

ITEM NO	DESCRIPTION	Q'TY
FS-240-A	CLEAN BENCH	1
FS-245	STOMACHER LAB BLENDER	1
FS-247	BIOLOGICAL CABINET	1
FS-261	WATER BATH	1

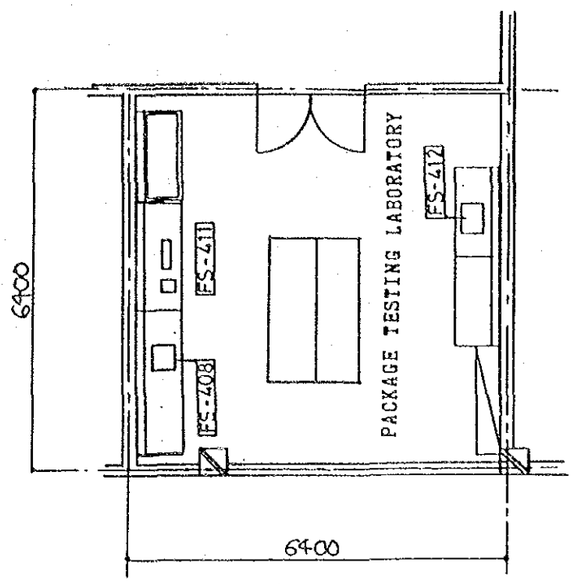
REMARKS

: CENTER TABLE, SIDE TABLE, BALANCE TABLE
: SHELF, CABINT
: FUME HOOD
: FAN
EX : EXISTING ITEM
FS : NEW ITEM

FOOD DEVELOPMENT CENTER

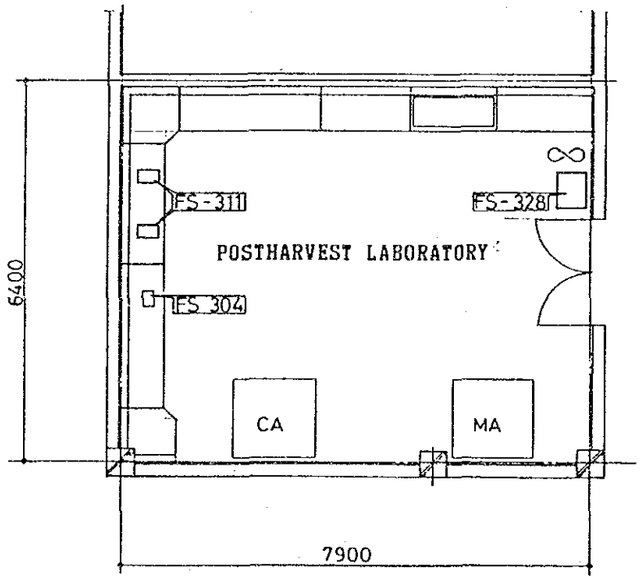
細菌分析課
MICROVIOLOGY

SCALE: 1/100	DRAWING NO.



PACKAGE TESTING LABORATORY

ITEM NO	DESCRIPTION	Q'TY
FS-408	CAN ENAMEL RATER	1
FS-411	ELECTRONIC TINPLATE COATING ANALYZER	1
FS-412	CAN SEAM PROJECTOR & SCCESSORIES	1



POSTHARVEST LABORATORY

ITEM NO	DESCRIPTION	Q'TY
FS-304	EGG HAUGH UNIT TESTER	1
FS-311	ELECTRICC TOP LOADING DIGITAL BALANCE	2
FS-328	ELECTRIC COOKING RENGE	1

REMARKS

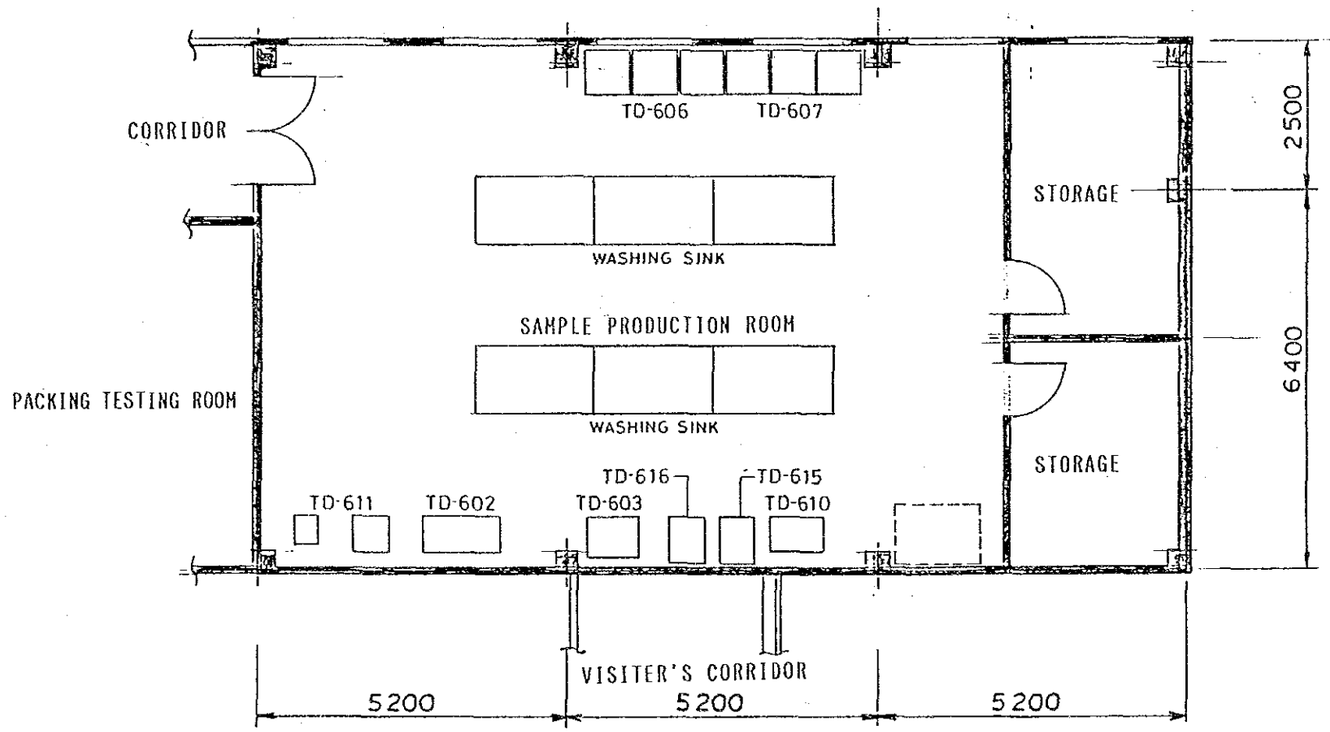
: CENTER TABLE. SIDE TABLE. BALANCE TABLE
: SHELF. CABINT
: FUME HOOD
: FAN
EX : EXISTING ITEM
FS : NEW ITEM

FOOD DEVELOPMENT CENTER

包装試験課、ポストハーベスト室

PACKAGE.TESTING.LAB.,POSTHARVEST.LABORATORY

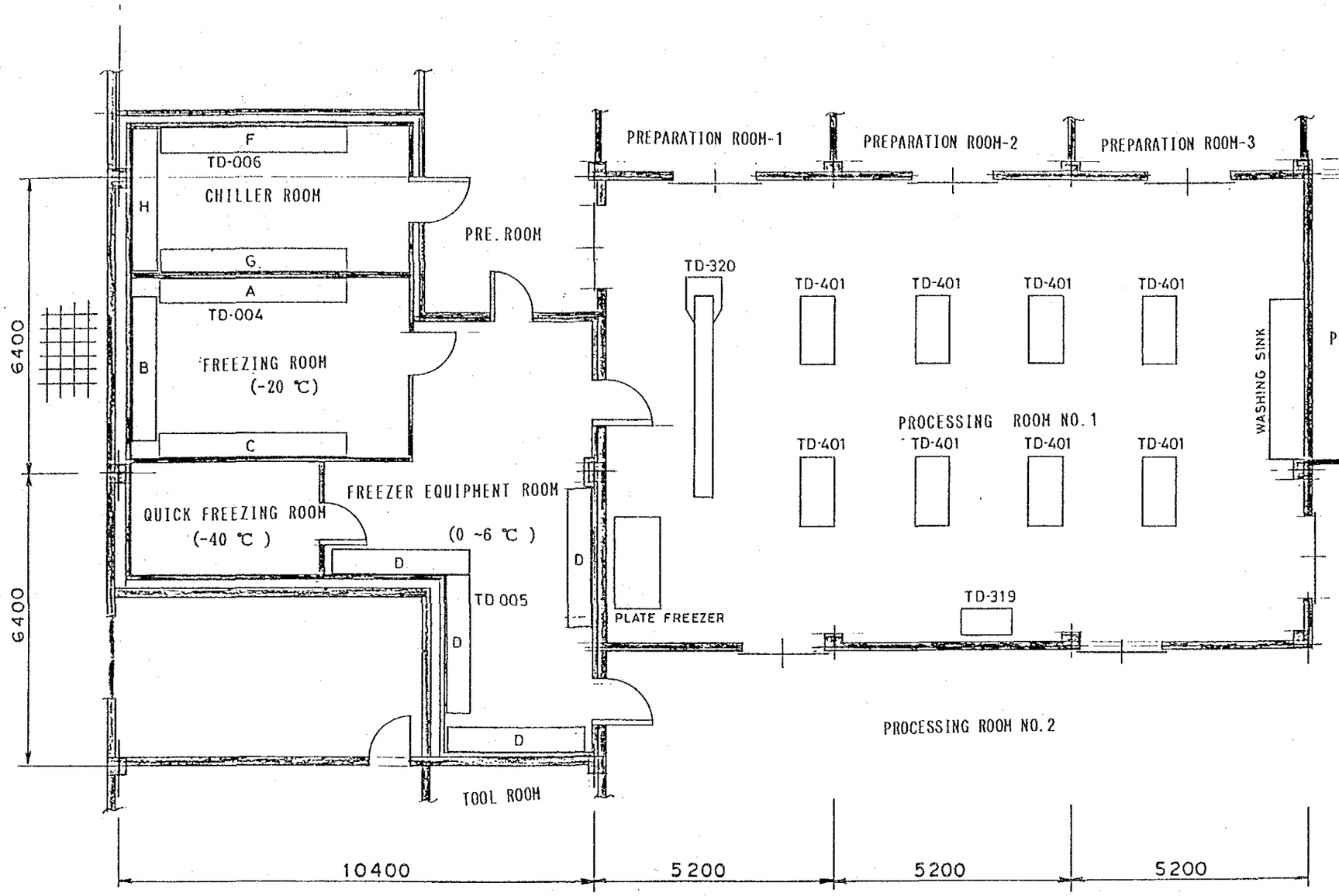
SCALE: 1/100	DRAWING NO.



SAMPLE PRODUCTION ROOM

ITEM NO	DESCRIPTION	Q'TY
TD-602	UPRIGHT FREEZER	1
-603	REFRIGERATOR	1
-606	GAS STOVE	3
-607	ELECTRIC STOVE	3
-610	FERMENTOR	1
-611	ICE MAKER	2
-615	LOW TEMP. INCUBATER	1
-616	CONSTANT TEMP. INCUBATER	1

FOOD DEVELOPMENT CENTER	
商品開発試験室	
SAMPLE PRODUCTION ROOM	
SCALE: 1/100	DRAWING NO.



FREEZING ROOM

TD-004	RUCK A,B,C	3
-005	RUCK D	4
-006	RUCK F,G,H	3

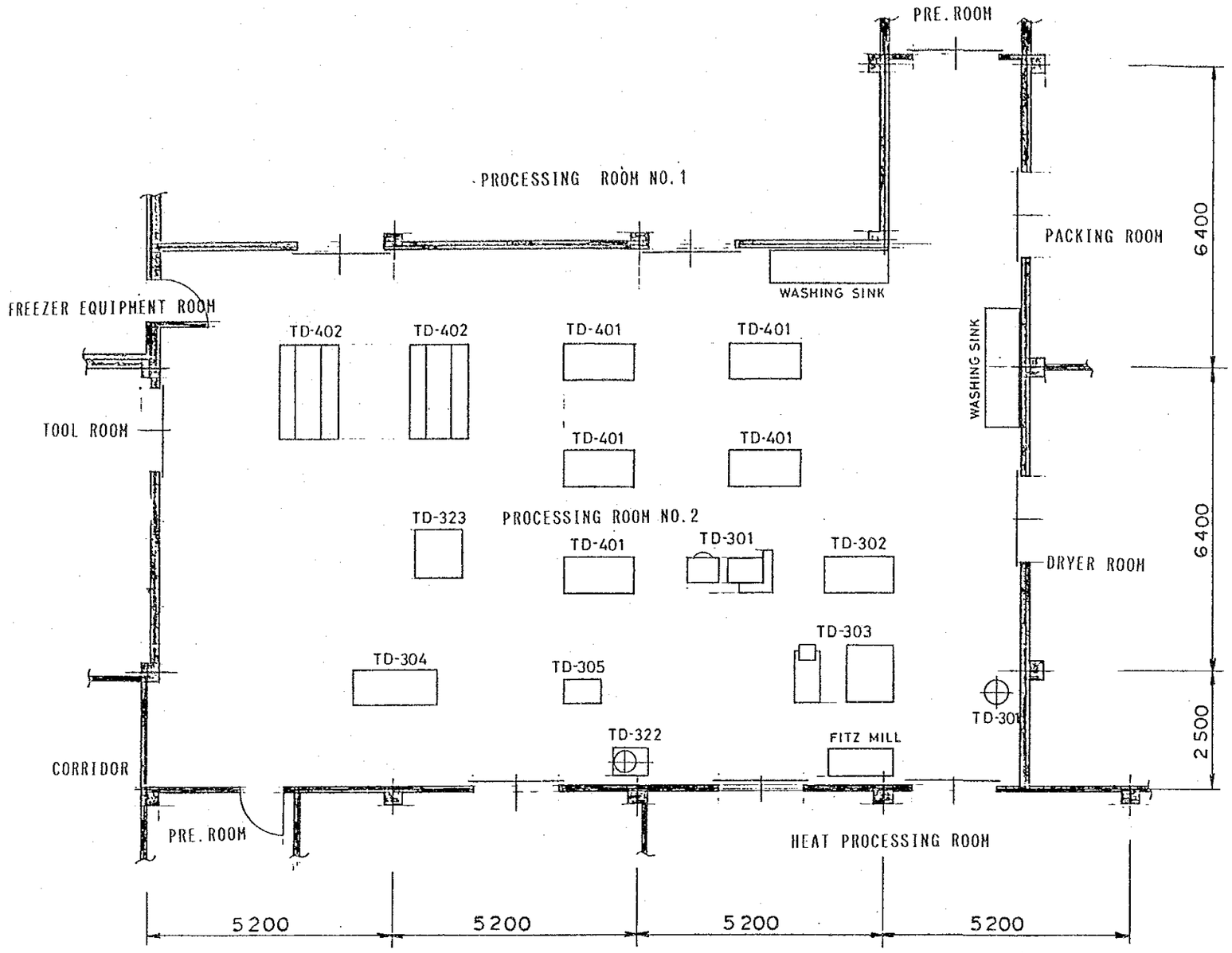
PROCESSING ROOM NO.1

TD-301	GAS BLANCHER	1
-302	EXPELLER	1
-303	PULPER AND FINISHER	1
-304	PINEAPPLE PEELLING DECORING NACHINE	1
-305	PINEAPPLE RING SLICING MOLD	1
-306	FRUIT AND VEGETABLE CUTTER AND AND DICER	1
-318	BAND SAW	1
-319	CURTING TANK	1
-320	SHRIMP SIZER AND PEELER	1
-322	BASKET CENTRIFUGE	1
-323	WASHING TANK	3

FOOD DEVELOPMENT CENTER

加工室-1,冷却室,冷蔵庫SA,凍結室,冷蔵庫C
PROCESSING ROOM-1,CHILLER ROOM,FREEZING ROOM,QUICK FREEZING ROOM,CHLLD ROOM

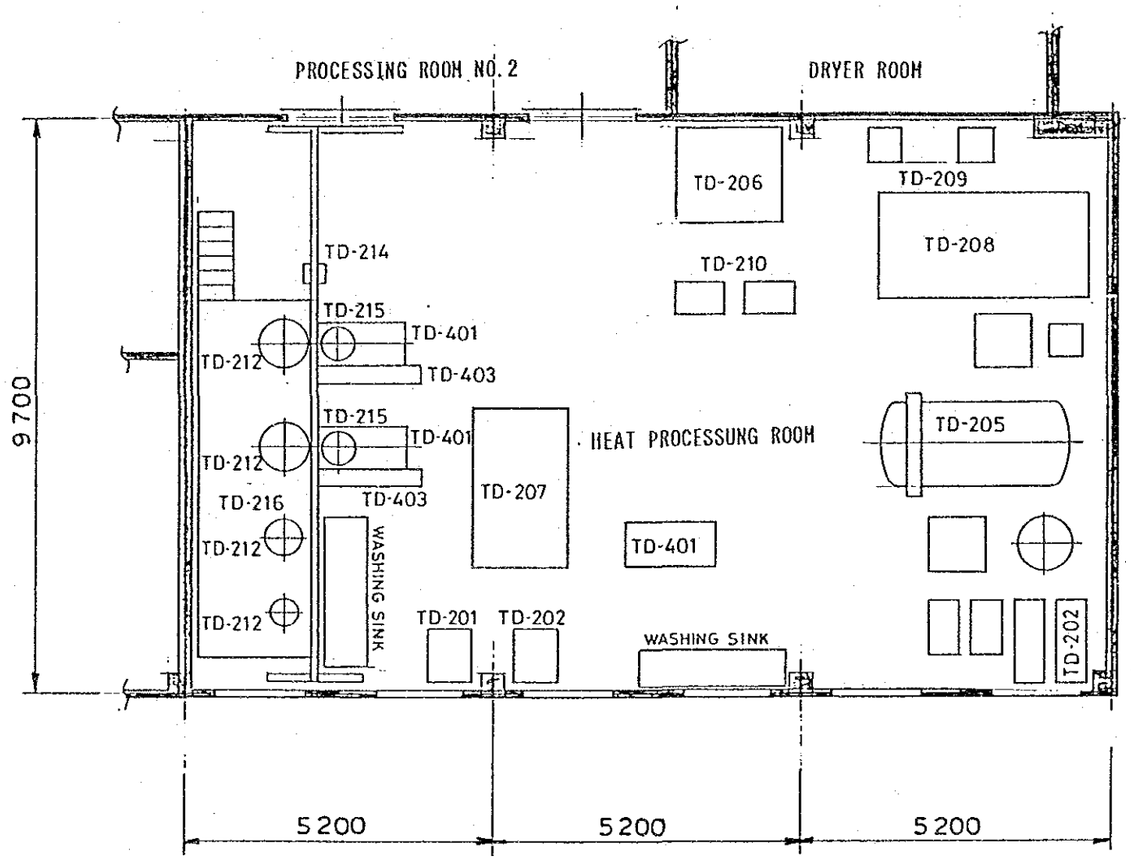
SCALE: 1/100	DRAWING NO.



PROCESSING ROOM NO.2

TD-401	PREPATATION TABLE	18
-402	MANGO PREPARATION CONVEYER	2
-403	WEIGHER TABLE	10

FOOD DEVELOPMENT CENTER	
加工室-2	
PROCESSING ROOM-2	
SCALE: 1/100	DRAWING NO.



HEAT PROCESSING ROOM

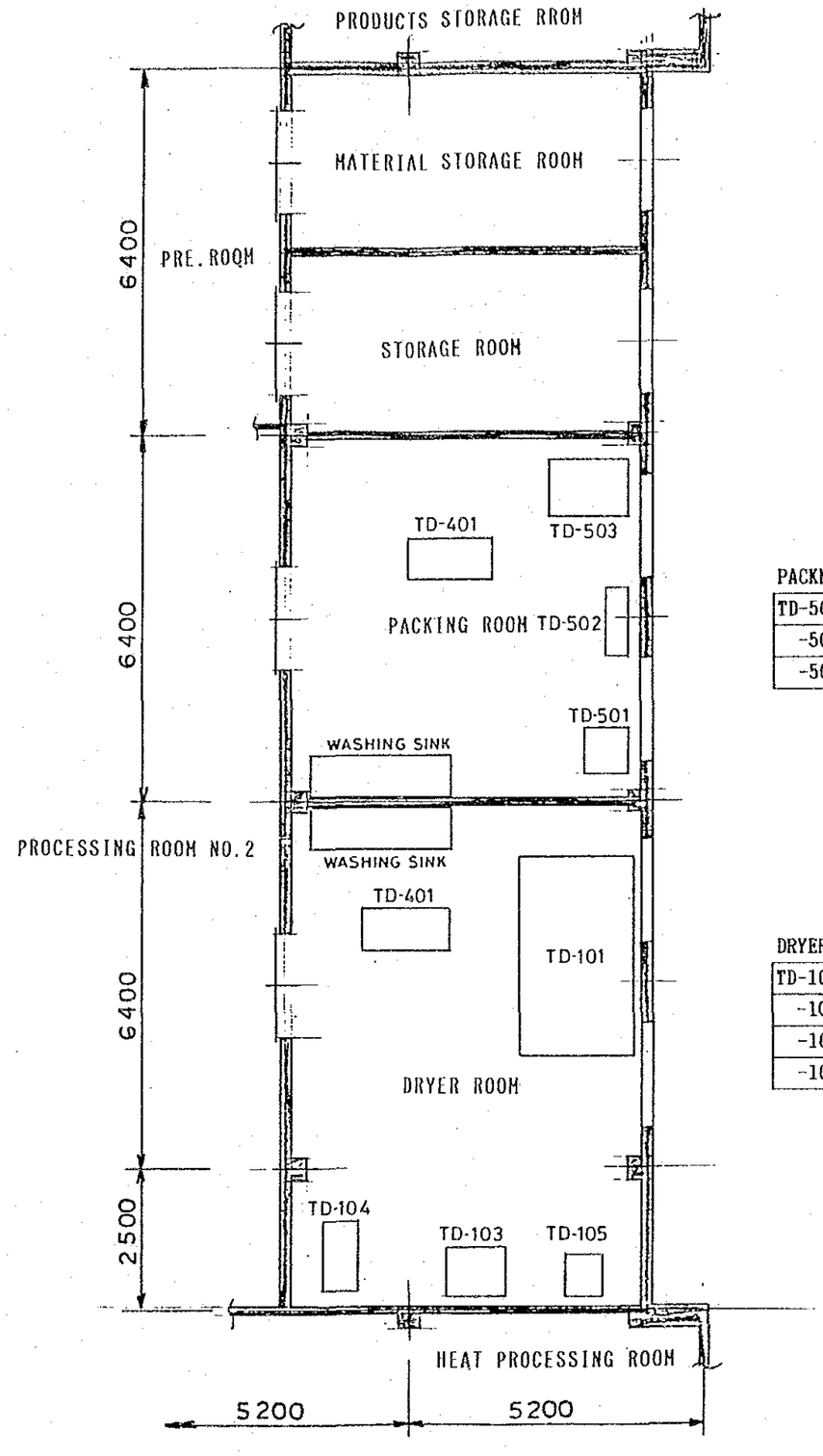
TD-201	VACUUM CAN SEAMER,O TYPE	1
-202	VACUUM CAN SEAMER FOR INSTITUTIONAL VACUUM PUMP	1
-204	CAN CODER	1
-205	HORIZONTAL RETORT WITH PRESSUER COOLING	I
-206	PLATE HEATER	1
-207	EXHAUST BOX WITH CONVYER	1
-208	VACUUM PAN CONCENTRATOR WITH ESSENCE RECOVERY	1
-209	FRYER	2
-210	FILLER AND CAPPER	1
-212	STEAM JACKETED KETTLE WITH AGITATOR	4
-214	HOIST AND RAAIL	1
-215	STAINLESS TANK	2
-216	PALTFORM	1
217	BASKET	10

FOOD DEVELOPMENT CENTER

加熱処理室

HEAT PROCESSING ROOM

SCALE: 1/100	DRAWING NO.



PACKNG ROOM

TD-501	INPULSE SEALER	5
-502	DISPENSER WITH HEAT SEALER	1
-503	VACUUM PACKAGING MACHINE	1

DRYER ROOM

TD-101	CABINET DRYER	1
-103	SPRAY DRYER	1
-104	DRUM DRYER	1
-105	FREEZING DRYER	1

FOOD DEVELOPMENT CENTER

資材倉庫,倉庫,包装室,乾燥室

MATERIAL STORAGE ROOM,STORAGE ROOM,

PACKAGING ROOM,DRYER ROOM

SCALE: 1/100	DRAWING NO.

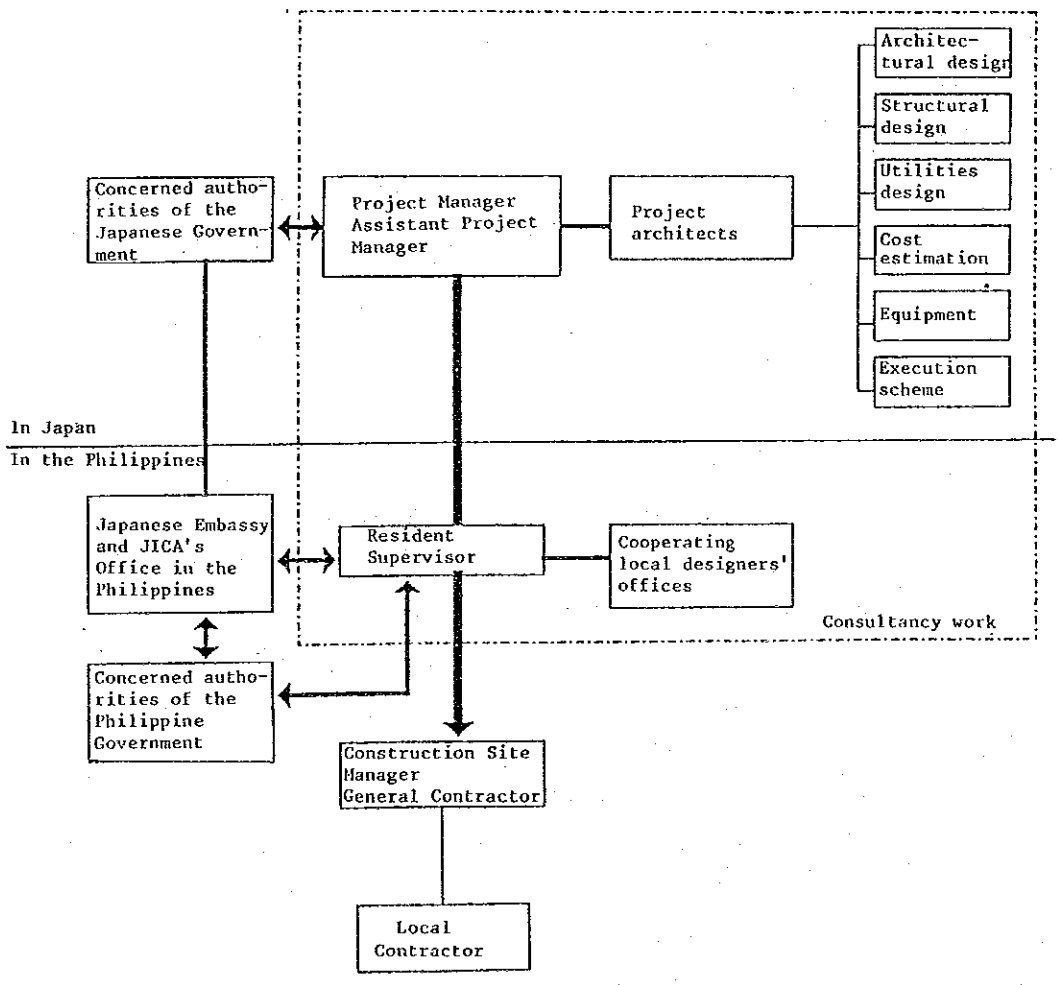
CHAPTER 5. PROJECT IMPLEMENTATION PLAN

CHAPTER 5 PROJECT IMPLEMENTATION PLAN

5-1 Executing Organization

The Philippine government agency responsible for planning and execution of this Project will be the National Food Authority (NFA), while the actual work will be carried out by the Working Committee composed of nine (9) responsible officials of concerned departments within NFA (including FDC Manager) which was established in November, 1986. The Committee chairman will issue instructions on necessary works related to this Project and coordinate with the concerned authorities.

Fig. 5-1-1 Arrangements for Execution Management and Supervision



5-1-1 Division of work

The works to be respectively borne by the Japanese Government and the Philippine Government for the construction of FDC are as outlined below.

(1) Works to be borne by the Japanese Government

1) Facilities

* Facilities related to inspection and training ...
  Facilities for quality evaluation, industry services (including training), canteen, multipurpose training hall, dormitory for trainees, including general administrative facilities
* Facilities related to food development ...
  Includes facilities for sample production and technology development
* Others ...
  Garage, guardpost, etc.

2) Equipment

* Equipment for quality inspection
* Equipment for technology development
* Equipment for industry services
* Equipment for trial production of sample products
* Others

3) Infrastructure

* Water supply facilities (within site)
* Electric power receiving and transforming facilities
* Telephone exchange facilities

4) Outdoor structures

* Onsite roads, parking lot
* Drainage facilities (within site)
* Primary treatment facilities for sewage and effluent
* Outdoor lamps

5) Related procedural works

* Works related to transportation of materials and equipment from Japan to the Philippines
* Works related to inland transportation from port of landing to construction site within the Philippines

(2) Works to be borne by the Philippine Government

1) Works related to the site and outdoor structures

* Securing of the site necessary for the construction of FDC
* Removal of buried matters and ground leveling
* Construction of fences
* Planting of vegetation
* Pond construction

2) Infrastructure

* Leading in electric power, city water and telephone to the site
* Securing a drainage channel leading out of the site

3) Equipment

* Installation and conditioning of equipment already in possession

4) Furniture and furnishings

* Fixtures, furnishings and furniture other than those to be borne by the Japanese side

5) Procedural matters and bearing of expenses

* Expenses accompanying banking arrangements
* Expenses accompanying tax exemption procedures
* Prompt action to facilitate customs clearance and inland transportation
* Procedures to exempt the Japanese nationals engaged in the implementation of the project under an authorized contract from customs duties, internal taxes and other fiscal levies which may be imposed in the Philippines.

* Conveniences for entry and sojourn in the Philippines of the aforesaid Japanese nationals for performing their duties.
* Assignment of staff necessary for administration, operating and maintaining this project based on a well thought-out staff assignment program

5-1-2 Construction and execution supervision plan

(1) Construction situation

Followings are the general construction situation in Metro Manila.

* Highly competent local construction companies and skilled craftsmen can be mobilized.
* Carpentry, plastery and placement of reinforcement bars are established as specialized trades, and the workers in these professions form groups under their respective master-craftsmen. Ordinary workers are not specialized but are mostly hired on a temporary basis.
* There are not many prefabricated products. The usual method is to haul in the materials and manufacture or assemble them on the site.
* The system of qualifying workers according to their skill, and the use of instruments for inspection and measurement of products are not as popular as in Japan.

(2) Heeds on Construction

Project facilities will be constructed reinforced concrete second floor structure which seemed no difficulty for construction by local contractor. But it is needed to dispach following technical engineers to execute more reliable construction.

For executing the following six types of work, however, dispatching of technical experts is considered necessary as technical experts well versed in their special nature, because required accuracy and specifications may not be available in the Philippines.

* Prestress work ..... It is the method of applying prestress on the beam in order to let it support the load of roof of long span of the food processing room and multi-purpose training room. So, it requires special skill to make strong concrete frame to apply prestress to the beam.

* Metal roofing work ..... Weather-proof metalic roof plate will be used for this Project, so it has to be paid special attention to fit them.

* Metal fitting work ..... Many-frames for aluminium and iron fittings are planned to be fitted, it need dispatching instructor to fit them properly and quickly within limited short time.

* Work on telephone exchange
* Work for installing generator
* Freezing storage work

} Installment instruction will be needed to secure functional performance for each work.

(3) Work supervision plan

Pursuant to the policy of the Japanese Government of grant aid cooperation, the consultant shall organize a project team to execute every detail of the design work and oversea the execution of work in order that the project may be executed smoothly according to the intent of the basic design. In the stage of execution supervision, the consultant shall dispatch a resident supervisor of appropriate technical competence to FDC to provide guidance and counsel at the work site and to maintain proper contacts. The consultant shall also dispatch a specialized technical staff for a brief period when necessary according to the progress of work to inspect and offer guidance on work execution on the spot. (See Figure 4-3-1)

1) Major policies of the supervision plan

* The concerned agencies and officials in charge of both governments shall be kept informed, and a close contact with them shall be maintained in order that the facilities may be completed without delay as per the construction schedule.
* Prompt and pertinent guidance and advice shall be provided to those involved in the execution of work in order that the facilities may be constructed in conformity with the design documents.
* Priority shall be given to local construction methods with the use of locally available materials to the maximum extent possible.
* A posture of effecting technology transfer shall be assumed with respect to executing methods and techniques in order that the project may demonstrate its effects as a grant aid cooperation project.
* Proper counsel and guidance on maintenance and management of the facilities shall be offered upon their completion in order that they may continue to be maintained and operated smoothly.
* The services of local consultants in applying for local construction permit and obtaining information on the local construction situation shall be sought through business tieups with them.

2) Contents of work supervision activities

* Cooperation in consummating a construction contract

  Selection of the construction contractor, determination of the form of construction contract, preparation of the proposed construction contract, examination of the contents of the breakdown of work and witnessing the signing of the construction contract.

* Inspection and confirmation of working diagrams, etc.

  Inspection of working diagrams, specimen materials and finishing, mechanical systems and materials for utilities submitted by the construction contractor.

* Provision of guidance on work

  Examination of the construction plan and schedule, offering of guidance to the construction contracts, reporting to the order on the progress of construction, etc.

* Cooperation in processing authorization for payment

  Examination of the contents of the requests for payment of construction fees applied for during and upon completion of construction, and cooperation in processing same.

* Witnessing of inspection

  Each finished work shall be inspected and pertinent guidance shall be offered to the construction contractor on same whenever necessary during the construction period. Upon confirming the completion of the work and the fulfilment of the terms and conditions of the contract, the consultant shall witness the delivery of the object of said contract and obtain acknowledgment of its receipt by the order with which his duties shall be completed. The consultant shall submit a report on the progress of work, on payment procedures and on matters concerning the completion and delivery of work to the authorities concerned of the Japanese Government.

5-1-3 Plans for procurement of materials and equipment

(1) Construction Work

Attention will be given particularly to the following matters in procuring material and equipment for FDC.

* Procurement in Japan

Of the construction materials which are to be procured in Japan, those which must be manufactured to order ..... Aluminium fittings, steel fittings, telephone exchange, power board, etc. must be ordered in time to meet the progress of work as they require extra manufacturing period for order placing - designing (and approval of the design) - fabrication - packaging - shipment which is unnecessary in the case of ordinary materials which are available on the market.

Order placing - Designing - Manufacturing - Packaging -
-- Goods manufactured to order

Shipment from factory - Transportation to the port of loading -
-- Ordinary materials

Stevedoring - Marine transportation - Waiting off-shore - Landing - Bonded warehouse - Customs clearance - Inland transportation - Unpacking - Bonded warehouse

As landing and customs clearance formalities at the local port are often quite time-consuming, close contact must be maintained to arrange for smooth processing of these formalities with the executing agency of this project.

* Local procurement

The utmost effort will be made to procure local materials and equipment as they are more easily available and will facilitate maintenance and upkeep of the facilities and enable prompt repairs and replacement to be made in the event of damage to any of the materials and equipment. In the event the local supply capacity is insufficient, however, procurement in Japan may have to be considered.

* Cost

Upon comparing the costs of local procurement and procurement in Japan, whichever is cheaper will be adopted. In the event of procurement in Japan, it is necessary to take into account the fact that imported articles for this project are duty-free. Attention on duty free and additional cost for packaging, transportation and insurance.

With due consideration to the above, the procurement of materials and equipment for FDC was planned as follows.

1) Superstructure work

Reference to superstructure work, sand, gravel, cement, concrete reinforcing bar, steel frame, concrete block and bricks are possible to procure in the Philippines. The decision will make after studying quality and price on reinforcing bar and steel frame. Concrete block does not have strength, so it can not use for structural wall.

2) Building work

Reference to building work, lumber, steel sash, alminium sash, plastering materials, tile, spanish roof title, stone paint and glass are possible to porcure in Philippines. But the quality of alminium sash and metal sash are not reliable about airtight and water proofing, so the Japanese products will be used depend on the place. Painting for concrete will be used Japanese products.

3) Air-conditioning and plumbing work

Reference to air-conditioning and plumbing work, sanitary ware and hume pipe can procure in the Philippines. Cooler, Pump, Valve and Iron pipe are procured from Japan.

4) Electric work

Reference to electric work, there is a specification for transforming work, so the transformer will be procured in the

Philippine. But PBX, distribution board, lighting fixture, light electrical appliance and wire, cable will be procured in Japan, because those materials are import from other country in the Philippines.

(2) Equipment work

Reference to equipment, equipment will be procured in Japan, because there is no Philippines products. Only spray dryer will be procured from the third country because Japan does not produce it.

As special equipment must be fabricated to order, the period required for designing and manufacturing them must be taken into consideration. As precision equipment are also included among these, special crating method (dampproof, water-proof, rust prevention, packing in cases, etc.) must be employed as necessary to prevent damage during overland and marine transportation.

Equipment which require a long time for installation must be ordered to meet the work schedule. Since spare parts and expendables for some of the equipment are difficult to procure in the Philippines, their adequate provision must be considered when planning such equipment.

The shipping schedule will be divided into 2 phases.

* First shipment: Following equipment which need time to install them.
  Testing bench, equipment for freezer, hot air dryer, heat processing, and processing.
* Second shipment: Other equipment not mentioned above.

5-1-4 Implementation schedule

In the event of implementing the construction of FDC under the grant aid of the Government of Japan, it will be carried out in three stages: Preparation of the execution design documents upon Exchange of Notes by and between the two Governments concerned, submission of tender and consummation of the construction contract, and finally the construction work itself. The Philippine government agency responsible for the Exchange of Notes is the National Food Authority.

1) Execution design work

Tender documents will be prepared on the basis of the basic design. They will consist of detailed design drawings, specifications, calculation sheets, estimation sheets, etc. Close consultations will be held with the concerned authorities of the Government of the Philippines at the inception, interim and final stages of execution designing, and upon obtaining their approval on the final product, the work will proceed to the preparation of the tender.

The period required for completing the execution design work is estimated to be three and a half month.

2) Tender work

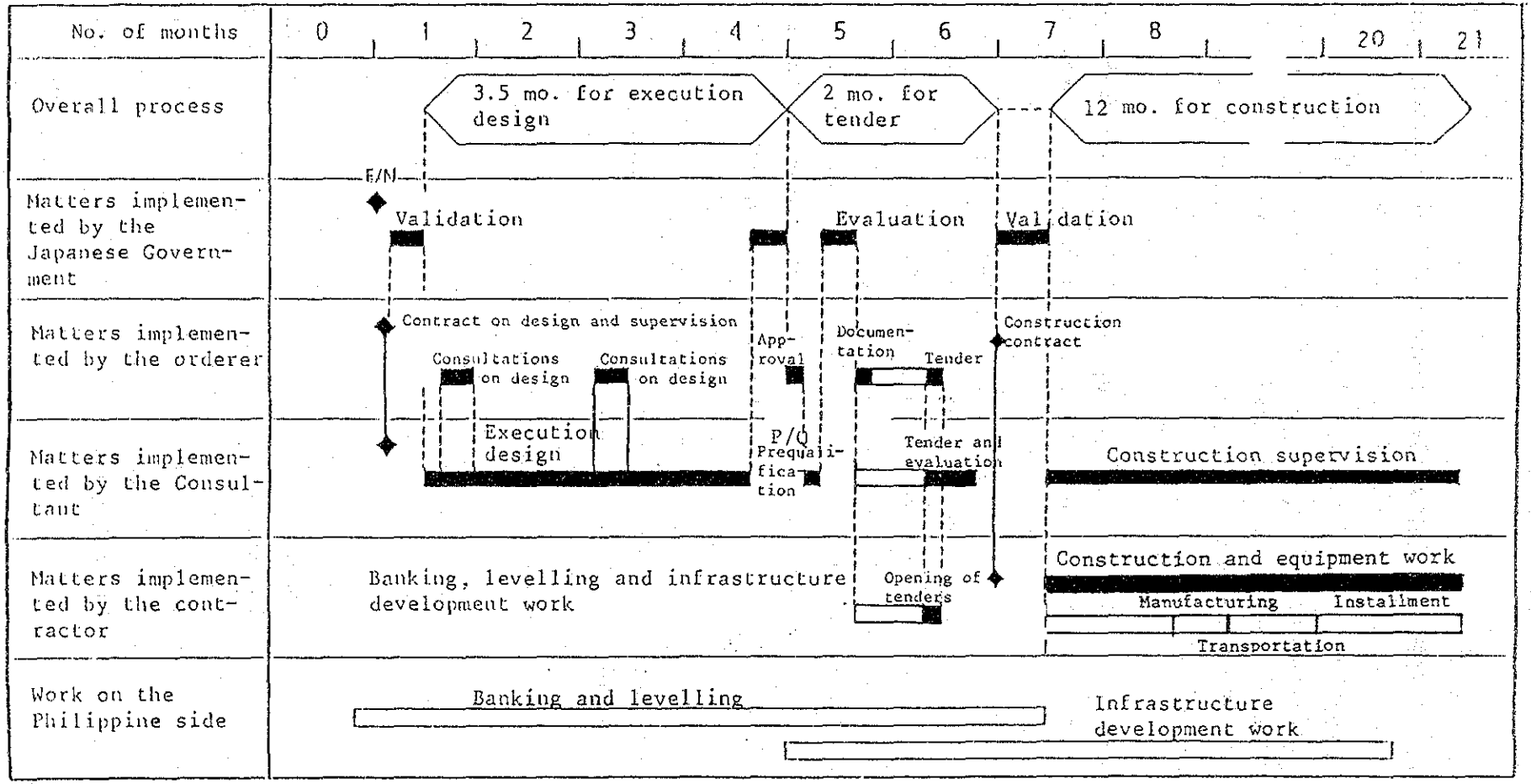
Upon completion of the execution design work, the prequalifications of eligible contractors to participate in the tender will be announced by public notice. Based on the results of screening, the executing agency will invite the eligible contractors to participate in the tender, and the tender will be held in the presence of NFA representatives. If the contents of the tender of the lowest bidder is evaluated to be proper, that bidder will be awarded the contract for which an agreement will be concluded with the Government of the Philippines.

The period required from the time of submission of tender to the conclusion of the construction contract is anticipated to be two months.

3) Construction and equipment work

The construction work will begin after signing of the contract and its validation by the Government of Japan. Judging from the scale and contents of the facilities of FDC, the period necessary for its construction is estimated to be about 12 months, providing that the construction materials are procured smoothly and the preparatory work to be undertaken by the Philippine side is carried out without a hitch.

■ Implementation Schedule



5-2 Administration, Operation and Maintenance Expenses

Expenses necessary for the administration of this Center, expenses for maintenance and upkeep of its facilities, expenses for operating its facilities, etc. were estimated on a trial basis. AS a result, the following amounts were indicated to the Philippine side as estimates of the Center's annual expenses.

Organizationally, the Equipment Maintenance Section (with five staff members) of the Sample Production Division will be responsible for maintenance and management of FDC's facilities and equipment. Since the Sample Production Division is a new division which FDC did not have and the necessary manpower for the division must be newly hired, manpower with technical competence capable of maintaining and managing not only the processing equipment but other equipment and facilities as well must be recruited. Maintenance of laboratory equipment for chemical analysis, etc. must be consigned to the National Science and Technology Authority and private agencies. Regarding daily use of equipment, it is important to extend the useful life of equipment by appointing a person to be in charge of each equipment and have him supervise the handling of the equipment with responsibility. It is also important to train every staff on how to maintain and manage each equipment.

(1)	Personnel expenses (98 persons)	4,700,000	pesos
(2)	Maintenance and operating expenses	5,916,000	"
	a) Light and heat	3,750,000	
	b) Travelling expenses	100,000	
	c) Communication	400,000	
	d) Repair of facilities	500,000	
	e) Maintenance	96,000	
	f) Purchase cost of raw materials	750,000	
	g) Purchase cost of periodicals, etc.	50,000	
	h) Printing cost	100,000	
	i) Depreciation	50,000	
	j) Miscellaneous	120,000	
	Total	10,616,000	pesos

The budget necessary for the operation of this Center will be financed by NFA, but FDC itself is anticipated to generate some revenues from inspection fees and training fees (the Philippine side estimates such revenues to be around two million pesos). As NFA's total budget for 1987 is about 8.1 billion pesos (approx. ¥64.8 billion). And FDC's operating and maintenance cost as well as general expense will be covered by the a part of NFA's general fund (Procurement Cost).

Table 5-2-1 Breakdown of NFA's Budget for FY 1987

(Units in 1,000 pesos)

	Operating Budget	General Fund	Corporate Receipt	Borrowings	
				National Gov't	Others
Personal Services	267,810		267,810		
Maintenance & Other Operating Exp.	1,340,559	333,030	740,670	266,859	
Procurement Cost	3,156,674	836,000	1,220,674		1,100,000
Loan Amortization	2,109,405		386,149	1,023,256	700,000
Capital Outlay	546,527		50,745	189,917	305,865
Sub Total	7,420,975	1,169,030	2,666,048	1,480,032	2,105,865
Indonesia Rice Loan to be paid in kind	670,906				
Grand Total	8,091,881				

5-3 Estimated Construction Cost for the Philippine Side Work

Estimated Construction Cost for the Philippine Side Work

(1)	Site development (including removal of buried matters and removal of trees)	180,000 pesos
(2)	Relocation of storm sewage drain pipe	105,000
(3)	Leading in power supply	300,000
(4)	Leading in telephone line	180,000
(5)	Leading in water supply	262,500
(6)	Connection of sewage drain pipe	15,000
(7)	Repair and rehabilitation of sewage treatment facility	300,000
(8)	Planting of vegetation	300,000
(9)	Fences	597,600
(10)	Pond construction	250,000
(11)	Outdoor lamps	250,000
(12)	Roofing for walk-way pavement along circular drive-way	300,000
(13)	Furnitures and furnishings	381,000
(14)	Banking arrangements	100,000
(15)	Tax exemptions, customs clearance, etc.	800,000
	Total	4,321,100 pesos

CHAPTER 6. PROJECT EVALUATION

CHAPTER 6 PROJECT EVALUATION

6-1 Effects

Through the implementation of this Project, FDC aims to offer technical support to the private food industry (especially to the small and medium scale enterprises) as well as offer individual enterprises technical support in terms of export marketing in order to upgrade the quality of food exports, enhance their export competitiveness and thereby contribute to the expansion of food exports from the Philippines.

The main functions of the following three fields will be upgraded.

* Tests and research on food processing
* Analysis and evaluation of food quality
* Technical guidance (extension services) and training

(1) Direct effects

The following impacts are expected through the Project

* Prompt execution and diversification of inspection and analysis of processed foods entrusted by private enterprises
* Diversification of processed foods through sample production
* Improving productivity through guidance on production technology
* Improving quality of processed foods through training activities
* Reduction in losses of manufactured products by improving the quality control system
* Reduction of crop losses through improved post-harvest treatment technology
* Manufacturing of processed foods to match demand through market survey