

**MINISTRY OF INDUSTRY, COMMERCE AND SUPPLY
HIS MAJESTY'S GOVERNMENT OF THE KINGDOM OF NEPAL**

**BASIC DESIGN REPORT
ON
THE PROJECT
FOR IMPROVEMENT OF STORAGE FACILITIES
OF IODIZED SALT
IN
THE KINGDOM OF NEPAL**

NOVEMBER 2000

**JAPAN INTERNATIONAL COOPERATION AGENCY
ZEN-NOH ARCHITECTS & ENGINEERS INC.**

PREFACE

In response to a request from His Majesty's Government of the Kingdom of Nepal the Government of Japan decided to conduct a basic study on the Project for Improvement of Storage Facilities of Iodized Salt and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to Nepal a study team from May 8 to June 16, 2000.

The team held discussion with the officials concerned of His Majesty's Government of Nepal, and conduct a field study at the study area. After the team returned to Japan, further studies were made. Then, a mission was sent to Nepal in order to discuss a draft basic design, and as this result, the present report was finalized.

I hope that this report will contribute to the promotion of the project and to the enhancement of friendly relations between our two countries.

I wish to express my sincere appreciation to the officials concerned of His Majesty's Government of in the Kingdom of Nepal for their close cooperation extended to the teams.

November 2000

Kinihiko SAITO
President
Japan International Cooperation Agency

November 2000

Letter of Transmittal

We are pleased to submit to you the basic design report on the Project for Improvement of Storage Facilities of Iodized Salt in the Kingdom of Nepal.

This study was conducted by Zen-noh Architects and Engineers Inc. under a contract to JICA, during the period from March 21 to November 28, 2000. In conducting the study, we have examined the feasibility and rationale of the project with due consideration to the present situation of Nepal and formulated the most appropriate basic design for the project under Japan's grant aid scheme

Finally, we hope that this report will contribute to further promotion of the project.

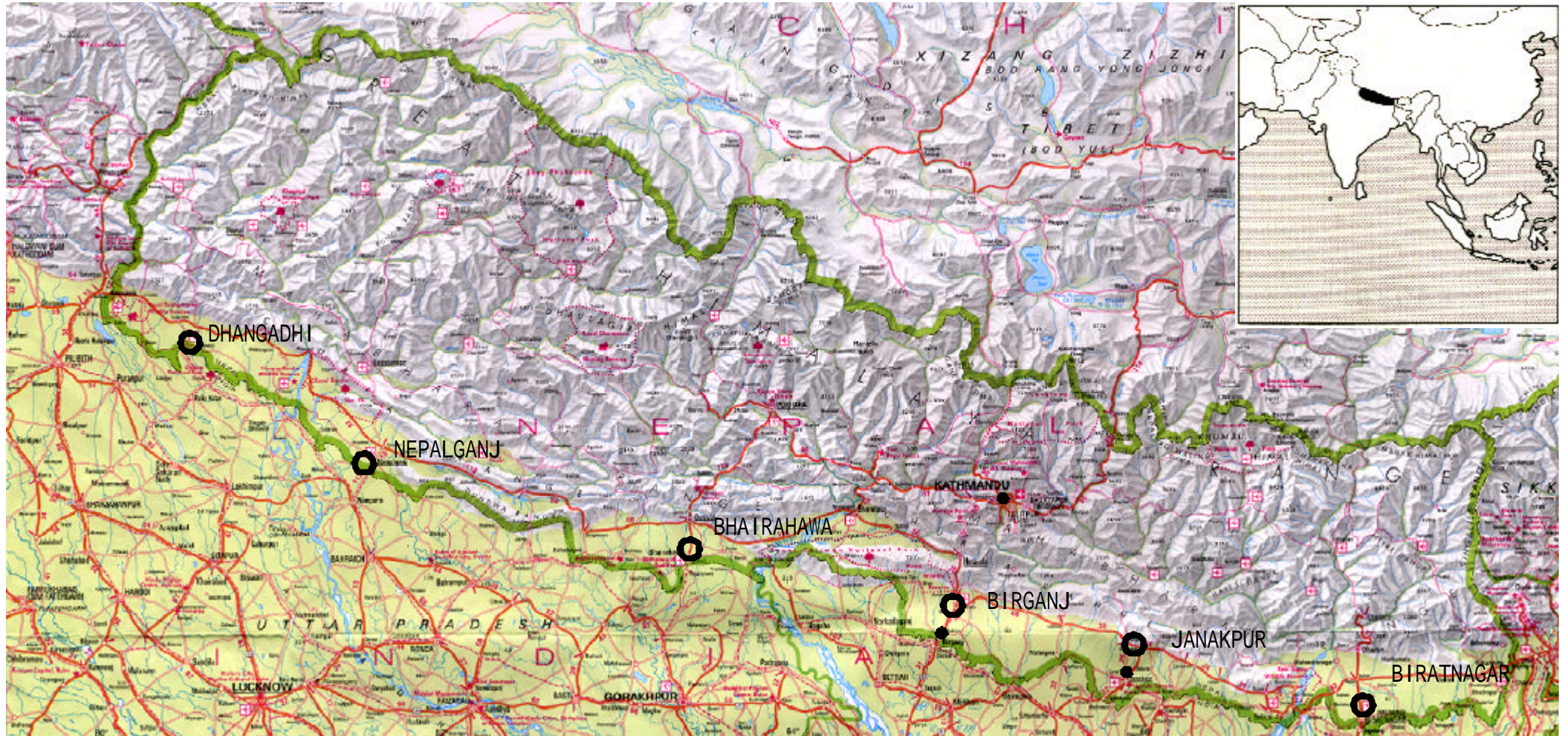
Very truly yours,

Hidejiro UCHIGASAKI

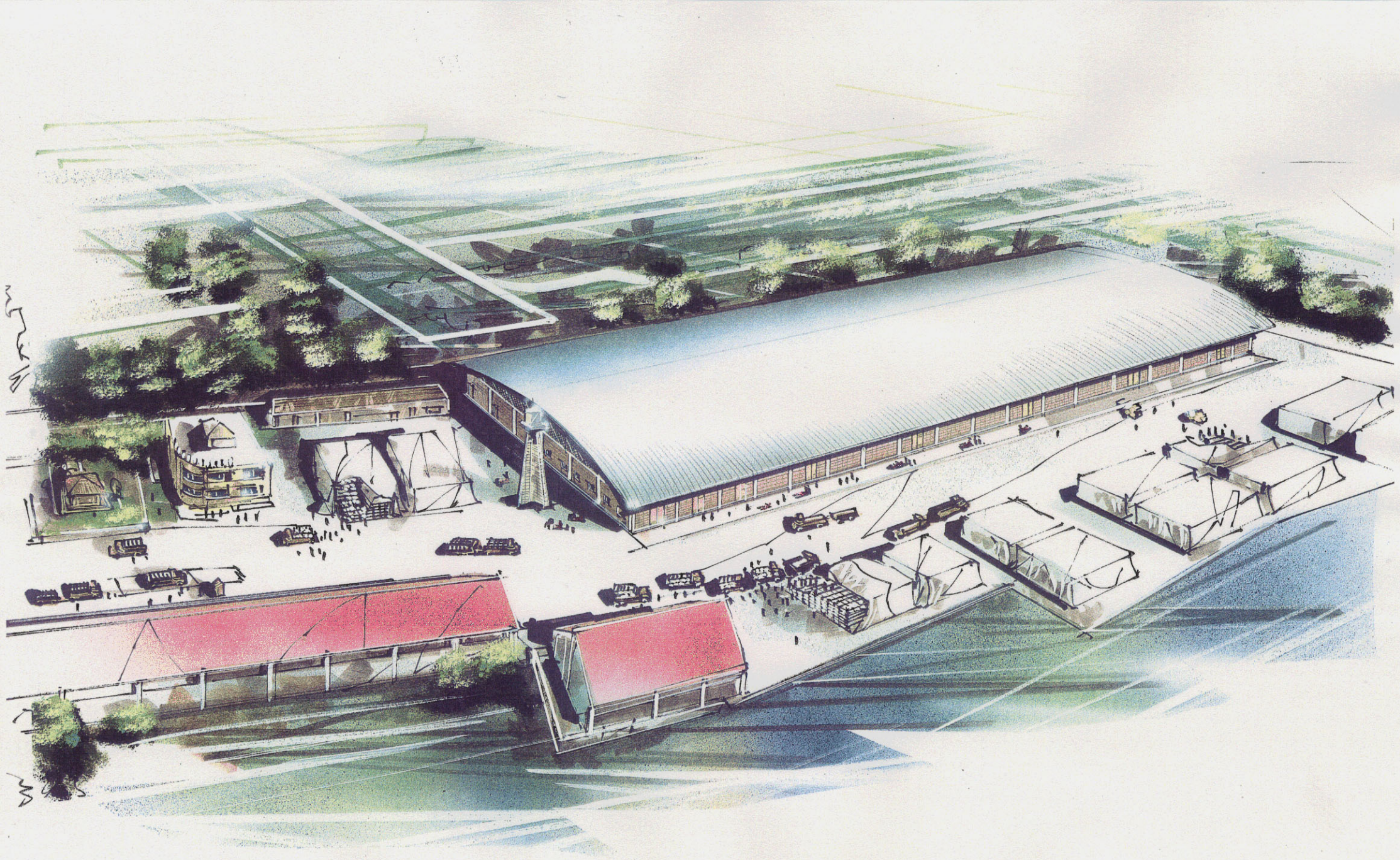
Project manager,

Basic design study team on the Project for Improvement of
Storage Facilities of Iodized Salt in the Kingdom of Nepal

Zen-noh Architects and Engineers Inc.

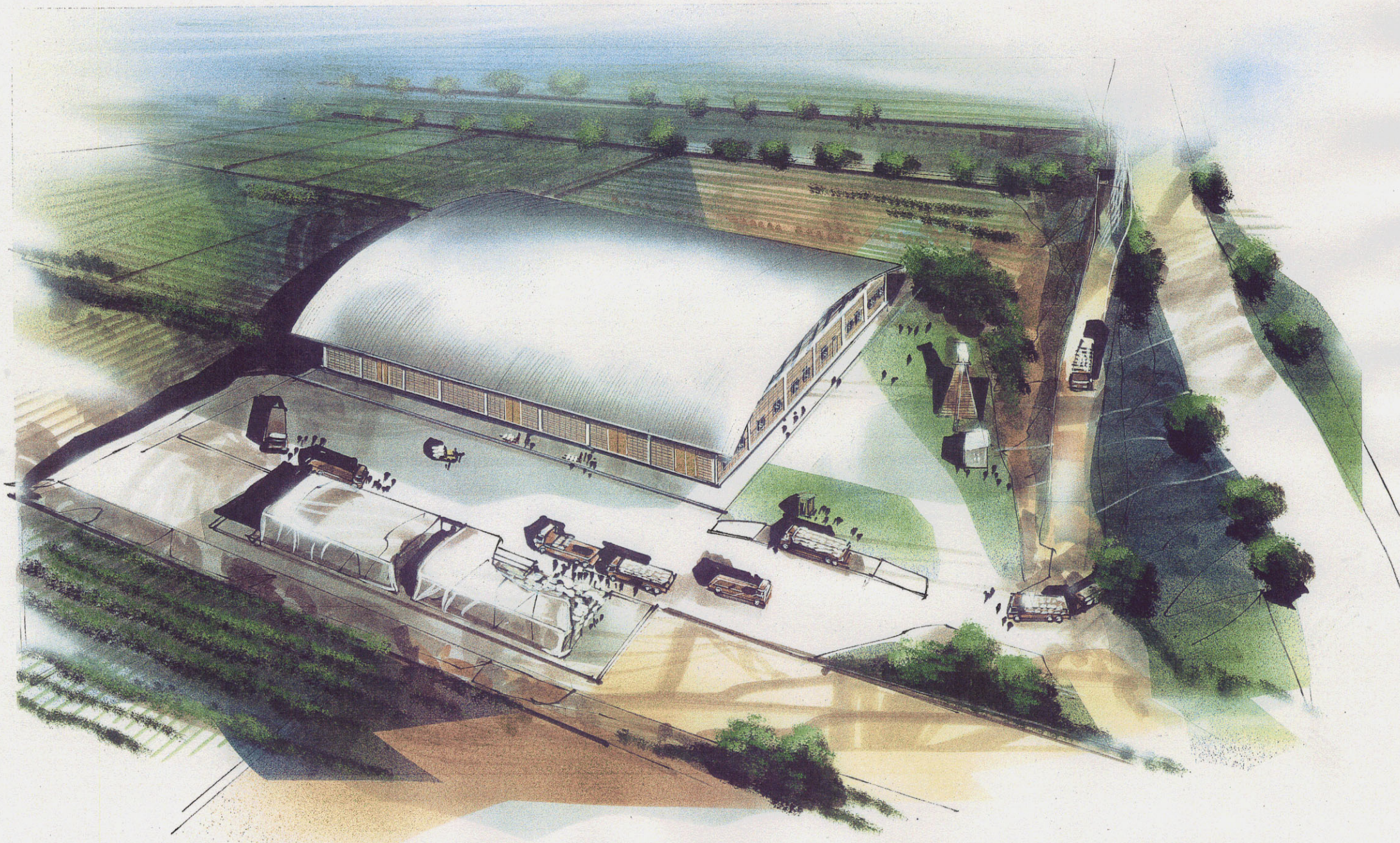


Location Map of the Project Sites



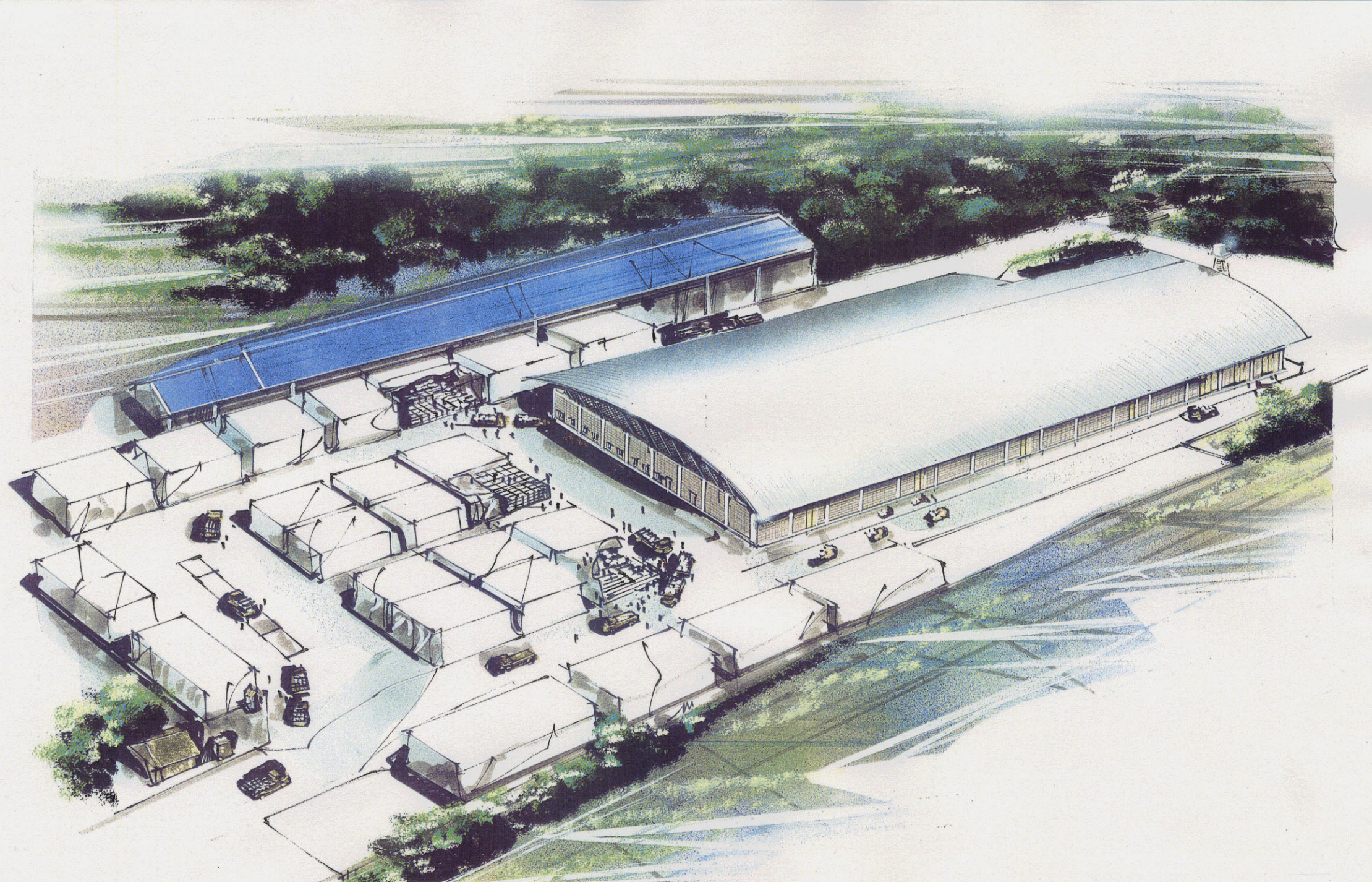
The Project for Improvement of Storage Facilities of Iodized Salt in the Kingdom of Nepal

Image of Completion Biratnagar (Phase 1): 5,000 t



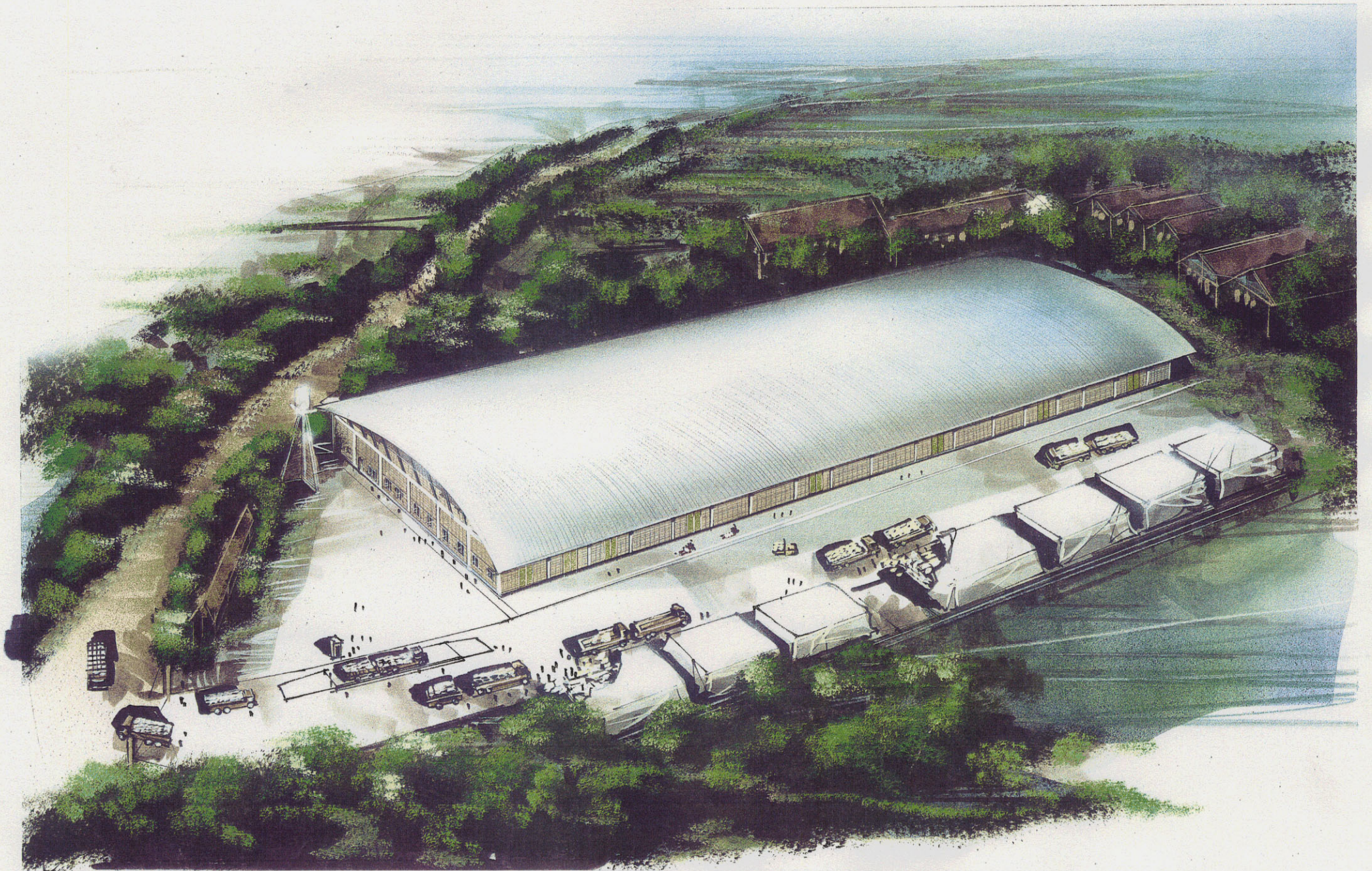
The Project for Improvement of Storage Facilities of Iodized Salt in the Kingdom of Nepal

Image of Completion Janakpur (Phase 1): 2,000 t



The Project for Improvement of Storage Facilities of Iodized Salt in the Kingdom of Nepal

Image of Completion Birganj (Phase 2): 5,000 t



The Project for Improvement of Storage Facilities of Iodized Salt in the Kingdom of Nepal

Image of Completion Bhairahawa (Phase 2): 5,000 t

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ABBREVIATIONS

STC :	Salt Trading Corporation
UNICEF :	United Nations International Children's Emergency Fund
MI :	Micronutrient Initiative:
ISSMAC :	Iodized Salt Social Marketing Campaign
IDD :	Iodine Deficiency Disorders
WHO :	World Health Organization
DHS :	Department of Health Service
CHD :	Child Health Division
IDDST :	IDD Support Team
GCP :	Goiter Control Project
GCEP :	Goiter and Cretinism Eradication Project
IEC :	Information, Education, Communication
VoW :	Video on Wheel
EIA :	Environment Impact Assessment
IEA :	Initial Environment Assessment
NEA :	Nepal Electricity Authority
NRs :	Nepal Rupee
AVR :	Automatic Voltage Regulator
UPS :	Un-interruptible Power supply
VHF :	Very High Frequency
E/N :	Exchange of Notes

CHAPTER 1 BACKGROUND OF THE PROJECT

Iodine deficiency disorders (IDD) are defined as a syndrome of thyroid hormone defects due to iodine deficiency. Although IDD has been regarded as a causative factor of thyroid adenoma, iodine deficiency during the fetal and neonatal periods has serious effects on the subsequent mental and physical development. Generally, fetal iodine deficiency results in neonatal cretinism characterized by severe mental and physical disorders. Even slight iodine deficiency is known to cause intellectual impairment. Consequently, IDD poses grave health and education related problems in the Kingdom of Nepal.

According to the data reported by WHO, two billion people in developing nations are at risk of IDD. Of these, twenty million suffer from encephalopathy. In the World Summit for Children held in 1990, the elimination of IDD by 2000 was adopted as one of the objectives of the action programs.

The Kingdom of Nepal, which has been facing a serious health problem from IDD, is a landlocked country located at the foot and side of the Himalayan Mountains. Because of the limited supply of natural iodine, the promotion of iodized salt intake was adopted as a means of solving IDD related problems. In 1973, an agreement was reached regarding the purchase of iodized salt with India from which country most salt is imported (Goiter Control Project). Currently, Salt Trading Corporation Ltd. (STC) is in charge of importing iodized salt from India and is promoting iodized salt throughout the country.

Although the number of families that use iodized salt in Nepal has increased since the implementation of the iodized salt popularization campaign (current rate of popularization: approximately 90%), according to the data (The State of the World's Children), 44% of children in Nepal suffer from thyroid adenoma, which indicates the highest morbidity in the world.

There are two problems that prevent the popularization of iodized salt.

(1) Washing of iodized salt before use

Generally, Nepalese people wash the surface of phoda salt, which is contaminated during transportation. In the process of washing, iodine coating is washed out with impurities.

(2) Problems related to the distribution of iodized salt

Currently, iodized salt imported from India is transiently stored in five main warehouses along the border before its shipment throughout country. The storage capacity of these warehouses is limited and large quantities of iodized salt are left outside. The iodine coating is inevitably washed out by rainfall, high temperature and high humidity.

In order to cope with the above problem (1), UNICEF is promoting a campaign to replace phoda salt in 75 kg packages, which is currently popular among the people because of its low price and ease of storage (accounting for approximately 62% of imported iodized salt) with refined/crushed salt (distributed in smaller packages) which requires no washing before use. In this situation, in order to cope with the above problem (2), Japan was particularly requested to construct additional storage facilities with a total capacity of approximately 20,000 tons by the Kingdom of Nepal.

CHAPTER 2. CONTENTS OF THE PROJECT

2-1 Objectives of the Project

In the Five-Year National Plan of Action for the Elimination of Iodine Deficiency Disorders (IDD) July, 1997 – June, 2002, prepared by Ministry of Health, His Majesty's Government of Nepal in collaboration with UNICEF, has made a commitment to the elimination of IDD in Nepal. The Project, which is regarded as one element of this plan, aims to ensure proper supply and distribution of iodized salt throughout the country by having the Salt Trading Corporation (the country's sole importer of salt) secure buffer stocks of iodized salt as an essential commodity and prevent loss of the iodine concentration in the course of storage and distribution.

2-2 Basic Concept of the Project

One of the specific objectives of the above Five-Year National Plan of Action for the Elimination of IDD is, "to increase demand and consumption of adequately iodized refined or crushed salt at household level", and the following have been raised as targets have been fixed: a) "to promote packed and non-phoda iodized salt (e.g. crushed and refined salt) among consumers and increase its availability throughout country according to set timetable until 2002, gradually phasing out the demand for phoda salt", and b) "to increase the warehouse capacity to store salt from the present level of 34,700 tons to 55,000 tons."

Based on this specific objective and these targets, examination was carried out as described below concerning the request, i.e. increase of 20,000 tons in storage capacity of iodized salt at the Salt Trading Corporation, and related items.

As a result of the examination, the following basic concept was adopted with a view to having the Salt Trading Corporation secure reserves of iodized salt as an essential commodity and prevent loss of the iodine concentration in the course of storage and distribution: to construct additional storage facilities with a total capacity of 20,000 tons, prepare platforms for temporary outdoor storage, and provide salt packing facilities (70,000 tons per year in 1kg pouches) and related equipment and materials such as weighing equipment, conveyance equipment, re-iodization equipment, iodine content measuring equipment, computers and waterproof sheets, etc. at the six sites of Biratnagar, Janakpur, Birganj, Bhairahawa, Nepalganj, and Dhangadhi.

Incidentally, concerning the grade of equipment (except for truck scales and forklifts to be newly introduced), it was decided to improve or have new version of equipment that is already in use or is being used on trial by the Salt Trading Corporation.

(1) Concerning setting of additional capacity of salt warehouses

It is realistic to secure capacity close to 40% of the annual requirement (approximately 54,900 tons) according to the National Plan and to construct additional warehouses with a capacity of 20,000 tons as requested. Concerning salt stocks that temporarily exceed the storage capacity, the Study Team deemed it desirable from the viewpoint of cost effectiveness to store these outdoors on condition that adequate waterproofing measures (construction of outdoor storage platforms and use of waterproof sheets) are taken.

(2) STC action plan intended to distribute adequate quality iodized salt

In order to distribute adequately iodized salt, the Salt Trading Corporation by 2005 plans to reduce the ratio of Phoda salt which easily loses its iodine, and at the same time to increase the ratio of salt packed in plastic bags in order to prevent lowering of the iodine content.

(3) Priority of functions and equipment at salt warehouses

In consideration of the STC action plan described above in (2), the Study Team conducted basic design of the salt warehouses with emphasis placed on raising the salt packing capability and introducing the quality control system.

1) Packing functions

In consideration of plans to increase the salt packing ratio on the STC side, it was decided to secure enough packing workspace and supply packing equipment to enable STC undertake activities required in the said plans to be conducted in each warehouse.

2) Quality Control Functions

It has been confirmed that STC and UNICEF will procure the iodine content inspection equipment that is crucial to the introduction of the quality control system planned on the STC side. Therefore, it was decided to supply other related equipment for re-iodization, measurement and information control and to secure the space to install such equipment in individual warehouses.

3) Salt storage functions

Regarding layout of the salt storage space, it was decided to adopt a layout, which makes warehouse management easy, and to supply forklifts and handcarts required for moving salt around. However, concerning the introduction of forklifts, the capability of STC to bear the costs of maintenance and replacement following the introduction of the equipments vis-à-vis recruiting additional warehouse laborers was examined.

4) Salt outdoor storage functions

Concerning waterproofing measures in the event of temporary outdoor storage which will be required (especially in the rainy season) even after Project implementation, the Study Team decided that in addition to waterproof sheets, it is necessary to include the construction of loading platforms (already in existence at some sites) in the works to be implemented by the Project.

The original request from the Nepalese side concerning measures for outdoor salt storage was for the provision of tent warehouses (also capable of preventing water infiltration from below), however, the Study Team proposed the use of waterproof sheets from the viewpoints of ease of use and cost effectiveness. However, since waterproof sheeting alone is not sufficient to prevent moisture from below, provision of loading platforms is indispensable from the viewpoint of securing quality control of the iodized salt.

2-3 Basic Design

2-3-1 Design Concept

The following basic concept and design criteria were set based on the results of analyzing and examining the Project features, natural and social conditions, and construction and procurement conditions, etc. derived from the basic concept.

(1) Problems concerning import, etc. of iodized salt

Due to conditions in the country of production - India (production in the dry season only), and restrictions on railway transportation, the salt importing period is restricted to

certain period and tends to concentrate in the latter part of the dry season from March to June.

The amount of salt imported in one consignment is around 2,300 tons depending on the size of freight trains. Moreover, since it is compulsory for salt to be unloaded from freight cars within 24 hours (normally 8 hours) to railway platforms and to be moved out from stations within 48 hours at the border station in India, salt which is carried into Nepal ends up being temporarily stored outdoors due to time constraints on storing it in warehouses straight away.

Accordingly, although outdoor storage will be largely reduced as a result of the Project, since it is probable that temporary storage will be practiced as part of the distribution process, platforms and waterproof sheets shall be adopted.

Current conditions concerning the import of iodized salt from India are as follows.

- 1) Every year from June to July, regional offices of the Salt Trading Corporation (STC) conduct demand survey from registered salt dealers in interviews. After totals are collated in district offices, the national aggregate demand is obtained with consideration given to conditions in the previous year.
- 2) Between October and February, STC dispatches two teams to the area of production in India (Gujarat State, producing 60% of India's salt) to obtain information concerning production conditions, quantities and quality. After assessment is carried out at STC headquarters based on this information, performance in the previous year and demand, STC sends a procurement team of four or five persons including Board directors and executive officers to the area of production during the salt production period from March to April.
- 3) The team holds negotiations and binds purchase contracts concerning price, quantity and delivery period, etc. with private salt producers in the area of production (eight or nine companies) and Hindusthan Salts Ltd. (a government undertaking; procurement from this corporation was 90% before but is 25% now).
- 4) After the results of the above contracts are obtained, a letter of recommendation is obtained from the salt commissioner in India, and request is made for freight cars to the Indian Ministry of Railways. This ministry has 100% power of decision with

respect to the allocation of rolling stock. Sometimes, the packed salt is kept outside on the yard for months waiting for railway rakes to come for loading.

- 5) Producers in the area of production mix iodine to the salt prior to packing into bags in outdoor store yards. The Indian salt department carries out sampling inspections prior to shipping, however, variations in concentration are large and salt is passed if the average iodine concentration is 50 ppm or more.
- 6) Rail transportation is sometimes done in uncovered wagons and it generally takes six or seven days for salt to reach the border from the area of production. Moreover, salt is listed in “B” category for railway transportation and as such, is given a low order of priority in India and it is not possible to accurately determine the time of arrival due to varying conditions such as weather, political situation and accidents, etc. Moreover, in places where transshipment takes place from broad gauge to meter gauge, salt is sometimes kept waiting for a number of weeks. As a result, deliveries to border warehouses are sometimes delayed for months.
- 7) Up to Raxaul Station within India closest to Birganj, salt is transported on broad gauge track all the way from the production area. At the meter gauge stations within India closest to Bhairahawa, Nepalganj and Dhangadhi, salt is transhipped at the stations of Gonda, and at Katihar to Biratnagar.

(2) Validity of the requested scale

Examination was carried out on the validity of the request, which was for the construction of additional salt warehouse capacity of 20,000 tons.

In Nepal, from the viewpoint of national security, the guideline has been set concerning buffer stock of essential commodities.

On the basis of the guideline set, Ministry of Supply, now Ministry of Industries, Commerce and Supply has instructed Salt Treading Corporation Ltd. to maintain a Buffer stock of salt required for six months of the country as per decision of HMG/N, Cabinet meeting of second March, 2000 in order to smooth distribution without any delay and disturbance in supply of salt in the country.

The existing capacity of salt warehouses owned by STC is 34,700 tons and, if expansion is carried out according to the peak figure in 1998/99 (62,024 tons), this means that

additional capacity will be required; however, in this case fairly large amounts of spare space will arise depending on the season.

Moreover, from the following conditions, the existing warehouse storage capacity of 34,700 tons is insufficient by *33,900 tons with respect to the required six months buffer stock (68,600 tons) and **20,180 tons insufficient with respect to 40% of annual imports (54,880 tons). Therefore, the requested capacity of 20,000 tons satisfies approximately 40% of the current annual demand and, although it does not consider future population increase, it was deemed to be valid from the viewpoint of cost effectiveness because large seasonal fluctuations mean that the minimum buffer stock is not always stored and marketing storage is also carried out in the wholesaling and retailing stages following handling by STC.

- Per capita salt consumption : approximately 6kg per year
(including livestock consumption)
- Present population : approximately 22,870,000
- Annual demand : approximately 137,200 MT
(6kg x 22,868,000 = 137,208 MT)
- The required buffer stock is given as a six-month supply (68,600 MT) in the request and 40% of annual imports (54,900 tons) in the National Plan for IDD
(137,200 MT ÷ 6/12 months = 68,600 MT)
(137,200 MT x 40% = 54,880 MT)
- Maximum allowance of existing STC salt warehouses: 34,700 MT
- Requested additional warehouse capacity: 20,000 MT
*(68,600 MT - 34,700 MT = 33,900 MT)
**(54,880 MT - 34,700 MT = 20,180 MT)

Estimated **40% Buffer stock** in '99/2000

*growth=2%

*from 5year National IDD Plan IV.2.ii

Region	*'99/2000	6kg/psn.year	*40% (MT)	Warehouse Location	Stock Capacity (MT)					
	Population	Demand(MT)	Buffer stock		Existing	Shortage	Proposed	Total		
Total	22,868,152	137,200	54,880	6 Sites	34,700	-20,184	20,000	54,700	100%	-184

(3) Results of examining requested storage capacity at each site

In the following table, for each requested site, demand has been computed based on the population served in the area managed by each border warehouse, and the excess or deficiency of existing warehouse capacity with respect to the necessary six month buffer

stock is shown. In the event, where the requested additional capacity is provided, stocks in the Far-western region of Dhangadhi will be 120% of the six-month supply, while in Janakpur they will be 43%.

With respect to the above request contents, in order to optimize warehouse storage capacity at each requested site, the Basic design Study team suggests decreasing the request size from 2,000 tons to 1,000 tons at Dhangadhi and increasing it from 1,000 tons to 2,000 tons at Janakpur.

Moreover, concerning the 2,000 tons for Janakpur, unlike the border warehouses at other requested sites, this functions as a depot in storing salt imported at Birganj. However, since the existing warehouse capacity is highly insufficient compared to demand in the target area, and STC expects to have this site function as a border warehouse (in view of its proximity to the East-West highway and the highway which leads to the Indian border) in the future.

Estimated Buffer stock for **6 months** in '99/2000

Region	*'99/2000	6kg/ psn.year	50% (MT)	Warehouse Location	Stock Capacity (MT)					
	Population	Demand (MT)	Buffer stock		Existing	Shortage	Proposed	Total		
East	5,183,082	31,098	15,549	Biratnagar	3,000	-9,549	5,000	11,000	71%	-4,549
				Birtamond	3,000					
Central	* 2,350,382	14,102	7,051	Janakpur	2,000	-5,051	2,000	4,000	57%	-3,051
					1,000			3,000	43%	-4,051
					4,000	-10,957	5,000	16,000	80%	-3,957
				**						
**	Kathmandu	4,000								
West	7,051,434	42,309	21,154	Bhairahawa	5,000	-10,654	5,000	15,500	73%	-5,654
				Pokhara	2,500					
Midwest	1,893,017	11,358	5,679	Nepalgunj	2,000	-1,979	2,000	5,700	100%	21
				Surkhet	1,500					
				Jumla	200					
Farwest	2,088,176	12,529	6,265	Dhangadhi	4,500	-765	1,000	6,500	104%	235
				Mahendranagar	1,000			2,000	7,500	120%
Total	22,868,152	137,209	68,604		34,700	-33,904	20,000	54,700	80%	-16,720

* The value for Birganj includes population, demand, buffer stock, and storage quantity in Janakpur.

** Since salt to the Kathmandu Valley, its environs and Chitwan district under the Narayanghat and Kathmandu warehouse is supplied from both Birganj and Bhairahawa, figures for population, demand, buffer stock, and storage quantity have been shared between both.

As a result, the scale of additional warehouse construction at each site will be as follows:
 Biratnagar: 5,000 MT (71%), Janakpur: 2,000 MT (57%), Birganj : 5,000 MT (80%),
 Bhairahawa: 5,000 MT (73%), Nepalgunj: 2,000 (100%), Dhangadhi: 1,000 MT (104%)
 The total increase in capacity is 20,000 MT.

Concerning any further deficiency in capacity, in line with temporary storage at the time of import, platforms shall be constructed as much as site space allows and waterproof sheets shall be used.

(4) Construction of platforms

In accordance with the above, using the platform (30 x 40 feet, 350 MT) already in existence at the Birganj site as a model, temporary storage platforms shall be constructed at each site based on the following concept.

- Biratnagar: 4,550 tons = 13 units (equivalent to the deficiency in the six month buffer stock)
- Janakpur: 700 tons = 2 units (equivalent to the deficiency in the six month buffer stock) *
- Birganj: (9,000 tons = existing 26 units) not applicable
- Bhairahawa: 2,450 tons = 7 units (equivalent to one batch of imports) **
- Nepalganj: 1,400 tons = 4 units (equivalent to one batch of imports minus excess storage capacity for 40% buffer stock)
- Dhangadhi: 1,050 tons = 3 units (same as above)

Estimated Buffer stock for 6 months (or 40%) Buffer Stock in '99/2000 with Platform

Region	Buffer Stock	Warehouse Location	Stock Capacity (MT)					Total	(Surplus)
			Existing	Shortage	Proposed	Platform			
East	15,549	Biratnagar	3,000	-9,549	5,000	4,550	15,550	1	
		Birtamond	3,000						
Central	7,051	Janakpur	2,000	-5,051	2,000	700	4,700	-2,351	
	19,957	Birganj	4,000	-10,957	5,000	(9,000)	25,700		
		Narayanghar	2,000					2,538	
		Kathmandu	4,000						
West	21,154	Bhairahawa	5,000	-10,654	5,000	2,450	17,950		
		Pokhara	2,500						
Midwest	5,679	Nepalganj	2,000	-1,979	2,000	1,400	7,100	1,421	
	*(4,543)	Surkhet	1,500	*(-843)				*(2,557)	
		Jumla	200						
Farwest	6,265	Dhangadhi	4,500	-765	1,000	1,050	7,550	1,285	
	*(5,012)	Mahendranagar	1,000	*(-488)				*(2,538)	
Total			34,700		20,000	19,150	73,850	5,246	

* (40% Buffer Stock)

*to 40% Buffer Stock

* Since Janakpur will function as a depot under the control of Birganj for the near future, scale is obtained by deducting the existing platform capacity at Birganj from the total buffer stock deficiency at Birganj and Bhairahawa.

** Concerning the deficient storage capacity at Bhairahawa, since salt supply to the capital Kathmandu and its environs is carried out from both Bhairahawa and Birganj, and

the deficiency can be handled by the existing platform at Birganj, platform scale at Bhairahawa is equivalent to one batch of imports.

(5) Pouch packing functions

The high consumption ratio of phoda salt tends to let iodine escape easily, is slowing down the promotion of IDD countermeasures. In view of this situation, STC has indicated a plan in which it aims to reduce the ratio of phoda salt imports from the current 58% to 30% by 2004/5 and to raise production of salt packed in 1kg polyvinyl pouches (some crushed salt is packed in 2kg pouches) to 80,000 tons per year (100% refined salt, 69% crushed salt). With respect to this plan, since the current pouch packing capacity of depots is approximately 10,000 tons per year, it was decided to bolster salt packing machine functions at each requested site warehouse by a total of 70,000 tons per year.

(6) Concept regarding natural conditions

Tarai area near the border with India belongs to the monsoon zone with the rainy season lasting from June to September. As rain countermeasures during the rainy season, the waterproof performance of outside including roofs, walls and fittings shall be improved. Since the stored commodity is salt and much corrosion has been observed on the roofs of existing warehouses especially, salt resistant roofing materials shall be used and joints shall be seamed as much as possible to prevent rain leaks.

Moreover, to ensure that inundation and other damage is not incurred during the heavy rain season (monsoon); consideration shall be given to rainwater drainage on land around facilities including platforms.

As for ventilation of warehouses, natural ventilation similar to that used in existing warehouses and equivalent facilities shall be adopted with a view to reducing maintenance costs.

Concerning countermeasures regarding seismic force and wind pressure, since there are no clear structural criteria, structures shall be planned and constructed in accordance with calculation criteria of the Architectural Institute of Japan.

(7) Concept regarding construction conditions in Nepal

Domestic legislation concerning construction of facilities in Nepal consists of building permission laws and regulations and standards for the installation of septic tanks, and

these shall be adhered to. According to the General Rules of Municipality, since buildings in urban areas require written permission, basic design shall be implemented with consideration given to the following points (see Appendix –5. 4):

- 1) Distances separating buildings from power cables should be at least 1.25 m in the case of 11 kV cables and 2.00 m in the case of 33 kV cables.
- 2) Distances separating buildings from national highways should be at least 25 m.
- 3) Distances separating buildings from adjoining perimeters should be at least 1.5 m.

(8) Concept regarding level of facilities and equipment, etc.

Facilities and equipment which satisfy the above-mentioned required packing functions, quality control functions, salt storage functions and outdoor storage functions, and which can be operated and maintained with the minimum of difficulty (regular replacement of expendable items such as fluorescent tubes, etc.), shall be set.

Land around new and existing warehouses and platforms shall be paved in order to improve the mobility of trucks and forklifts.

When it comes to selecting construction methods, equipment and materials, local materials and methods shall be adopted upon giving consideration to works period limitations and excluding special items.

Moreover, concerning the type of equipment and materials, the same specifications of equipment and materials used at present shall be adopted to ensure that operation and maintenance are easier. Moreover, concerning equipment and materials to be newly introduced, validity was examined through carrying out comparison of maintenance costs with labor costs that can be reduced as a result of introduction.

2-3-2 Basic Design

(1) Content and scale of facilities by site

The following tables outlines the content and scale of facilities by site in the Project.

Site \ Item	Biratnagar	Janakpur	Birganj	Bhairahawa	Nepalganj	Dhangadhi	Total
Warehouse capacity (tons)	5,000	2,000	5,000	5,000	2,000	1,000	20,000
Warehouse area (m ²)	2,295	916	2,294	2,296	920	511	9,233
Packing lines	10	4	8	9	3	3	37
Iodine inspection room	1 staff	1 staff	1 staff	1 staff	1 staff	1 staff	6 staff
Quality control room	2 staff	* 3 staff	2 staff	* 3 staff	1 staff	1 staff	12 staff
Date printing room	5 staff	2 staff	4 staff	5 staff	2 staff	2 staff	20 staff
Materials stores (number)	1	1	1	1	1	1	
Toilets (urinal + closet) (outdoor/men's/women's)	1+1/1+2/4	1/1+2/3	1+1/1+2/4	1+1/1+2/4	1/1+2/2	1/1+2/2	
Room area (m ²)	490	312	490	490	223	223	2,228
Handling area under eaves	345	152	288	345	211	136	1,479
Total floor area (m ²)	3,131	1,380	3,073	3,131	1,355	870	12,940
Platforms (number)	13	2	(26)	7	4	3	29

* Since the site of Janakpur and Bhairahawa are separated from the regional offices, the office function like a branch office and one administrative staff is required.

(2) Facilities plan

1) Incoming and outgoing traffic lines plan

Warehouse capacity at each site is calculated based on approximately 40% of present annual demand and warehouses should in theory always be full, although there are seasonal fluctuations. Therefore, newly imported salt is first temporarily stored on platforms and covered in waterproof sheet before being moved to the warehouses in line with outgoing delivery. Accordingly, incoming and outgoing traffic lines will be as follows, and transporting functions based on these will be required.

Iodized salt delivered from the border station is weighed on a truck scale.

After weighing is complete, sampling inspection of the iodine concentration is carried out one truck at a time.

Following inspection, salt is placed in the warehouse or on the platform for temporary storage covered with waterproof sheets as and when required.

Set amounts of salt are transferred from the platform to the warehouse at all times depending on the amount of free space in the warehouse.

A set amount of salt is removed from the warehouse every day and is packed into 1kg (sometimes 2kg) pouches.

Prior to packing, sampling inspection is once more carried out on the iodine concentration, and re-iodize salt in which the concentration is lacking.

Pouched salt is packed into 50kg sacks and is then either shipped or stored.

Both the salt packed in pouches and that packed in sacks is weighed on a truck scale at the time of shipment.

(See Appendix – 5. 2 Godown Flow Chart).

2) Facilities functions

Concerning the method of storage in warehouses, salt shall be piled by item in blocks measuring 20 layers high and weighing around 167 tons, and the first-in first-out method shall be adopted in units of blocks. Loading and unloading for transfer shall be carried out by forklift, however, manual labor shall be relied on to unload and load salt onto forklift pallets and from pallets onto blocks. Detailed design of warehouses was advanced with a view to providing forklift corridors between partitioned sections each consisting of a number of blocks.

The packing and processing area shall be separated from the storage area and shall combine the iodine concentration inspection room, quality control room, date printing room, materials store, and toilets. Forklifts shall be used to carry salt and products into and out of the packing and processing area, while handcarts shall be used within the said area.

(3) Site and facilities layout plan

Concerning the shape of sites, surrounding environment and sites where facilities already exist, the position and content, etc. of facilities were confirmed and layout decided.

Below is given an outline of the site and facilities layout plan based on the content and scale of facilities at each requested site.

1) Biratnagar

Located in the south side of the city, this site that stretches lengthwise from east to west, is on the east side (separated by only a ditch) of the highway that links the East-West Highway to the border with India. Since buildings such as the office and warehouse, etc. already exist on the west side of the site, the outdoor stock yard on the east side will be the construction area.

The approach to the facilities shall be from the west side road as is the case with existing facilities. Since the northeast part is shaped and is suited to the layout of facilities, the new warehouse shall be constructed here. The new platforms shall be constructed in the southeast part and truck corridors shall be secured around the platforms to make the loading and unloading of salt easier. Space of around 15 m shall be secured between the warehouse and platforms to improve truck mobility

Moreover, since forklifts will be used to transfer salt between the warehouse and platform, the ground here shall be paved to make forklift movement easier.

2) Janakpur (Lalgadh)

The existing office is in the city while the existing warehouse is in the station, however, the requested site is located approximately 25 km from the city center in Lalgadh, which is close to the Bardibas where turnoff to Shindhuli on the East-West Highway and faces the south side of this highway. Because this land is currently paddy, it shall be necessary to raise the paved surface following completion by around 50 cm above the existing ground level. Moreover, since the nearby highway is on a river embankment and has a height difference, adjustment of the existing access road which links the highway to the site will be necessary. Moreover, because there are no telephone lines nearby, installation of VHF telephones is required (at the expense of the Nepal side).

The approach shall be constructed from the east side of the site, and facilities shall be placed on the east side of the site in order to minimize banking. With a view to improving truck mobility, a space of around 15 m shall be secured between the warehouse and platforms. Moreover, land to the front of the warehouse and platforms shall be paved to make it easier for forklifts to move around.

3) Birganj (Shimura)

The existing office and warehouse are located in the city, however, the requested site is some 18 km from the city center and is situated in an industrial zone close to the airport 3 km south of the Pathalaia branch of the highway that links the East-West Highway to the border with India. The site stretches from east to west in elongated fashion and faces onto the west side of the said highway. On the east side of the site, 26 platforms have already been constructed. The west side will be used as the construction site, however, due to the large inclination on the west side, the land immediately west of the existing platforms is appropriate. In addition, height difference with part of the west side of the construction area is about 1.5 m.

The approach road shall be from the east side as with the existing facilities. Facilities shall be positioned so as to minimize the range of banking and to utilize the existing salt pits. A corridor shall be secured around the warehouse to enable trucks to circle, and space of around 15 m in width shall be secured to the front of the warehouse to make truck movement easier. Moreover, land to the front of the warehouse and platforms shall be paved to make it easier for forklifts to move around.

4) Bhairahawa

The existing office and warehouses (in the city center) are on the east and west sides of the highway which leads to the Indian border. However, both sites have constricted space and, even on the relatively more spacious east side site, there is only enough to build a warehouse with a scale of 3,000 tons compared the required scale of 5,000 tons. As an alternative, STC proposed land approximately 2.5 km south of the said site. This alternative site contains warehouses, which are not currently used, and there are plans to use these for businesses other than salt in future. There is ample land area here and, although the site does not face onto the highway. It is located close to the customs base on the border with India and since there is a plan to construct a road from the site to this base in future, it was decided to adopt this land as the construction site.

The approach road shall be from the north side as with the existing facilities. Since there are many trees on the west side of the site, facilities shall be positioned in the north-south directions to avoid these. With a view to improving truck mobility, a space of around 15 m shall be secured between the warehouse and platforms, and ground shall be paved to make forklifts activities easier.

Moreover, in the event where STC purchases land next to the above-mentioned east side site by the time of explanation of this report, the said site shall be used for construction. In this case, too, the shape of buildings will not be any different.

5) Nepalganj

Located in the south side of the city, this site which stretches lengthwise from east to west and south is on the east side (separated by only a ditch) of the highway that links the East-West Highway to the border with India. The existing office is on the south side of the site and buildings such as warehouses, etc. are on the north side. Moreover, because power cables run over the stockyard on the east side, the construction site is limited. In view of the above conditions, construction of warehouse space for 2,000 tons is possible only on the land facing the existing warehouses across a corridor.

Accordingly, the new warehouse shall be located here, while the new platforms shall be placed so as to avoid the power cables. Land to the front of the warehouse and platforms shall be paved to make it easier for forklifts to move around.

Moreover, STC has applied to the power company for the transfer of power cables and in the event where they are moved by the end of the detailed design, layout only shall be altered without changing the shape of the buildings. In this case, the warehouse will be placed on the northeast side of the site, and the platform will be placed on the southeast side.

6) Dhangadhi

This site is located in the city center to the south of a main road. Existing buildings (ground floor is rented to shops, upper floor is offices) are located on the side of the frontal road and there is an access road between the buildings. There is an existing warehouse on the east side of the site and land suitable for construction is located on the southwest side. Moreover, since there is a possibility of inundation of the whole site at times of torrential rain, it is necessary to raise the floor level of the new building around 50 cm above the ground.

The approach road shall be from the north side as in the case of the existing facilities. The access road for trucks shall be located along the existing warehouse so as to avoid the small shrine on the site. With a view to improving truck mobility, a space of around 15 m shall be secured between the warehouse and platforms.

Moreover, land to the front of the warehouse (including the existing warehouse) and platform shall be paved to make it easier for forklifts to move around.

(4) Building plan

1) Floor plan

Basic design of buildings shall be carried out in accordance with the above-mentioned salt handling, storage and processing functions. These functions shall be unified into one building and, in order to make forklift activities within sites easier, flat floors shall be adopted and salt storage areas shall be connected to packing and processing areas by corridors under eaves.

Concerning floor layouts, the necessary area of each room shall be secured according to the content and scale of facilities at each site, and layouts that are effective and functional in terms of storage and quality control shall be adopted. Packing rooms shall be installed with a re-iodizing machine and packing lines. Handcarts shall be used to move salt around inside packing rooms, and corridors shall be secured for carrying salt into and out of the packing lines.

With respect to quality control functions, a quality control room, an iodine concentration inspection room and a date printing room shall be provided. These shall be positioned facing outwards so that ventilation and light are secured. In particular, the layout of the quality control rooms and data printing rooms shall be such that direct entry and exit from the packing rooms is possible. In addition, a materials store shall be provided for use in storing pouches and sacks. Separate toilets shall be provided for men and women, and a toilet shall be provided for the benefit of warehouse and outdoor laborers.

Forklifts will be used for moving salt around within the warehouse. Forklift corridors surrounded by storage space on both sides shall be secured.

2) Section plan

Since forklifts will be used for moving salt around between outdoor platforms, packing rooms and warehouses, rather than attaching platforms to each building, on-site land shall be joined by gentle slopes to make movement on the premises easier. Floor height shall be at least 0.3 m above the ground in order to prevent infiltration by water and to enable efficient drainage.

Natural ventilation shall be adopted inside warehouses. No walls shall be provided on ceilings or areas beneath roofs, but there will be netting.

Storage space inside warehouses shall be 20 layers or 3.5 m high, but at least 5.0 m shall be secured beneath roof structure in consideration of workspace on top of piled salt.

3) Structural plan

In order to make buildings safe and durable, structures which comply with local natural conditions and site conditions shall be adopted. In consideration of conditions in the local construction sector, it is common for beams and pillars to adopt RC structure, for walls to be made from locally procurable concrete blocks, and for roof trusses to adopt skeleton construction. Therefore, in the Project, those structures shall be adopted.

Moreover, since the Project sites are located in the monsoon belt, limitations are placed on general concrete works and transportation during the rainy season from June to September, so reduction of the works period is an important issue. Since the sites were found to possess sufficient soil bearing capacity during the field surveys, spread foundations shall be adopted due to their advantages in terms of works period and cost.

In structural calculation, i.e. when calculating structural resistance to load and external forces (seismic force, wind power), since structural standards are unclear in Nepal, calculation criteria of the Architectural Institute of Japan shall be adhered to.

4) Building Facility Planning

Basic design was carried out according to the following plan.

Electrical work

a) Electrical power receiving and substation

11kv power feeders are already prepared on the road in front of each site except for the Janakpur site.

Electrical power shall be supplied from the main line mentioned above to each site. The distributing line from the main to the site shall be covered by Nepal side, and the electrical work of the construction to be covered by Japanese Grant Aid shall be from the intake pole in the site to the newly constructed facilities within the site.

The electrical power capacity of existing facilities in the site shall be covered by the new substation.

In case of Janakpur, 11kv line will be prepared approximately 250m away from the site by NEA (Nepal Electricity Authority). Therefore, it is necessary to provide the in-take cable from this NEA 11kv line to the site over the private land. This expense shall be borne by Nepal side, same as other five sites.

b) Electrical power distribution system

11kv power source shall be dropped to 3 phase 400v and 1 phase 230v by the new substation.

Overhead wiring system shall be adopted as much as possible because of cost down. In the current situation in Nepal, distribution panels are made of imported products from many countries, for instance circuit breakers etc. There is not any unified standard. Therefore, distribution panels with accessories shall be made in Japan for this Project.

The existing facilities are supplied with low-tension electrical power, and charges are measured by the numbers of intake lines.

NEA controls electrical power supply. However, in the Tarai area (plain area) it is supplied from India also. In the western area, Nepalganji and Dhangadhi, electrical power is supplied from India in the daytime. The situation of power supply in Nepal is not stable. Blackouts are often happen and voltage is in fluctuation.

In consideration of this condition, small generators shall be installed in order to sustain the Packing work (only for sealing machines). The computers and accessories shall be operated with the power through AVR (Automatic voltage regulator) and UPS (Uninterrupted power supply system). The Equipment supply work in this Project shall prepare this equipment.

c) Lightning arrester work

The site areas are very prone to lightning. Therefore, lightning arresters shall be installed.

d) Telephone work

Telephone for e-mail shall be installed in order to perform the incoming, outgoing and inventory management of the salt. Only one line will be prepared in the Quality

control room and Iodine inspection room. These sets shall be branched from one intake line.

In case of Janakpur, there is no connection line. Therefore, it is necessary to prepare the VHF system. This system is a rental system of NTA (Nepal Telephone Authority). STC shall apply the introduction of this as the Authorized official organization.

Registration charge:	NRs 8,000
Equipment and installation cost:	NRs 10,000
Insurance cost:	NRs 200,000
Annual commission charge:	NRs 3,500
Total	NRs 221,500

Plumbing work

a) Drinking water supply work

The municipal water supply pipe is already prepared near each site. The municipal water shall be distributed from this main pipe to the site. Due to the low supply pressure, an underground reservoir tank shall be designed and the water shall be pumped up to the elevated tank in each site.

The elevated water tank shall be made of stainless steel for salt resistant. Piping materials shall be galvanized iron according to the Nepal way. It is installed with out insulation work. Connecting fixtures and valves could not be earned easily in Nepal. Therefore, these products and parts will be supplied from Japan or the third country.

b) Drainage work

Wastewater except for Toilet use shall be discharged to the municipal sewage main directly. Toilet water shall be treated through the septic tank. After treatment of septic tank, that water shall be discharged to the municipal sewage main also. However, there is no municipal sewage main in Janakpur, therefore the seepage pit shall be installed. Piping materials shall be PVC pipe.

Regulations for installation of septic tank in Nepal:

- Septic tank shall be installed at least 6m away from buildings.
- The minimum size of septic tank shall be 750 mm x 1500 mm ~ 3000 mm and capacity shall be more than 1m³.

- Tank shall be made of bricks or concrete and not leak treating water .
- Drainage piping shall have a 100 mm diameter and be connected to drainage main pipe under the road.
- Catch basins shall be installed between connection points and septic tanks .
- Ventilation pipe shall be prepared in septic tank.
- Piping mentioned above have a 50 mm diameter and shall be raised 2 m or more than the building height.
- In case of seepage pit , the pit size shall be a 900 mm diameter or more and depth shall be at least 1000 mm below the inflow pipe. Seepage pit shall be made of bricks, stones or concrete blocks;
Wall of it shall be non- permeable, and a minimum clearance from the top of pit to the top of piping shall be 900 mm.

Concerning the rainwater, salt pit (outdoor drainage balancing pit) shall be prepared for preventing salt outflow from the site.

c) Sanitary fixtures

Local – made sanitary fixtures shall be adopted. Lavatory styles shall be prepared Asian type and Western type.

d) Fire fighting equipment

Fire extinguisher shall be installed.

e) Ventilation system

Basically natural ventilation system shall be adapted to the salt stocking area. Ceiling fans shall be installed in the packing room, inspection room and other working rooms. Ventilation fans shall be installed in the toilets.

5) Building materials plan

Concerning roofing materials, since it is only possible to procure color sheet iron and molded or corrugated sheet iron of 6 m or less locally, there is a strong possibility that such materials could not satisfy the water resistance and corrosion resistance functions required of salt warehouses. Therefore, relatively cheap but corrosion resistance aluminum zinc alloy plated steel sheet shall be imported from Japan, cut into long sections with no joints on site, and used as roofing material.

For avoiding direct contact with salt bags and concrete floor, the plastic floor sheets shall be installed.

Concerning interior finishing work, materials that are salt resisted shall be selected.

(5) Equipment Preparation Plan

The breakdown, quantity and outline of the equipment for this project are as listed and described below.

Planned locations of warehouses	Biratnagar	Janakpur	Birganj	Bhairahawa	Nepalganj	Dhangadhi	Total
(1) Measuring equipment							
1) Truck scale (30-ton class)	1	1	1	1	1	1	6
2) Platform scale (100kg class)	3	1	3	3	1	1	12
(2) Transportation equipment							
1) Handcart (500kg)	20	8	16	18	6	6	74
2) Forklift truck (2.5-ton class)	2	1	3	2	1	1	10
3) Forklift pallet	48	24	72	48	24	24	240
4) Truck (4-ton class) **1	0	0	0	0	0	0	0
(3) Re-Iodization equipment							
1) Crusher **1	0	0	0	0	0	0	0
2) Crusher - Mixer	1	1	1	1	1	1	6
3) Repacking unit (8 tons/day)	10	4	8	9	3	3	37
(4) Iodine content measuring/testing equipment							
1) Portable iodine checker **2	**	**	**	**	**	**	**
2) Analyzer **1	0	0	0	0	0	0	0
3) Distilled water unit	1	1	1	1	1	1	6
4) Table for analysis work (with sink and water tap)	1	1	1	1	1	1	6
5) Diesel Generator	1	1	1	1	1	1	6
(5) Other equipment							
1) Tent-type warehouse **1	0	0	0	0	0	0	0
2) Waterproof sheet (6m × 16m)	78	12	156	42	24	18	330
3) Computer system	1 set	1 set	1 set	1 set	1 set	1 set	6
4) Facsimile unit **3	1	1	1	1	1	1	6
5) Filing cabinet **3	2	2	2	2	2	2	12
6) Office furniture and fitting **3	8 sets	6 sets	7 sets	8 sets	4 sets	4 sets	37 sets

Notes:

**1 Equipment excluded as a result of Basic Design Study, though it was included in the original request list.

**2 Equipment to be procured by the cooperation with UNICEF, though it was included in the original request list.

**3 Equipment whose procurement is expected to be requested to the Nepalese side as a result of Basic Design Study.

The detailed equipment plan is as described below.

1) Measuring equipment

Truck scale

Since there are few truck scales available in or near existing warehouses, with a few exceptions, weight measurement and weight management on a truck load basis upon delivery/shipment of salt are not carried out at present. The weight of delivered salt is calculated for weight management by multiplying the number of sacks by the weight of salt per sack. However, because holes are made in the sacks by cargo handling hooks, a considerable amount of salt is lost during transportation before the sacks reach the warehouses. As a result, in many cases the actual weight

of a sack is lower than the initial weight of salt per bag. In short, the estimation of the delivered amount of salt for weight management, on the basis of counting the bags is neither accurate nor practical under present circumstances. On the other hand, weighing every bag upon acceptance is not at all practical since deliveries are concentrated over a certain period of the year and a large number of salt bags are delivered in a short time. Therefore, truck scales are indispensable for accurate weight management.

Since most trucks currently used by STC for salt delivery to warehouses have a load capacity of 11 tons, a truck scale with a weighing capacity of 30 tons and a platform dimensions of 8 m (length) × 3 m (width) shall be provided to each site.

Platform scale

Salt is imported from India in 75kg or 50kg bags. The salt is then shipped to domestic locations in Nepal in these large bags in the same way or repacked into 1kg or 2kg pouches for the Nepalese domestic markets after re-measuring the weight. (In that case, these pouches are packed in 50kg bags for shipment.)

At most of the warehouses, stock management cannot be conducted, as weight management upon shipment of salt is not sufficiently performed due to the lack of weighing equipment. The introduction of platform scales to enable accurate checking and adjusting of the weight of salt bag by bag upon shipment would seem to be crucial.

Since the basic shipping unit is fixed at 75kg or 50kg bags, the platform scale should be in the 100kg class. The machines should be made of stainless steel to resist the corrosive effect of salt and of dial type for easier maintenance and management. The number of platform scales to be provided is to be determined on the basis of the processing level of each warehouse as shown below.

Site	Biratnagar	Janakpur	Birganj	Bhairahawa	Nepalganj	Dhangadhi	Total
No. of platform scales	3	1	3	3	1	1	12

2) Transportation equipment

Handcarts

At present, workers carry salt bags on their backs in the warehouses for the repacking process in which salt is repacked into pouches from large bags.

However, the transportation distance in the new warehouses planned under this project is approx. 100 m (max.). Ideally, handcarts made of stainless steel are to be introduced for improved operation efficiency. Since the basic delivery/shipping unit is fixed to a 75kg or 50kg bag, the appropriate number of bags to be placed on a cart at one time is 4 to 6, which suggests the withstand load to be approx. 500kg. The main purpose of using these handcarts is the transfer of salt for repacking, however, they can also complement the role of forklift trucks, a matter that is discussed in the following paragraph. Two handcarts for each repacking line to be installed at each site will be sufficient. The number of handcarts thus determined for each site is as shown below.

Site	Biratnagar	Janakpur	Birganj	Bhairahawa	Nepalganj	Dhangadhi	Total
No. of handcarts	20	8	16	18	6	6	74

Forklift trucks

None of the warehouses under STC management use forklift trucks at present. At the new planned warehouses, carrying salt bags on the back is not suitable in phases of efficiency and the introduction of forklift trucks will be a necessity. To improve the efficiency and convenience of transport operations, forklift pallets are to be attached to the forklift trucks.

The capacity of a forklift truck shall be 2.5 tons. Since salt is regarded as being a food item, forklift trucks should be either battery-driven with no exhaust gas or LPG with relatively clean exhaust gas. The price of a battery-driven forklift truck being considerably more expensive than any other type, therefore the LPG type forklift truck has been selected for this project. The prices of battery-driven and LPG type forklift trucks stand at 185 and 105 respectively against that of gasoline-engine type forklift truck rated at 100.

The number of forklift trucks to be provided is to be determined on the basis of the handling volume at each warehouse as shown below. The number of forklift pallets to be provided is also examined, which is discussed in the following paragraph, as shown below.

Site	Biratnagar	Janakpur	Birganj	Bhairahawa	Nepalganj	Dhangadhi	Total
No. of forklift trucks	2	1	3	2	1	1	10
No. of forklift pallets	48	24	72	48	24	24	240

Trial calculation of the number of forklift trucks required

1. Time required to move or reload salt in a warehouse
(The time is calculated based on the average transfer distance in a warehouse.)

Loading	1.0 min.
Incoming into warehouse	1.0 min.
Unloading	1.0 min.
Outgoing from warehouse	1.0 min.
Total	4.0 min.

2. Transferred volume per hour per forklift truck

Volume per forklift truck	1.5 tons at a time
Volume per hour per forklift truck	
$1.5 \text{ tons} \times (60 \text{ min.}/4 \text{ min.}) =$	22.5 tons/hour

3. Transferred volume per forklift truck

Operating hours per day	About 6 hours
Volume per day per forklift truck	
$22.5 \text{ tons/hour} \times 6 \text{ hours/day} =$	About 135 tons/day
Operating days per year	About 250 days/year
Transferred volume per year per forklift truck	
$135 \text{ tons/day} \times 250 \text{ days/year} =$	33,750 tons/year

4. Calculation of transferred volume

Site	New warehouse	Existing warehouse	Platform	Stockpile capacity (for 6 months supply)
Biratnagar	5,000 tons	3,000 tons	4,550 tons	12,550 tons
Janakpur	2,000 tons		700 tons	2,700 tons
Birganj	5,000 tons		9,000 tons	14,000 tons
Bhairahawa	5,000 tons		2,450 tons	7,450 tons
Nepalganj	2,000 tons	2,000 tons	1,400 tons	5,400 tons
Dhangadhi	1,000 tons	1,000 tons	1,050 tons	6,050 tons
			Subtotal	48,150 tons

Total handling volume per year $48,150 \text{ tons} \times 12/6 \text{ months} = 97,300 \text{ tons}$

The number of transfer sessions after arrival at a warehouse until dispatch for shipping after the repacking process

Upon arrival	1.0 transfer unit
Transfer before repacking	0.7 transfer unit
Transfer after repacking	0.7 transfer unit
Upon shipment	1.0 transfer unit
Total	3.4 transfer units

Total transferred volume
 $97,300 \text{ tons/year} \times 3.4 \text{ units} = 330,820 \text{ tons/year}$

5. The number of forklift trucks required
 $330,820 \text{ tons/year} \div 33,750 \text{ tons/year} =$ about 10 forklift trucks

Forklift pallets

In order to effectively utilize the forklift trucks discussed above, forklift pallets shall also be provided. Eight pallets accommodate the load of one truck. So 24 pallets, good for three-truck loads, are provided for a single forklift truck.

Trucks

The delivery of imported salt from India to respective existing warehouses is conducted intensively in the dry season, so a number of trucks are hired. The use of trucks is limited to this specific period and it is not practical to own trucks.

After constructing new warehouses, truck services should continue to be outsourced by STC as in the past.

3) Re-iodization equipment

Crushers

Crushers are primarily installed to crush Phoda salt and make it into crushed salt or fine crushed salt, however STC does not crush Phoda salt to produce crushed salt at present. STC has a policy that they will reduce the importation of Phoda salt that easily loses its iodine, and increase the importation of crushed salt and fine crushed salt instead of Phoda salt. Consequently, necessity of the crushing of Phoda salt will not be in future.

Crushing process to turn Kurkuch salt into fine crushed salt, and loosening process for solidified crushed salt and fine crushed salt can be functioned by “Crusher – Mixer” mentioned next clause. Therefore, Crushers are not considered separately.

Crusher - Mixer

Movable crusher - mixer that also serve as re-iodization units are used at present. The iodine content of the salt imported in large bags from India is measured, and then iodine solution is sprayed over the salt when the content level is lower than the specified value. The current Indian-made crusher - mixer are provided through a UNICEF assistance scheme and some bought by STC.

Stainless steel is currently used for the parts that come in contact with salt, however the body frame is built with ordinary mild steel resulting in substantial corrosion due to salt, and the frequent mixture of rust into the salt. Further, since the crusher - mixer are used throughout the year, including outdoors use on many occasions, they are badly deteriorated. They should be renewed as early as possible.

It is also necessary to set up a special space for iodization inside the new warehouses, which will eliminate outdoor operation of the crusher - mixer, so that

a clean working environment will be established. The crusher - mixer to be provided shall employ the basic structure of the current ones with rustproof construction and be designed to be movable for convenience in repairing.

The grains of salt in large bags in the lower layers of the stack often stick to one another during long term storage and solidify due to the weight of other salt bags higher up. As a result, a "loosening" process is required before repacking the salt into pouches. Crushing process, to turn Kurkuch salt into fine crushed salt, is done at some parts of existing warehouses.

Considering above "Loosening" and "Crushing" processes, crusher-mixer should equip one pair of two crushing rollers at lower portion of the inlet hopper.

Crusher - mixer for salt are not manufactured in Japan, as they are not necessary in this country. However, several manufacturers produce them in India. The supply of Indian-made crusher - mixer would be ideal in consideration of the availability of maintenance services.

The requirements of re-iodization and "loosening" processes vary at different warehouses. However, about 7% of the total amount of shipped salt is re-iodized. When it comes to the need for loosening, about 20% of the total amount of shipped salt undergoes this process. Since the crusher - mixer in current use are badly deteriorated, total renewal is necessary. With the capacity of a crusher - mixer estimated to be considerably high, one crusher - mixer should be provided per site.

The following table shows the amount of salt that requires re-iodization or loosening at respective warehouses.

Planned location of warehouses	Total amount shipped (tons)	Amount of salt to be re-iodized (tons/year)	Amount of salt to be loosened (tons/year)	Amount of salt to be re-iodized and loosened (tons/year)
		7% of total amount shipped	15% of repacked salt	**1
Biratnagar	32,900	2,300	4,900	7,200
Janakpur	14,900	1,000	2,200	3,200
Birganj	27,300	1,900	4,100	6,000
Bhairahawa	44,700	3,100	6,700	9,800
Nepalganj	12,000	800	1,800	2,600
Dhangadhi	13,200	900	2,000	2,900
Total	145,000	10,000	21,700	31,700

Note **1 : The amount to be re-iodized and the amount to be loosened may partially overlap. However, in this trial calculation, they are merely added for the total.

Repacking units

Part of the refined salt, Karkatch salt (a generic name for crushed salt, fine crushed salt, etc.), imported in 75kg or 50kg bags is repacked in 1kg vinyl pouches (majority) or 2kg vinyl pouches at each warehouse prior to shipping. Salt is weighed to a specified amount by a balance scale, packed in vinyl bags, and sealed by an electric sealer.

About 4 to 5 workers conduct the repacking process. Repacking for 8 hours per day covers 4,000 pouches ($4,000 \times 1\text{kg/pouch}$ is equivalent to about 4 tons per day). The total number of days spent repacking is about 250, which means 1,000 tons of repacking per line per year. The operation of repacking is being carried out on the concrete floors in the warehouses or in auxiliary buildings. The conditions of these working floors are poor in terms of hygiene and working efficiency. They should be improved to a certain degree.

STC plans to increase the rates of various types of salt, excluding Phoda salt, up to approx. 70% and repack all types of salt to be supplied to regular consumers, excluding large-volume customers, into pouches for shipping by 2005.

Iodine added to salt naturally evaporates with time if the package is not sealed. In order to prevent the loss of iodine during distribution, the salt should be packed and sealed in pouches. To this end, the introduction of a proper repacking system is indispensable.

Power failures are frequent, the warehouses are located at great distances from the capital rendering the provision of maintenance problematic and it is difficult to attract workers with special skills; accordingly, the provision of high performance automatic systems to the warehouses is not recommended. However, since the amount of salt to be repacked is expected to increase in the future, a system which has a high productivity per unit area and that is easy to use should be introduced.

Summarizing the above, packing and weighing should continue to be done manually, and a system using semi-automatic sealing machines for the bag sealing process (fusing and sealing) has been decided to be introduced. Semi-automatic sealing machines have been used experimentally at some warehouses and it is certain that the implementation of the machines will not cause any technical difficulties

It has been determined to provide stainless-steel working tables in order to secure smooth operational flow and to improve hygiene conditions and working environments for the weighing and repacking processes that are currently performed on the floor inside the warehouses. The particular system planned under this project includes the provision of two additional lines for manual packing and weighing with each sealing machine. Operation for 8 hours per day packs about 8,000 bags (equivalent to 8 tons) amounting to 2,000 tons of packing per year. With this improvement realized, the manpower will be reduced by approx. 40% as compared in the table below.

	Capacity (per day)	No. of workers required				
		Packing	Weighing	Sealing	Sealing support	Total
Current scheme	4-ton line × 2	2	2	4	2	10
Improvement Plan	8-ton line	2	2	2	0	6

Some warehouses produce 2kg pouches of salt, and so they do not need semi-automatic sealing machines, as the amount is limited. Manual sealing machines should continue to be used for sealing 2kg pouches as in the past. One unit per line should be the arrangement.

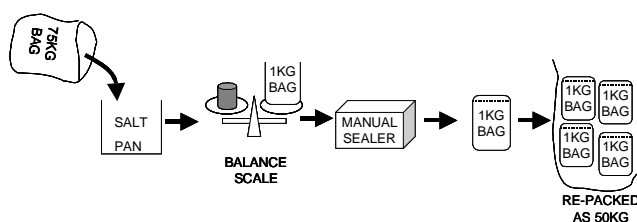
Motor-driven printers, 0.5 units per line, of the same class as those currently used for printing the date on the pouches should be provided.

Power failures are frequent, especially in the western regions, where the power supply is highly unstable as the power source is in India. With warehouses in these regions it is often, the case that salt is stored without repacking, which causes the iodine content to evaporate. As a solution to the problem resulting from power failures, a backup power generation system to be operated for repacking in the event of power failure should be provided to the regions. The capacity of the power generator has been determined from the number of lines on the site as follows.

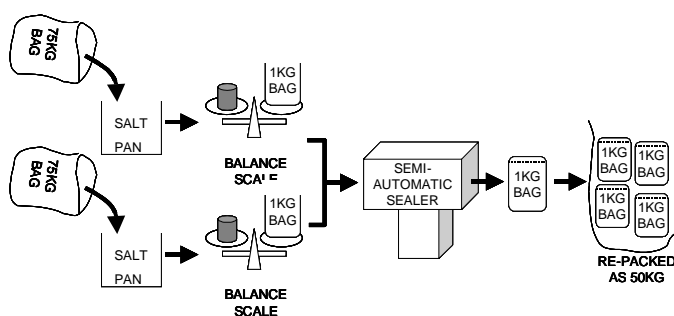
Site	Biratnagar	Janakpur	Birganj	Bhairahawa	Nepalganji	Dhangadhi	Total
No. of Diesel Generator	1	1	1	1	1	1	6
Capacity	30kVA	17kVA	30kVA	30kVA	17kVA	17kVA	

The current condition and proposed improvement plan are shown below.

Current condition:
4 tons/day/line



Improvement plan:
8 tons/day/line



The equipment arrangement for the improvement plan for 8 tons/day/line includes the items shown in the following table.

	Name of equipment	Quantity per line	Capacity, volume, or dimensions (at a rough estimate)	Remarks
1	Salt pan (for packing) (Stainless steel)	2	L ₉₀₀ × W ₆₀₀ × D ₃₀₀	With legs
2	Ladle for feeding salt into a bag (Stainless steel)	4	One scoop is equivalent to almost 1kg of salt.	
3	Balance Scale	2	Weighing capacity: 2kg	1kg weight × 2
4	Salt pan (for adjusting weighing) (Stainless steel)	2	L ₃₀₀ × W ₃₀₀ × D ₂₀₀	With legs
5	Belt type continuous bag sealer	1	Max. belt speed: 9 m/min. Stainless shoot down to the floor surface is provided (width: 600 mm)	With legs
6	Manual sealer for 2kg pouch	1	Seal width: About 300 mm	
7	Date printer	0.5	Motor-driven and semi-automatic	
8	Working table for weighing (Stainless steel)	1 set	L _{1,300} × W ₆₀₀ × H ₆₀₀ (2 units) L _{2,100} × W ₈₀₀ × H ₆₀₀ (1 unit) The edges of the top plate have rims measuring approx. 50 mm.	With legs
9	Round stools	4	H ₄₀₀ × 300	

STC estimates that the total salt requirement in 2005 will be about 145,000 tons, 30% of which being Phoda salt. Further, STC anticipates that a total of 101,500 tons of salt excluding Phoda salt will be crushed salt and refined salt and 80,000 tons per year (79% of 101,500 tons) which excludes salt to be shipped in large bags

to large-volume customers will be repacked into pouches. The following table shows the estimated total amount of shipments in 2005 and the breakdown.

(Unit: tons)

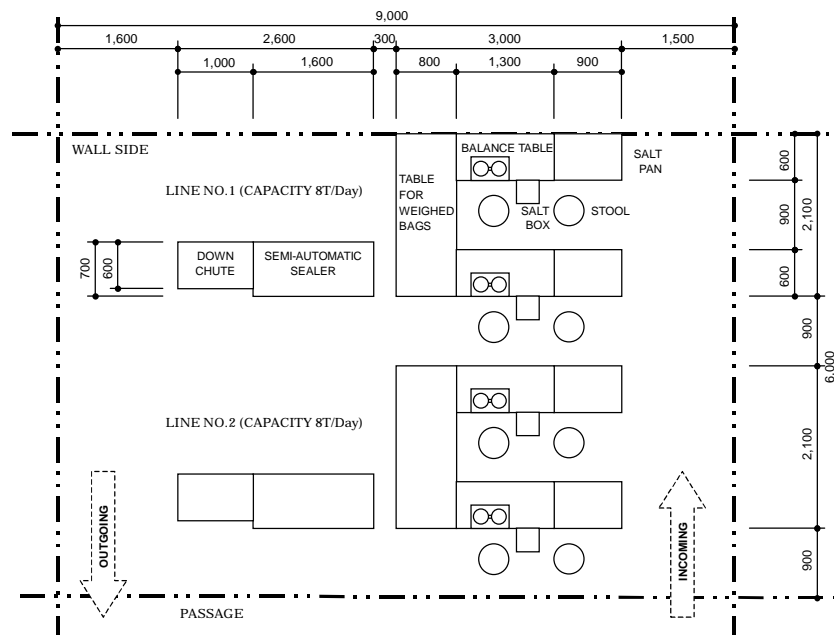
Total amount of shipment	145,000
Crushed & Refined salt (70% of the total above)	101,500
Salt to be repacked (in 1kg/2kg pouches)	80,000
Salt to be repacked at warehouses	70,000
Salt to be repacked at depot offices	10,000
Salt to be shipped in 75kg large bags	31,500
Phoda salt (30% of the above total)	43,500

For this project, the number of equipment units shall be determined so as to have a sufficient capacity to repack the total amount of salt excluding that repacked at depot offices under the respective warehouses. Since the weighing equipment and repacking equipment currently in use is badly deteriorated, total renewal is necessary. The number of repacking lines required by warehouse in 2005 is listed in the following table.

Planned locations of warehouses	Amount of salt to be shipped excluding Phoda salt (tons)	Total amount of salt to be repacked (tons)	Amount of salt that can be repacked at depot offices (tons/year)	Amount handled at warehouses	
				Amount to be repacked (tons/year)	No. of lines required for repacking
Biratnagar	27,500	21,700	3,000	18,700	10
Janakpur	10,200	8,000	0	8,000	4
Birganj	19,800	15,600	0	15,600	8
Bhairahawa	30,400	24,000	7,000	17,000	9
Nepalganj	7,100	5,600	0	5,600	3
Dhangadhi	6,500	5,100	0	5,100	3
Total	101,500	80,000	10,000	70,000	37

Note : The new equipment to be provided for weighing and repacking has a capacity of 8 tons/day per line, or 2,000 tons/year.

The view plan of the floor layout and space for the weighing and repacking equipment is shown below.



4) Iodine content measuring/testing equipment

Portable iodine checker

The content of iodine in the salt imported from India is currently determined using the simplified measuring equipment supplied by UNICEF. (A reagent is dripped onto samples of iodized salt to induce a coloring reaction and the samples are classified into four levels according to the concentration expressed by the differences in color development.) Titration analysis using glassware is alternatively conducted to measure iodine content. The iodine content obtained by the former method is only regarded as being a rough estimate, while the latter time-consuming analytical method requires some knowledge and expertise.

A portable spectrophotometer has recently been developed for easy, accurate and quick measurement of iodine content. This new measurement device is to be provided for STC by UNICEF. Therefore, the participation in this assistance program is to be withdrawn.

Analyzers (Glassware and chemicals)

Initially, analyzers were included as one of the requested items under this project but it has become unnecessary since the "portable iodine checker" discussed above is found to function as an analyzer.

Distilled water units

In order to generate the distilled water required for analysis purposes, a small electric distillation unit should also be provided. One distillation unit should be provided for each site.

Table for analysis work

A simple table should be provided to keep the measuring equipment mentioned above in place. In preparation for the arrangement of a distilled water unit, the table should be equipped with a sink and a tap. One table should be provided per site.

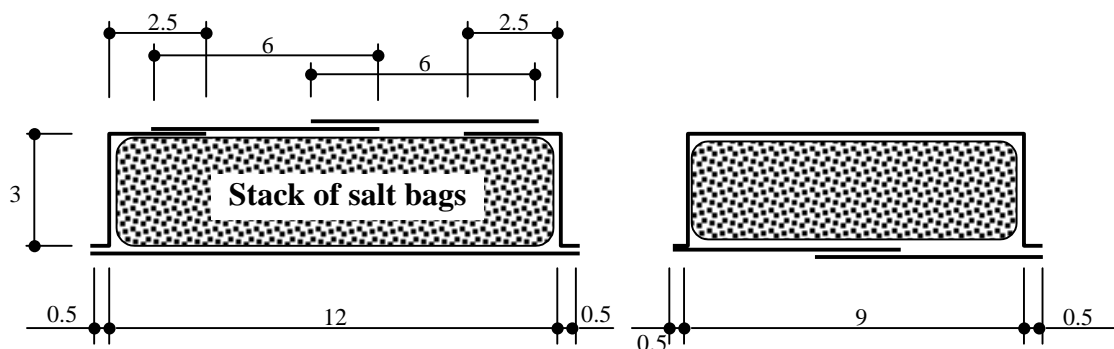
5) Other equipment

Tent-type warehouses

Initially there was a request for the provision of tent-type warehouses from the Nepalese side. As a result of our investigations conducted this time and consultations with the Nepalese representatives, “waterproof sheets” were selected since, as compared with tent-type warehouses, water proof sheets can be easily handled or worked on in emergencies, are more flexible with respect to variations in the volume of salt to be stored, and have a higher affinity for the conventional method employed at warehouses. The outline of the waterproof sheets is described in the following paragraph.

Waterproof sheets

As mentioned above, waterproof sheets, as opposed to tent-type warehouses, should be provided for this project. The sheets should be 6 m (width) × 16 m (length) to correspond to the current stack (approximately 9 m (width) × 12 m (length) × 3 m (height)) of salt bags on the platform and six sheets per platform should be provided. The sheets should be used as shown below (unit: m).



The number of waterproof sheets to be provided to warehouses is determined based on the number of outdoor platforms planned and the existing platforms as shown below. Appropriate quantity of fixing ropes will be supplied.

Site	Biratnagar	Janakpur	Birganj	Bhairahawa	Nepalganji	Dhangadhi	Total
No. of platforms	13	2	26	7	4	3	55
No. of sheets	78	12	156	42	24	18	330

Computer system

The numerical data from the STC headquarters show the volumes of incoming (delivered-in) salt, outgoing (shipped-out) salt, and stored salt at STC's warehouses during the past five years. Some old data of these are kept in the form of handwritten records, there might be some mis-posting. Some likely factors are listed below.

- a) The procedure of counting is not integrated, or well-experienced workers are not in charge.
- b) With the current calculation of the volumes of incoming, outgoing, and stored salt depending upon simple multiplication of the number of salt bags by the unit weight per bag, the loss of salt due to tears in the bags, etc., is not precisely reflected in the data.
- c) Sufficient measurement or calculation of the volumes of salt is difficult due to the fact that the receiving are concentrated in a particular season. Furthermore, such low accuracy of weight management can be attributed to the lack of truck scale availability.
- d) The data management system is not well organized at each warehouse, and the data are forwarded to the headquarters with some inaccuracy.
At present, these data are not utilized effectively in distribution planning.

In order to improve the situation in connection with items a) and c) above, instruction on the physical distribution control should be given as the soft component for the implementation of this project. As for item b), a certain degree of improvement can be anticipated from the introduction of truck scales. And in connection with item c), centralized control of the STC organization as a whole should be established by installing computers at respective warehouses to establish a network, which enables real-time communication on the status of incoming, outgoing, and stored salt with the headquarters via telephone lines. With such a

system in place, efficient delivery after import, stock distribution between warehouses, and shipping to domestic destinations as well as a proper distribution management will be realized. In addition, the actual volume delivered from India will be known moment-by-moment so that confusion generated at the warehouses near the border between India and Nepal will be minimized.

To this end, a centralized control system, in which STC's headquarter in Kathmandu can control the overall status of incoming, outgoing, and stored salt at each warehouse, should be established immediately by providing the respective warehouses with computers equipped with communication capability via telephone lines and a simplified network built up. With such a system in place, efficient delivery after import, stock distribution between warehouses, and shipping to the domestic destinations as well as a proper distribution management will be realized. In addition, the actual amount delivered from India will be known moment-by-moment so that confusion generated at the warehouses near the border between India and Nepal will be minimized.

It should be noted that computer systems have already been installed at the Kathmandu headquarters and some administration offices of local warehouses for operation and used mainly for accounting procedures. The clerks in charge of operating the computer systems have a degree of competence and the systems to be provided under this project will presumably be handled without problems. However, considering the sites where there are no such competent clerks, instruction on the operation of the computer systems will be offered in combination with the implementation of the soft component

The computer systems should be selected from those assembled and sold within Nepal in view of maintenance feasibility, etc. The location of purchase will be finalized after investigating prices. Printers and communications components should be provided together with software localized into the Nepalese language. The systems should also be installed with AVR (automatic voltage regulator) and UPS (uninterruptible power supply) in preparation for power-related problems on sites. One set of these devices should be provided for each site.

Facsimile unit

At present, detailed reports on incoming, outgoing, and stored salt at each warehouse are forwarded to the STC headquarters by mail or by STC staff on business trips. As a result, it is often the case that it takes long time to convey the

latest information required to the headquarters, resulting in the generation of problems in nationwide physical distribution management. The computer systems discussed above are proposed for this project so that such time-consuming communication will be improved.

It is also necessary to install a facsimile unit at each warehouse in preparation for failures with the computer systems. Installing facsimile units together with the computer systems will support and secure a document exchange routine between the warehouses and the Kathmandu headquarters. It is necessary that one facsimile unit is prepared per site at the expense of the Nepalese side.

Filing cabinets

To a certain extent, stock control has been carried out at each warehouse, however, the documented records and information have been damaged or lost due to insufficient numbers of filing cabinets, which affects stock control performance. In order to establish reliable and thorough document control, the preparation of filing cabinets at the expense of the Nepalese side is required.

Office furniture and fittings

The preparation of office furniture and fittings at the expense of the Nepalese side is required.

2-3-3 Soft component plan

(1) Objectives

At present Salt Trading Corporation Ltd. (referred to as STC hereinafter) handles almost all the salt consumed in Nepal. STC purchases and imports iodized salt from India. However, due to the fact that the production of salt in India is conducted intensively in March and April, and that the delivery to the warehouses in Nepal can not be made punctually because of the limited capabilities of the railway transportation systems in India. As the result of this situation, the salt delivery is concentrated in unpredictable periods, which is a serious problem affecting warehouse management and quality control. On the other hand, since the scale of the request for this Project under the Japanese Grant Aid covers only the domestic buffer stock specified by the Nepalese government (volume of salt equivalent to six month's supply). The outdoor storage of salt

bags will not be resolved if the delivery to warehouses continues to be concentrated in a specific period as a result of the circumstances mentioned above. With the salt bags stacked outdoors, the iodine added to the salt evaporates and gets lost easily and accordingly, these bags of salt need to be stored inside warehouses as quickly as possible.

In view of the above-mentioned problems concerning the procurement of salt, instruction on the warehouse management and physical distribution control by means of the soft components should be provided under this project. Regarding quality control (iodine content monitoring), UNICEF is to improve the currently adopted monitoring/inspection procedures so that they can effectively cope with the present situation and to provide instruction on the quality control of iodized salt as food.

The numerical data from the STC headquarters show the volumes of incoming (delivered-in) salt, outgoing (shipped-out) salt, and stored salt at STC's warehouses during the past five years. Some old data of these are kept in the form of handwritten records, there might be some mis-posting. Some likely factors are listed below .

- a) The procedure of counting is not integrated, or well-experienced workers are not in charge.
- b) With the current calculation of the volumes of incoming, outgoing, and stored salt depending upon simple multiplication of the number of salt bags by the unit weight per bag, the loss of salt due to tears in the bags, etc., is not precisely reflected in the data.
- c) Sufficient measurement or calculation of the volumes of salt is difficult due to the fact that the receiving are concentrated in a particular season. Furthermore, such low accuracy of weight management can be attributed to the lack of truck scale availability.
- d) The data management system is not well organized at each warehouse, and the data are forwarded to the headquarters with some inaccuracy.

At present, these data are not utilized effectively in distribution planning.

In order to improve the above situation, instruction on the physical distribution control should be given in the form of a soft component as a part under this grant aid project.

The soft component should be effectively utilized to shorten the period during which salt bags are stored outdoors (on a first-in-first-out basis), documenting accurately the

volumes of incoming, outgoing, and stored salt, and reviewing the re-iodization and packing processes.

The final objective of the introduction of the soft component is to transfer comprehensive expertise on warehouse management procedures to the local officers in charge so that they can carry out sound and efficient warehouse management by themselves after the instruction session.

(2) Expected effect (Direct effect)

- 1) The period of outdoor storage should be minimized with thorough implementation of first-in-first-out operation. Increasing the rate of repacking salt into pouches to produce the maximum IDD prevention effect should minimize the loss of iodine. IDD should be eradicated from Nepal as quickly as possible.
- 2) Instruction on the operation of the computer system, which is included in the plan under this financial assistance without compensation, should be provided in the form of a soft component.

The computer system is expected to realize the centralized control of the physical distribution of salt by STC by (1) relaying the information on the salt imported from India real-time to each warehouse and (2) forwarding the status of the volumes of incoming, outgoing, and stored salt at each warehouse to the STC headquarters real-time. With the system, fully implemented, efficient delivery after import, stock distribution between warehouses and depot offices, and shipping to domestic destinations as well as a proper distribution management will be realized. In addition, confusion generated at the warehouses near the border between India and Nepal can be minimized.

- 3) The duty of STC in connection with iodine monitoring operations may end when salt is shipped from warehouses or depot offices to salt dealers. However, this component should review the plan to place further emphasis on the data management systems covering the stages up to shipment and communications with the central office

With all the above effects realized, the project should commence smoothly.

(3) Activities (Operation in detail)

- 1) Examination, planning, and instruction on the methods of inspection and recording of the volumes of incoming, outgoing, and stored salt at each site as well as the method of communications between the sites and the headquarters

- 2) Examination, planning, and instruction on the methods of weighing and sampling of salt at each site upon delivery and shipment
- 3) Examination, planning, and instruction on the traffic lines of trucks, forklift trucks, and handcarts on the premises of each site
- 4) (Hands-on driving training of forklift trucks, etc., should be provided by the respective manufacturers. This component will provide instruction on the entire operation of the transportation system.)
- 5) Examination, planning, and instruction on efficient repacking of salt into pouches
- 6) Establishing an efficient physical distribution system and monitoring iodine content nationwide through provision of information and exchange of opinions with relevant experts

Management manuals to facilitate future practical operations should be prepared through the activities mentioned above.

With the above activities implemented, the STC headquarters must be able to monitor and ascertain the status of the physical distribution of salt throughout the country in real-time. Furthermore, the monthly report on the volumes of incoming, outgoing, and stored salt at the warehouses and the nation-wide distribution balance should be submitted.

For the implementation of this technical transfer project, STC is requested to assign special staff (as the counterpart officers) at their headquarters and respective sites. The dispatched experts for this component should instruct their counterparts and cooperate with them for effective transfer of technical software.

(4) Contents and achievements for the operation in respective phases

- 1) For the First Phase the operation should be executed in accordance with the activity plan described above within a period of two months immediately after delivery. Two sites will be involved in the First Phase.

For the Second Phase, the operation should be executed in accordance with the activity plan described above within a period of two months immediately after delivery. Four sites will be involved in the Second Phase.

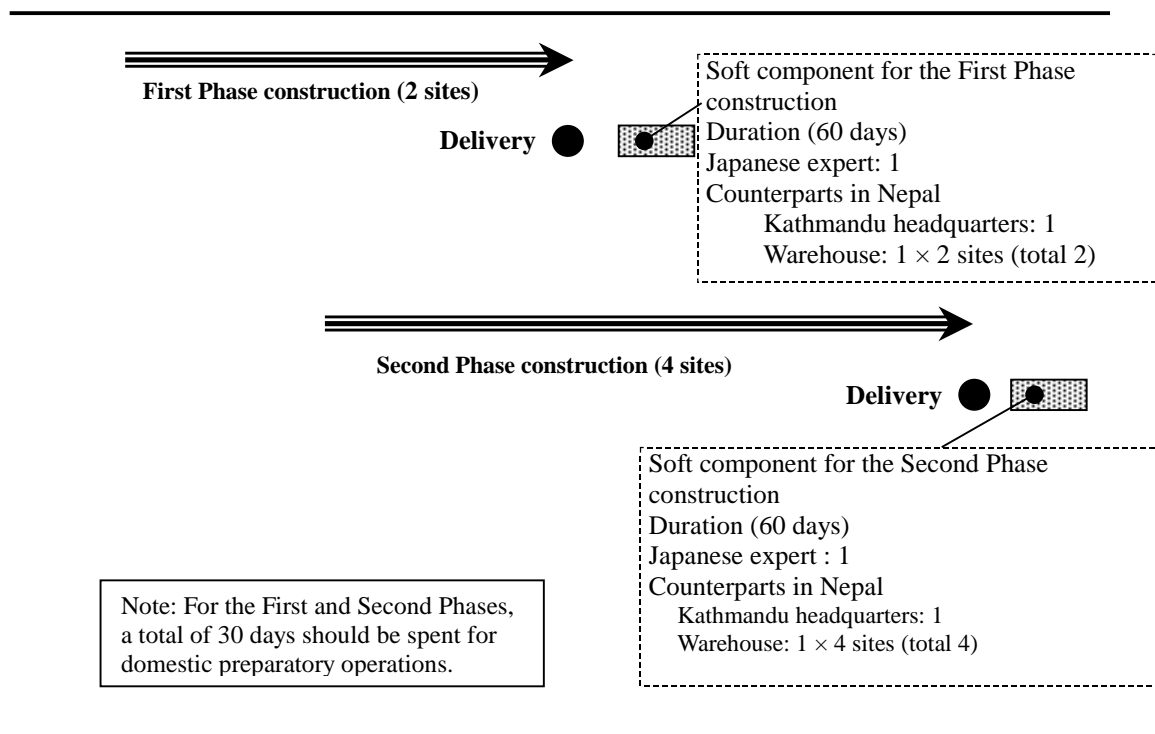
- 2) Basic activities in the two phases above should be carried out on the sites where warehouses are to be constructed. However, since it is necessary to collect and

evaluate information from across the nation at the headquarters in Kathmandu, there are also plans to carry out activities at the headquarters.

- 3) After each term, management manuals prepared in the course of the activities should be submitted to mark achievements in the operation.

(5) Detailed implementation schedule

(The number of workers for each activity and phase, style, timing, period required, required cost, etc.)



2-4 Implementation of the Project

2-4-1 Organization

(1) Overview of the implementing agency

The Project implementing agency is the Salt Trading Corporation. STC was established in 1963 with joint participation of His Majesty's Government of Nepal and Public investment with the following objectives:

- Import and distribution of salt at reasonable prices;
- Import and distribution of other necessary goods like cereals, sugar and so on throughout the country;
- Establishment of new industry and revamping the old sick industries by making investment and other necessary support.

1) Organization chart: see following figure

2) Responsibility and authority of the agency

- Import of iodized salt in suitable quantities for uniform distribution and supply in the Kingdom of Nepal
- Iodization of salt prior to distribution to wholesalers and retailers
- Maintenance of salt buffer stocks for smooth supply throughout the year
- Appropriate and stable supply of salt via wholesalers and retailers including remote areas in Nepal

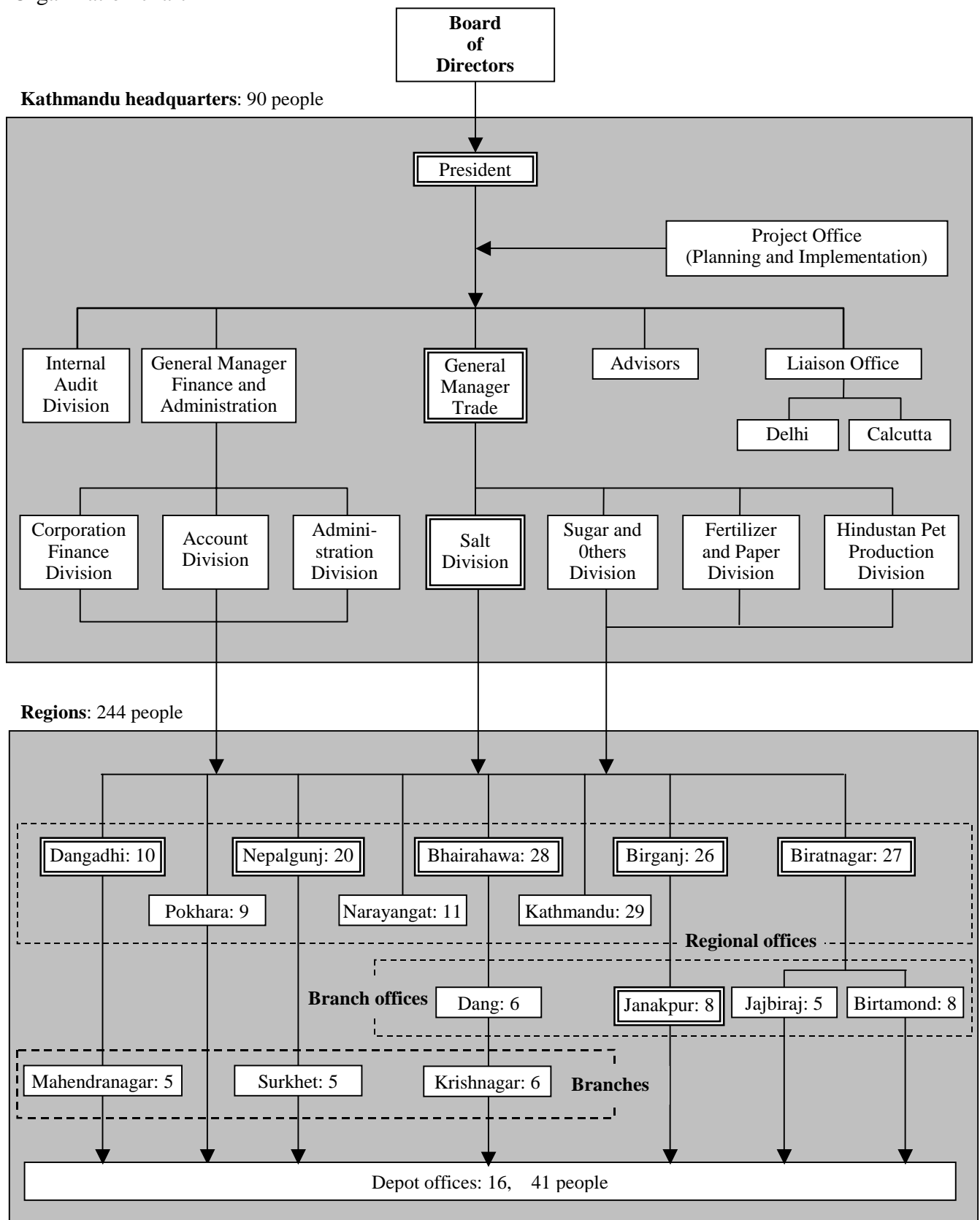
3) Responsibility and authority concerning the Project

The facilities to be constructed and equipment to be supplied under the Project will be owned by His Majesty's Government (HMG) Ministry of Industry, Commerce and Supply (the supervising ministry) and will be leased free of charge to STC. STC will then use and maintain these facilities and equipment from viewpoint of implementing IDD countermeasures.

4) Employees

Total employees: 334, headquarters: 90, regional offices: 244, packing contract laborers: 155

Organization chart

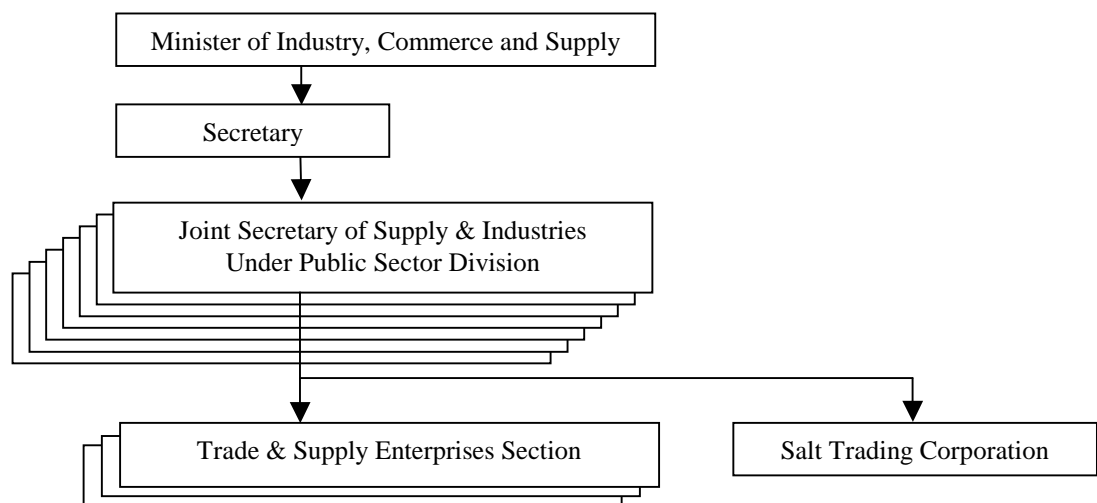


(2) Outline of the supervisory ministry

In April 2000, HMG Ministry of Supply, which was in charge at the time of the original request, was consolidated and reorganized into HMG Ministry of Industry, Commerce and Supply. The Division of Supply and Industries under Public Sector of the Ministry is responsible for the Project.

The main function of the Division of Supply and Industries under Public Sector is to make available the daily necessary goods and goods needed for development activities, at the reasonable rate in the market, avoiding an artificial shortage of those times.

1) Organization chart of the Ministry



2) Responsibility and authority of the Supply Division of HMG Ministry of Industry, Commerce and Supply

- Policy formulation and its execution for smooth supply of daily necessary goods
- Countrywide administration of the supply system for daily necessities
- Policy formulation and its execution for smooth and regular supply of food
- Marketing management and price evaluation of daily necessary goods
- Research and analysis of data regarding the supply of important necessary goods
- Arrangement to import construction materials and necessary goods coordinating with the Division of Commerce in the Ministry

3) Responsibility and authority concerning the Project

For the successful implementation of the Project and to fulfill, the necessary condition of Exchange of Note, HMG Ministry of Industry, Commerce and Supply has already made the following decision:

- a) The warehouse for salt under the Japanese Grant Aid will be constructed at the land owned by STC and ownership of newly constructed warehouses will go to Ministry of Industry, Commerce and Supply.
- b) The warehouses will solely be used by STC for storage and distribute of iodized salt. Supporting thereby the program of the government in eliminating IDD from the country. As such, there will be no charge on STC for use of warehouses by which STC will be assisting purely the Government programs.
- c) The maintenance of warehouses when and if necessary will be done by STC.

The Government decision has already been made clearly mentioning the fact that warehouses built on STC land will be the property of HMG but in case (i) STC withdrawing from its current salt business and not involving in National IDD program or (ii) HMG prohibiting STC from salt business, STC will sell the land covered by the proposed warehouses to HMG. The price settlement will be done by a HMG Valuation committee that will indicate a representative from STC, HMG Ministry of Industry, Commerce and Supply is the line Ministry of STC and all the guidelines are issued by the Ministry to STC regarding salt distribution in the country.

All the equipment to be received under the grant assistance will be owned by HMG Ministry of Industry, Commerce and Supply. However, STC will be using all the equipment like the facilities (warehouses) free of cost to help the Government to implement the national program of IDD by handling, storing and distributing the iodized salt nationwide.

The maintenance of equipment when and if necessary will all be done by STC itself. This is same as previous project assisted by Indian Government.

4) Staff

All staff of the Division of Supply and Industries under Public Sector, is numbering 30.

2-4-2 Budget

(NRs1,000)	1996/1997	1997/1998	1998/1997	1999/2000
Supervising ministry	Ordinary	3,270	3,556	4,100
	Development	225,852	271,500	318,050
	Total	229,122	275,056	322,150
Implementing agency	1,968,903	1,738,452	1,842,372	Actual revenue

The cost of applying for planning permission to be directly borne by HMG Ministry of Industry, Commerce and Supply is some NRs 1,216,000. In the event that the sites under the first phase are to be Biratnagar and Janakpur, this cost will be approximately NRs 426,000 that means that the second phase will involve some NRs 790,000. However, as half the total sum will be refunded upon completion of the works, the actual amount to be borne will be NRs 608,000 and there should be no problem as far as budgetary measures are concerned. (For details, please refer to Clause 3-2(3) Cost of works and equipment to be borne by the Nepal side.)

Financial conditions of STC (the implementing agency) are as follows.

STC Financial Conditions

Balance sheet	Nepal rupee		
Item	1996/1997	1997/1998	1998/1999
Source of funds			
1. Shareholder's fund			
(a) Capital	24,777,700	24,777,700	24,777,700
(b) Reserves and profits	38,432,009	39,533,239	39,383,542
2. Loan capital			
(a) Secured loan (from Bank)	532,643,926	623,086,653	691,815,868
Total	595,853,635	687,397,592	755,977,110
Utilization of funds			
1. Immovable property	43,307,833	46,070,418	45,749,034
(a) Remaining cost	36,071	3,866,407	1,169,371
(b) Less sale/depreciation	2,106,101	2,312,106	2,499,247
(c) Net value	41,165,661	39,891,905	42,080,416
2. Investment	142,179,053	143,442,509	143,367,509
3. Movable property	669,310,320	738,729,019	835,654,639
(a) Inventory	224,485,777	254,926,467	165,408,883
(b) Debtors	124,312,478	128,312,251	139,638,054
(c) Cash and bank balance	46,299,307	42,799,139	35,027,847
(d) Advance and deposit	274,212,758	312,691,162	495,579,855
Less current liability and provision	263,211,096	238,851,930	267,087,934
Net movable property	406,099,224	499,877,089	568,566,705
4. Deferred expenditure	6,409,697	4,186,089	1,962,480
Total	595,853,635	687,397,592	755,977,110

Profit - Loss Account

Nepal rupee

Item	1996/1997	1997/1998	1998/1999
1. Income	1,968,903,326	1,738,452,487	1,842,372,311
2. Cost	1,837,932,940	1,609,024,031	1,710,830,523
3. Total profit	130,970,386	129,428,456	131,541,788
4. Administrative expenditure	124,633,553	124,801,836	128,451,189
5. Net operation profit	6,336,833	4,626,620	3,090,599
6. Property sale profit/(loss)	0	-934,978	276,959
7. Other incomes	6,295,586	7,913,033	4,728,733
8. Profit before income tax, bonus	12,632,419	11,604,675	8,096,291
9. Employee bonus	1,263,242	1,160,467	809,629
10. Income tax provision	3,751,828	2,611,052	2,003,832
11. Net profit	7,617,349	7,833,156	5,282,830
12. Remaining profit up to last year	623,565	499,125	743,781
Total	8,240,914	8,332,281	6,026,611
Available for allocation			
Additional income tax for last year	1,813,624	1,252,093	246,990
Payment to directors	372,625	380,867	391,658
General reserve	600,000	1,000,000	0
Proposed dividends	4,955,540	4,955,540	4,955,540
Balance carried over to the balance sheet	499,125	743,781	432,423
Total	8,240,914	8,332,281	6,026,611

From the above it can be seen that STC income and expenditure were properly balanced in each term for the past three years and no particular financial limitations exist with respect to the execution of the Project. Moreover, necessary expenses following the start of the Project will be included in item 2. Cost on the Profit - Loss Account. These expenses are extremely minor and have a minimal impact on total cost, as is demonstrated later in 3-3 Operation and Maintenance Plan.

Furthermore, in the stipulations for establishment of STC it is stated that, "STC shall make arrangement to import salt at reasonable price and distribute it through the Kingdom of Nepal", and it is not possible for STC to pursue commercial profits in its salt importing and retailing activities by raising salt prices.

2-4-3 Staff and Technical Levels

(1) Staffing

The work force of STC is made up of staff at the Kathmandu headquarters (90 staff) and staff at regional offices (244). Headquarters is divided into finance and administration department and trade department, and the trade department is composed of divisions responsible for salt and divisions in charge of other items. Concerning the Project, a separate Project Office with responsibility for Planning, Coordinating and Implementation of the project will be set up in headquarters. As for the regions, there are eight zonal offices (160 staff) that include five border warehouses, and they are responsible for controlling 4 branch offices (27 staff), 3 sub-branch offices (16 staff) and 16 depot offices (41 staff). Incidentally, Janakpur belongs to the branch office under control of Birganj Zonal Office (see 2-4-1 (1) Organization Chart).

(2) Technical level with respect to inventory control and quality control

Warehouse entry and issue and inventory control of salt is currently carried out based on numbers of bags and pouches, however, since deliveries of salt are irregular and concentrated into a certain season due to restrictions on the import and procurement side, distribution of salt within Nepal cannot be carried out on a first-in first-out basis. Rather than arising from the technical level of distribution control, this situation is caused by the distribution control system. Accordingly, in line with the construction of additional warehouses, it is necessary to build a distribution control system that uses computers. Use of computers on a trial basis has been started at the Kathmandu headquarters and zonal warehouse offices, and they are mainly used for accounting processing. Moreover, office supervisors have a certain degree of computer work ability, so there should be no problems regarding operation in the event of supply under the Project. Concerning warehouse management and distribution control, a soft component has been planned.

Quality control concerning iodine concentration is carried out by specially assigned staff acting in accordance with UNICEF guidelines, however, because the guidelines were introduced from 1998 and have not yet become fully established, monitoring is still not carried out adequately.

CHAPTER 3. IMPLEMENTATION PLAN

3-1 Implementation Plan

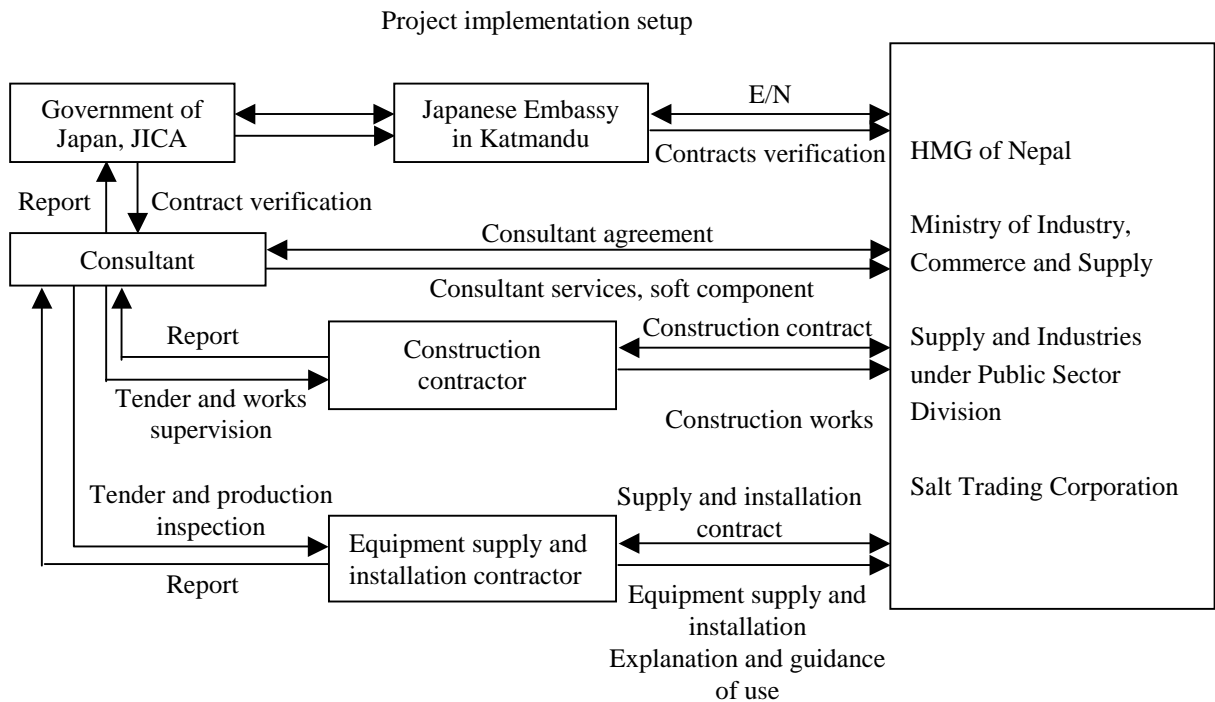
Based on analysis of the items examined and materials and data collected in the field survey, examination was carried out on the case of Project implementation under the Grant Aid Scheme of the Government of Japan, and the results of this were compiled into the implementation plan.

3-1-1 Implementation Concept

The Project implementing agency is the Salt Trading Corporation, however, the facilities to be constructed and equipment to be supplied under the grant aid will be owned by the Ministry of Industry, Commerce and Supply and leased free of charge to the implementing agency, which will be responsible for subsequent operation and maintenance. Accordingly, following the exchange of notes in each phase, the whole series of procedures from the consultant agreement, approval of detailed design, construction contract and equipment supply and installation contract, etc. will be carried out by Ministry of Industry, Commerce and Supply or STC as authorized by the Ministry.

Under the Grant Aid projects, Japanese companies implement the construction work and the equipment supply and installation, under the supervision of Japanese consultants. Moreover, facilities construction contract and equipment supply and installation contract are ordered separately.

Local construction companies are classified from A-D according to their contract costs. 110 companies are ranked as Class A, 25 as Class B, and 27 as Class C. However, almost all of the Class A companies are small scale private concerns mainly concerned with supply of materials and labor, and they do not possess high levels of technology in the areas of quality control, etc. Therefore, although it is possible to utilize local operators as subcontractors in general building fields such as civil engineering works, foundation concrete works, and brick and block masonry works, etc., when it comes to areas such as steel frame works, roof works and building equipment and electrical works, etc., a wiser approach may be for a Japanese company to execute work under the guidance of Japanese technicians by recruiting local materials and labor. Therefore, the execution setup will need to be composed of a chief works engineer and various other engineers in charge of materials and labor procurement, architecture, works drawings, and electrical and equipment works, roof works, etc.



3-1-2 Important Points in Implementation

In carrying out the facilities construction works, it is necessary to give consideration to rainy season countermeasures and the fact that sites are widely dispersed. Monthly rainfall at each site exceeds 500 mm and some of them occasionally exceed 1,000 mm in the monsoon season for approximately three months. Furthermore, in the first phase, it is necessary to complete foundation works in the short period before the start of rainy season. Therefore, it is necessary to secure the required works precision, effectively use local materials and labor, and establish an economical but efficient execution setup in the limited time available with the minimum number of dispatched personnel from Japan. It is necessary for the company that is selected as the contractor to possess the ability and experience to satisfy these conditions.

Moreover, Nepal has labor laws and regulations, which give detailed prescriptions concerning employment conditions such as time, wages, and compensation, etc., and since it will be necessary to recruit local staff without any trouble in accordance with these, past experience in Nepal will be an important element in ensuring efficient execution.

Concerning construction materials, almost all general materials including imported items are available on the local market. However, difficulties may arise concerning the procurement of large quantities and delivery of materials on time. In particular, concerning procurement of large quantities of materials processed from imported raw materials, supply capacity is limited and there is said to be frequent price controlling. Therefore, with respect to the major

structural material of steel frame, it is necessary to consider third country procurement from India (Nepal's main trading partner in terms of imports).

Site	Distance from Katmandu	Mutual Distance	Monthly rainfall, June-September	
			1997	1998
Biratnagar	487km	184km 109km 251km 280km 208km	380 ~ 476mm	276 ~ 1225mm
Janakpur	384km		362 ~ 574mm	190 ~ 823mm
Birganj	256km		360 ~ 530mm	280 ~ 1116mm
Bhairahawa	288km		258 ~ 460mm	209 ~ 940mm
Nepalganj	473km		248 ~ 504mm	163 ~ 730mm
Dhangadhi	643km		296 ~ 604mm	225 ~ 853mm

3-1-3 Scope of Works

The Japanese Grant Aid for the project covers the construction works only within the sites. Therefore, the Nepal side shall be responsible for carrying out works for the distributing electricity power line to the first pole in each site, the municipality water distribution main to each site including meter, the telephone lines to the main terminal box installed within facilities except for Janakpur site, and the municipality sewer main to the final basin in each site.

3-1-4 Consultant Supervision

Consultant supervision shall be carried out in accordance with the "Standard Guidelines for Consultant Supervision" (March 1998) prescribed for JICA implementation of grant aid.

During the first and second phases, an architect shall be permanently stationed in Katmandu to maintain cooperation and reporting links with the Project implementing agency and to carry out periodic field supervision at each site. Furthermore, in line with the advancement of works, the structural design engineer and equipment design engineer who were responsible for detailed design shall be dispatched to Nepal to carry out priority supervision. The chief architect in cooperation with the above engineers shall carry out each progress inspection and completion inspection. Moreover, concerning equipment and materials, the responsible engineer shall be dispatched to Nepal to carry out installation inspections (in addition to the product inspections in Japan).

3-1-5 Procurement Plan

(1) Construction equipment and materials

In Nepal, apart from construction projects financed by domestic capital, large-scale construction and civil engineering works based on assistance from international agencies and/or donor nations are implemented and there is a constant demand for construction equipment and materials. Since almost all construction materials except for natural products are imported, many imported items are available on the domestic market in Nepal and it is possible to procure most needed articles except for large amount and special items such as roofing materials and salt-resistant paint, etc. which need to possess high salt resistance. Moreover, concerning after service and spare parts, too, there is not considered any problem because set quantities are constantly available on the market.

Procurement area (Country of Origin)

Local procurement	Cement, re-bar, concrete block, brick, other natural construction materials
Procurement in Japan	High tension bolts, hanger rails, salt-resistant paint, etc. Power receiving equipment except transformer, distribution panels, etc.
Japan or third country	Roof materials, Generator
Third country procurement	General building materials Steel, cement (see 2-1-2 Important Points in Implementation)

(2) Equipment

Concerning equipment, too, items that can be easily obtained in Nepal shall be procured locally. In particular, concerning computer equipment, in consideration of maintenance and software in a language suitable for Nepal, items that are assembled and sold in Nepal shall be procured.

Crusher - mixer for re-iodizing are not manufactured in Japan, however, since there are numerous makers in India and maintenance services can be easily secured, Indian equipment shall be supplied. Concerning packing equipment, too, equipment of similar specifications shall be procured from third countries from the viewpoint of renewing equipment currently in use.

As for other equipment, since products made in Japan are judged to be superior in terms of performance and specifications, Japanese products shall be procured. However, in determining the products to be procured, priority shall be given to makers which have experience of supplying in Nepal, possess agents in Nepal, and are well capable of supplying after-sale services and expendable parts, etc.

Country of origin

Local procurement	Computer equipment, work tables, etc. out of repackaging equipment
Procurement in Japan	Weighing equipment (truck scale, platform scales) Conveyance equipment (handcart, forklift, forklift pallets) Diesel generator Others (analysis table, waterproof sheet)
Third country procurement	1. India: re-iodization equipment (crusher - mixer, re-packaging equipment excluding work tables, etc.), distilled water unit 2. China: portable iodine checker **1

**1. This was on the original request list, however, it has come to be procured as portable equipment under technical cooperation linked to the Project.

(3) Transportation in Nepal

Since Nepal is a landlocked country, all internal transportation except for the airways is carried out by road. Therefore, numerous 10-ton trucks and trailer trucks made in India operate in Nepal, and internal transportation making use of these trucks is easy.

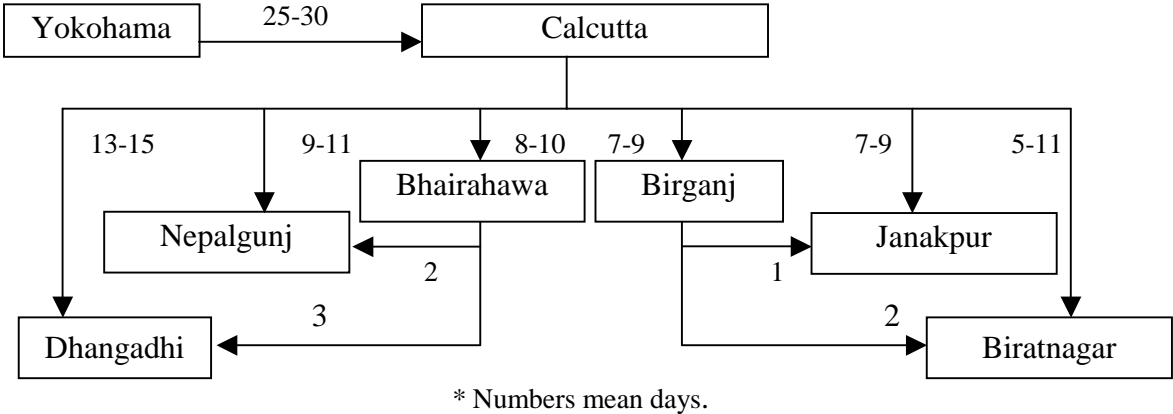
The six Project sites are located close to the East-West Highway running across the Tarai area. Moreover, the major industrial cities of Nepal are Biratnagar, Birganj and the capital Katmandu, and the East-West Highway and the main arterial highway connect these cities. Major routes of internal transportation in the Project are the East-West Highway linking sites from east to west, the main arterial road linking Katmandu, and the import route from India, which leads to Bhairahawa and Birganj.

(4) Import routes

Almost all imported equipment and materials are transported overland through India and Nepal from Calcutta Port, and the major import routes on the border with India are Bhairahawa and Birganj (Biratnagar is also a possibility depending on item).

Moreover, all these import routes are connected to the East-West Highway.

Transportation days



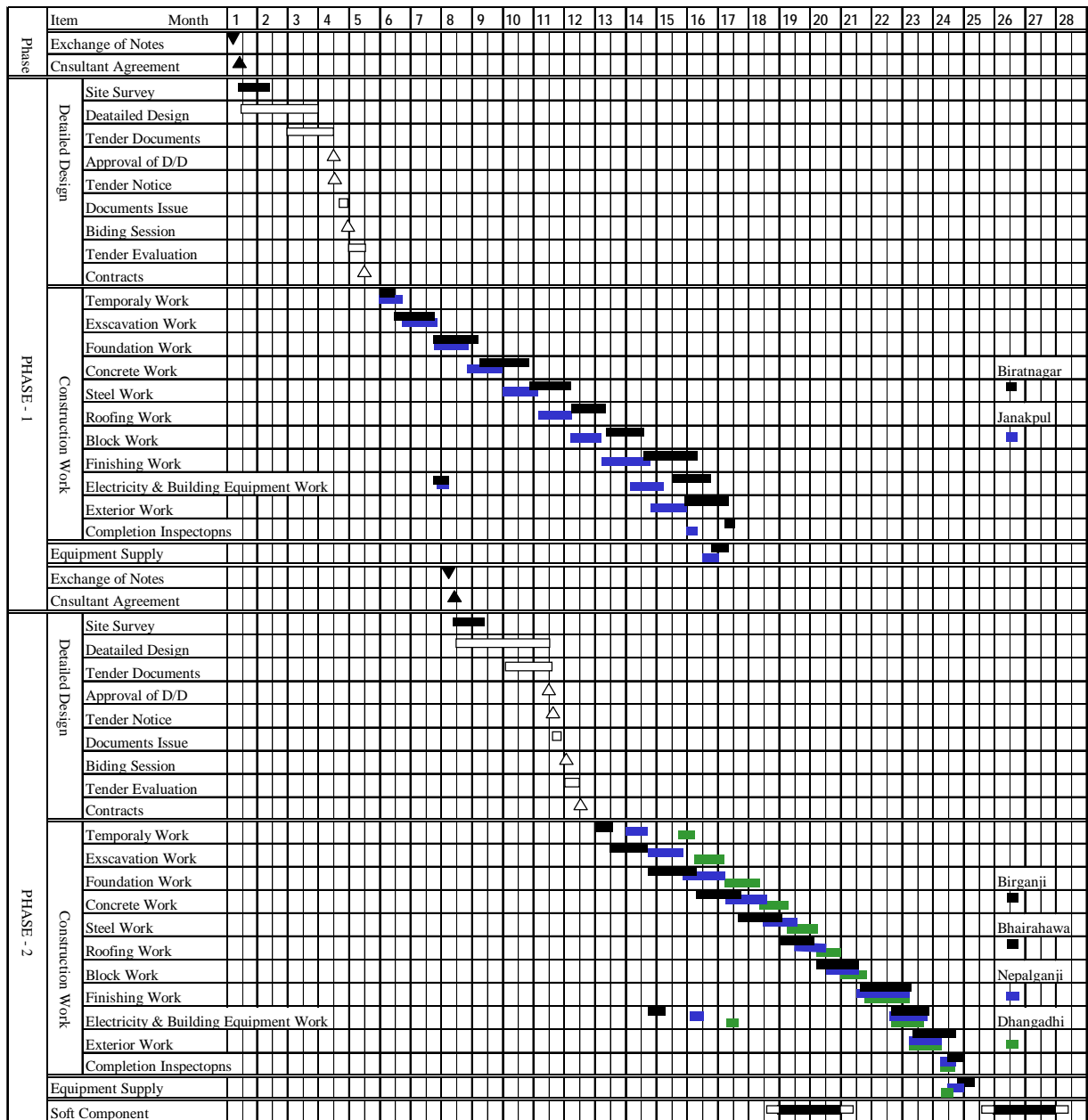
3-1-6 Implementation Schedule

Sites under the Project are scattered over a vast area and, again, precipitation during the rainy months of June through September is likely to hinder execution of the works. After taking into account the timing of work initiation, efficient execution methods, etc. the work schedule will be split as necessary so as to complete execution within a single fiscal year (12-month period).

The first phase will involve four months for detailed planning/tender and 11.5 months for the relevant execution. Similarly, four months will be allotted for detailed planning/tender followed by twelve months for execution of the works in the second phase.

The reason that it is desirable to split the work schedule for individual sites is that the first phase is less than 12 months and since the rainy season will start in June, after the work is initiated, it will be difficult to execute major works at diversified locations. A total of 7,000 tons is thus deemed to be preferable to be executed in the nation's largest industrial city of Biratnagar and neighboring Janakpur in the first phase, with the remaining four sites to be executed in the second phase.

Implementation Schedule



3-2 Obligations of the Nepal Side

(1) Major Undertakings to be taken by the Nepal side: HMG/N Ministry of Industry, Commerce and Supply, and Salt Trading Corporation.

1) Undertakings required of the Nepal side

In the implementation of the Grant Aid project, the recipient country is required to undertake such necessary measures as the following:

- a) To obtain permission in cases where legislation relating to environmental assessment in Nepal is applicable
- b) To make all necessary arrangements for construction works, such as obtaining building construction permit,
- c) To secure land necessary for the sites of the Project, and to clear, level and reclaim the land prior to commencement of the construction, and to construct fences and gates around sites, and to construct road around sites if necessary,
- d) To provide facilities for the distribution of electricity, water supply and drainage, and other incidental facilities in and around the sites,
 - i. In-taking of power lines to sites
 - ii. In-taking-in of water supply pipes to sites
 - iii. External piping and connections with sewer mains
 - iv. In-taking of telephone lines to main terminal box of the building, and installation of a VHF telephone in the Janakpur Site
 - v. General furniture and office equipment (desks, chairs, filing cabinets, facsimiles, etc.)
- e) To ensure all the expenses and prompt execution for unloading, customs clearance at the port of disembarkation.
- f) To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which will be imposed in Nepal with respect to the supply of the products and Services under the Verified Contracts.
- g) To accord Japanese nationals whose services may be required in connection with the supply of the products and services under the Verified contracts, such facilities as

may be necessary for their entry into the recipient country and stay therein for the performance of their work.

h) To bear all the expenses, other than those to be borne by the Grant Aid.

2) "Proper Use"

The Nepal side is required to maintain and use the facilities constructed and equipment purchased under the Grant Aid properly and effectively and to assign staff necessary for this operation and maintenance as well as to bear all the expenses other than those covered by the Grant Aid.

- a) The Ministry, as the responsible agency for the Project and the line Ministry of STC, shall make all necessary arrangement for smooth implementation of the Project and assist STC in implementing the Project.
- b) STC shall take all necessary measures, such as allocating sufficient budget and human resources, in order to secure the effective use and proper maintenance of the warehouses and equipment.
- c) STC shall make all possible efforts to supply only packed refined and crushed salt by phasing out Phoda salt from the market as early as possible.
- d) STC shall implement monitoring of warehouse management (warehouse entry and issue and inventory control, etc.) at each warehouse. (Refer to Appendix 4)

3) "Re-export"

The products purchased under the Grant Aid should not be re-exported from the recipient country.

4) Banking Arrangements (B/A)

- a) HMG of Nepal or its designated authority should open an account in the name of the Government of the recipient country in an authorized foreign exchange bank in Japan (hereinafter referred to as "the Bank"). The Government of Japan will execute the Grant Aid by making payments in Japanese yen to cover the obligations incurred by HMG/N or its designated authority under the Verified Contracts.

- b) The payments will be made when payment requests are presented by the Bank to the Government of Japan under an authorization to pay (A/P) issued by HMG/N or its designated authority.
- c) The Nepal side shall bear commissions for above a) b) to a bank of Japan for the banking services based upon the B/A.

(2) Cost of works and equipment to be borne by the Nepal side

The following items can be raised as costs to be borne by the Nepal side: building permission application expenses, distribution and mains connection costs of electricity, telephone and water supply lines, and the following equipment and materials costs.

(Estimate works costs to be borne by the Nepal side)

(NRs)

Site Item	Biratnagar	Janakpur	Birganj	Bhairahawa	Nepalganj	Dhangadhi	Total
Building permission fee (refund)	296,000 -148,000	130,000 -65,000	295,000 -147,500	296,000 -148,000	121,000 -60,500	78,000 -39,000	1,216,000 -608,000
Electricity leading-in	8,000	1,258,000	8,000	8,000	8,000	8,000	1,298,000
Telephone leading-in	10,500	221,500	10,500	10,500	10,500	10,500	274,000
Water mains leading-in	13,100	13,100	13,100	13,100	13,100	13,100	78,600
Sewage connection	36,000		36,000	36,000	36,000		144,000
Total	215,600	1,557,600	215,100	215,600	128,100	70,600	2,402,600

(Estimate works costs to be borne by the Nepal side)

Site Item	Unit rate (NRs)	Biratnagar	Janakpur	Birganj	Bhairahawa	Nepalganj	Dhangadhi	Total quantity
Facsimile	72,000	1	1	1	1	1	1	6
Filing Cabinet	25,600	2	2	2	2	2	2	12
Office furniture etc	16,500	8	6	7	8	4	4	37
Total cost (NRs)		255,200	196,600	238,700	255,200	189,200	189,200	1,349,700

3-3 Operation and Maintenance Plan

In order to ensure a definite supply of iodized salt to citizens, STC shall secure buffer stock of iodized salt as a necessity and prevent the loss of iodine in distribution by operating and maintaining the Project facilities and equipment according to the following contents.

(1) Organization and staffing

Concerning this matter, a Project Planning and Implementation Team has already been established at headquarters under the direct supervision of the President of STC. The five border warehouses meanwhile belong to the existing zonal offices and are under their control. Additional construction will be carried out on the grounds of existing offices at three of these sites. There already is an office in Birganj (Shimra). Since the branch office of Janakpur is about 36km away from the site (Lalgadh) and the zonal office of Bhairahawa is about 2.5km away from the site, it is necessary to provide one administrative staff for each site. In view of the above conditions, implementation of the Project will not entail any increase in staff, but it will be able to be handled by internal transfers within each office. Moreover, concerning loading and packing laborers, since these staff is employed by the day, there should be no particular problem regarding recruitment. (See 1-4-1 Organization Chart)

The arrangement of staff at each site will be as follows.

Item \ Site	Biratnagar	Janakpur	Birganj	Bhairahawa	Nepalganj	Dhangadhi	Total
Administrative staff	Existing office	1	Existing office	1	Existing office	Existing office	2
Iodine inspection	1	1	1	1	1	1	6
Quality control	2	2	2	2	1	1	10
Date printing	5	2	4	5	2	2	20
Packing line	85	34	68	77	26	26	316
Loading laborers	Day labor	Ditto	Ditto	Ditto	Ditto	Ditto	

(2) Inventory control and quality control

By minimizing outdoor storage times, thoroughly implementing first-in first-out control, and increasing the ratio of salt which is repackaged into plastic pouches, volatilization and loss of iodine in salt will be kept to a minimum, and this will make IDD prevention more effective and aid in the early elimination of iodine deficiency disorders in Nepal. For this purpose, the following inventory control and quality control measures shall be taken.

- 1) Utilize the computer system to be supplied under the grant aid in warehouse management. The purpose of this system is to enable STC to have unified control over salt distribution conditions in Nepal by 1) transmitting detailed salt delivery information from India to each warehouse, and 2) relaying detailed warehouse entry and issue conditions from each warehouse to headquarters. Through operating such a system, it will be possible to carry out efficient distribution, allocation to each warehouse and delivery to domestic destinations after import, thus allowing appropriate distribution management to be carried out.
- 2) Concerning iodine monitoring, carry out iodine measurement and data management, and communication to headquarters, from warehouse entry to the time of shipment.
- 3) Survey and record warehouse entry, issue and stock quantities at each site, and relay these data to headquarters.
- 4) Establish methods for measuring quantities and inspecting products at times of warehouse entry and issue.
- 5) Establish traffic lines for trucks, forklifts and handcarts, etc. within site premises.
- 6) Establish work processes for efficiently repackaging salt into small pouches.

(3) Maintenance methods

Concerning building maintenance, only general items such as replacement of fluorescent tubes and other expendable items are required, and this work can be performed by the existing staff.

Concerning iodized salt distribution and storage costs, although there will be a natural increase in handled quantities in line with higher demand, it is thought that Project implementation will not bring about any change. Moreover, concerning increases in the quantity of salt packed in pouches, since existing products are sold at prices which include processing and handling costs, the bolstering of packaging functions resulting from the Project will not particularly increase the cost burden of the implementing agency.

Concerning equipment, since re-iodization equipment and packing equipment, etc. will be supplied to replace or add to equipment already in use at STC, it will be possible to carry out maintenance under the existing staff and budget. Concerning maintenance costs, too, since necessary expenses are already included in product retail prices, it was deemed that sustained operation is possible even if equipment quantities should increase.

Concerning new items of equipment to be introduced, i.e. forklifts and truck scales, etc., validity of introduction was examined by comparing the maintenance and replace cost (including operating expenses) with salt handler expenses in the case of forklifts and external consignment cost in the case of truck scales.

1) Maintenance cost of Project facilities

The maintenance cost of Project facilities (excluding personnel expenses and re-packaging expenses) was estimated as follows based on rough calculation of power tariffs, water rates and facilities repair expenses. As a result, total annual maintenance cost at the six sites was found to be NRs 1,043,202 equivalent to 0.06% of total annual costs at STC (1998/99), i.e. NRs 1,710,830,523, and just 8.1% of annual losses of NRs 12,840,000 resulting from the suggested salt loss (5% of handled quantities at the six sites) caused by inadequacy of existing salt distribution and storage facilities.

Since the distribution and storage will be improved and salt losses greatly reduced as a result of Project implementation, it is deemed that the maintenance cost of facilities can be comfortably covered.

Annual electricity cost (6 sites total) = 18,324 kWh/year x NRs 5.5/kWh =	NRs 100,782
Annual water supply cost (6 sites total) = (basic rate NRs 40/ton x 6 + 17.9 ton x NRs 9.5/ton) x 12 months =	NRs 4,920
Facilities repair costs (construction cost x 0.15%) =	NRs 937,500
Total (8.1% of suggested annual losses)	<u>NRs 1,043,202</u>
Value of annual losses (5%: converted into phoda salt retail price)	
96,300 tons (total handled quantity at 6 sites) x 5% x NRs 200/75kg = NRs 12,840,000	

2) Pouch packing costs

The pouch-packing costs were estimated as shown below. As a result, pouch packing cost per 1kg of salt was found to be NRs 0.78, and since this is within the scope of the existing pouch packing cost of NRs 1.45 for crushed salt and NRs 1.60 for refined salt, it can be said that Project implementation will lead to no increase in retail price.

Annual production quantity (6 sites total) = 70,000 tons = 233,300kg/bag x 300 days

Packing cost per 1,000 1kg pouches

Electricity cost = NRs 709,530/year ÷ 300 days ÷ 233.3tons/bag =	NRs 10.14
Water supply cost = NRs 62,376/year ÷ 300 days ÷ 233.3tons/bag =	NRs 0.89

Pouch cost = NRs 0.65/kg/bag x 1,000 =	NRs 650.00
Personnel expenses = NRs 100/person/day x 8.5 persons ÷ 233.3tons/bag =	NRs 3.64
related equipment maintenance and renewal cost **1	NRs 116.30
Total	NRs 780.97
Total packing cost per 1kg pouch = NRs 780.97 ÷ 1,000 =	<u>NRs 0.78</u>

Current pouch packing cost

Warehouse delivery price =	Crushed salt: NRs 2.00-2.05/kg	Refined salt: NRs 3.90/kg
Pouch packing cost (including indirect cost) =	Crushed salt: NRs 1.45/kg	Refined salt: NRs 1.60/kg
Wholesale price =	Crushed salt: NRs 3.45-3.50/kg	Refined salt: NRs 5.50/kg

**1 Calculation of packaging related equipment and handcart maintenance and renewal costs

- Total annual depreciation cost: ¥ 405,997/year/line (assuming 300 operating days per year and a daily depreciation cost of ¥ 1,353/day/line)
- Since the daily packing capacity is 8 tons/day, depreciation cost per ton (1,000 pouches) is ¥ 169/ton (NRs 105.37/ton)
- Since maintenance cost is considered to be around 10% of the equipment cost on average, the aggregate of depreciation cost and maintenance cost is NRs 116.30/ton (1,000 1kg pouches).

3) Truck scale

Even in those cases where truck scales are installed within warehouse sites, since they are often separated by 1-2 km and it is necessary to carry out weighing two times (once at the time of entry and once at the time of issue), this is costly in terms of fare and time. Moreover, existing truck scales are owned by private companies and have poor precision levels, and some companies even refuse requests from STC.

The following table shows the current state of truck scales at each site. Current necessary expenses are obtained by combining the following weighing cost with truck fuel cost and driver expenses, etc.

Warehouse site	Distance to truck scale	Weighing cost (Nepal rupee)	
		Once	Twice (entry and issue)
Biratnagar	2.0Km	50	100
Janakpur	25.0Km	75	150
Birganj	1.0Km	50	100
Bhairahawa	1.5Km	60	120
Nepalgunj	1.0Km	150	300
Dhangadhi	None	----	----
Average		77	154

From the above table, concerning the cost of one truck delivery to a warehouse, the weighing cost alone is NRs 154 on average. Considering those annual salt deliveries to STC amount to 130,000 tons per year, the annual weighing cost will be roughly NRs 2,000,000.

Since truck scales have a long service life of 15 years or more and they incur hardly any maintenance costs, even when depreciation cost is taken into account, it is clear to see that weighing by truck scale is less costly than consigning to an external operator.

4) Forklift

Concerning the introduction of forklifts, maintenance and renewal costs were calculated in comparison with handler personnel expenses as shown below. As a result, even following deduction of maintenance cost and renewal cost, introduction of forklifts enables a total saving of approx. NRs 5,229,000 to be made at the six sites (10 forklifts in total).

a) Comparison of current personnel expenses with cost when using forklifts

1. Calculation of existing personnel expenses

Conveyance cost per bag per trip (1 bag is 75kg)			
Personnel expenses (1 worker per day)		NRs 150.00/day	
Work load (number of trips per worker per day)		75 bag trips/day	
Conveyance cost per bag (NRs 150.00 ÷ 75 bag trips)		NRs 2.00/bag trip	...
Number of trips from arrival of bags at warehouse up to repackaging and shipping			
Arrival time		1.0 trip	
Transfer before repackaging		0.7 trips	
Transfer after repackaging		0.7 trips	
Shipping time		1.0 trip	
<hr/>			
Total		3.4 trips	...

Conveyance cost per bag (conveyance cost from arrival of bags at warehouse up to repackaging and shipping)			
NRs 2.0/bags/trip x 3.4 trips =		NRs 6.80/bag	x
Conveyance cost per ton			
NRs 6.80/bag x (1,000kg/75kg back) =		NRs 90.67/ton	
Conveyance cost of annual handling quantity 96,300 tons			
NRs 90.67/ton x 96,300 tons =		NRs 8,731,521	...

2. Trial calculation of forklift use

Forklift purchase cost	¥ 3,300,000	NRs 2,062,500
Service life	10 years	
Annual depreciation cost	¥ 330,000	NRs 206,250
Annual maintenance cost and fuel cost	¥96,000	NRs 60,000
Annual operator expenses	¥ 134,400	NRs 84,000
<hr/>		
Above total (per vehicle)	¥ 560,400	NRs 350,250

Since the annual handling load of 96,300 tons can be handled by 10 forklifts:

Annual cost per 10 forklifts	¥ 5,604,000	NRs 3,502,500	...
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3. Annual cost difference between current manual handling and use of forklifts

NRs 8,731,521 - NRs 3,502,500 = NRs 5,229,021/year -

Yen conversion ¥ 8,366,434/year

Note 1) 1 bag contains 75kg

2) 1 Nepal rupee (NRs .) = approximately 1.6 yen

CHAPTER 4 PROJECT EVALUATION AND RECOMMENDATION

4-1 Project Effects

The introduction of this project, the construction of additional storage facilities with a total capacity of 20,000 tons, in the Five-Year National Plan of Action for the Elimination of Iodine Deficiency Disorders may contribute to ensuring the necessary stock of salt that accounts for 40% of annually imported quantity and prevent the loss of iodine caused by the lack of warehouse space for iodized salt. The facilities and materials required for packing iodized salt into small bags to prevent the loss of the iodized salt in distribution processes, are to be provided so that the supply rates of iodized salt including refined salt and crushed salt may be increased up to 100% and 69%, respectively, and the supply rate of phoda salt, which requires strict quality controls, may be reduced from the current 58% to 30% by 2005. In this way, sufficiently iodized salt supply system can be established in the Kingdom of Nepal.

Regarding the direct effect of this project, the necessary stock of iodized salt is ensured by constructing additional storage facilities and increasing the warehouse capacity. Although the shortage of warehouse capacity becomes critical before the rainy season because of the marked increase in the import of iodized salt, platforms for temporary storage are to be provided and the iodized salt stored on these platforms is to be covered with waterproof sheets. The Kingdom of Nepal, which annually imports 137,200 tons of iodized salt from India, can successfully store all the imported iodized salt without it being exposed to rainfall, high temperature and high humidity. The introduction of various devices for repackaging, measurement, transportation and re-iodization may contribute to the prevention of the decrease in iodine level in the storage and distribution processes.

Besides the construction of facilities and provision of equipment and materials, the instruction of warehouse management and distribution control according to the soft component plan will promote the introduction of strict stock-control system by "First in-First out." In addition, the popularization of iodized salt packed in small plastic bags may minimize the loss of iodine during the storage and distribution processes. A computer-controlled system is to be introduced to promote the integrated management of domestic salt distribution by STC and sufficient operative training is to be provided. This project promotes efficient delivery and the appropriate management of distribution. The introduction of iodine measurement

techniques and a data management and transmission system will promote the smooth progress of this project.

Regarding the indirect effect, the preservation of the specified iodine level and the delivery of sufficiently iodized salt to consumers will promote the popularization of appropriately iodized salt throughout the country. Consequently, all the Nepalese will have a sufficient iodine intake and IDD will be eliminated from the Kingdom of Nepal.

(1) Reduction of outdoor storage

The percentages of outdoor storage are to be reduced by constructing additional warehouses and the monthly percentages of indoor storage are to be increased to the levels exceeding the figures shown in the following table.

Percentage of indoor storage (minimum)	Biratnagar	Janakpur	Birganj	Bhairahawa	Nepalganji	Dhangadhi
1999/00 (before the implementation)	19.4%	...	22.2%	30.8%	30.5%	70.1%
2003/04 (after the implementation)	63.7%	85.1%	50.0%	80.3%	74.0%	84.0%

(2) Reduction of phoda salt supply (target rate of phoda salt supply: 30%)

Because the content of iodine in phoda salt decreases easily, its supply rate is to be reduced from the current 58% to 30% by fiscal 2004/5. (See the following table.)

(3) Promotion of production of iodized salt packed in small bags

Iodized salt packed into small bags currently accounts for 22.2% of the total volume of production. This percentage is to be increased to 55.6% by fiscal 2004/5.

		Biratnagar	Janakpur	Birganj	Bhairahawa	Nepalganj	Dhangadhi
1999/00 (before the implementation)	Phoda	13.4%	49.2%	52.4%	75.6%	81.0%	85.0%
	Packed	16.0%	21.5%	27.1%	24.0%	17.7%	13.5%
2003/04 (after the implementation)	Phoda	4.5%	4.4%	21.7%	52.5%	43.5%	37.8%
	Packed	60.8%	87.9%	61.7%	44.4%	51.9%	56.7%

- The annual production capacity of iodized salt packed in small bags at targeted sites is 70,000 tons.

The beneficial effects, the characteristics of the project and the practicability of the

management and control of the project demonstrate the adequacy of the implementation of this project as a Grant aid.

The benefits of this project are to be provided to all the people of the Kingdom of Nepal, approximately 22.90 million people, who consume iodized salt.

This project contributes toward improving IDD, which poses urgent and critical problems in the Kingdom of Nepal.

This project contributes to the achievement of the Five-Year National Plan of Action for the Elimination of Iodine Deficiency Disorders because the contents of this project correspond to those of the Plan.

STC, the agency in charge of this project, can utilize its own financial, human and technological resources to maintain, operate and manage this project.

STC does not pursue profit and contributes to the social benefit in the supply of iodized salt.

The construction of additional storage facilities is exempt from environmental assessment, and the outflow of salt is effectively improved by storing salt in warehouses.

4-2 Recommendation

As mentioned before, the implementation of this project will contribute to the elimination of IDD and provide benefits such as the improvement of health and educational conditions of the Nepalese. Accordingly, the validity of the implementation of this project for Grant Aid has been confirmed. The operation and management of this project can be conducted by the Nepalese side because of their sufficient human and financial resources.

This project, however, can be implemented smoothly and efficiently and Nepalese IDD prevention project can be promoted, if appropriate countermeasures are established to cope with the following subjects.

(1) Constant supply of iodized salt

The Grant aid is to provide the storage facilities and the facilities and equipment for packing iodized salt into small bags. However, the iodized salt production system will be operated and managed by STC. On the basis of the current system, STC is to enhance the First in-First out system which is mentioned in section (2) Stock control and quality 1)-6), 3-3

Operation and maintenance plan, to establish a network for distribution and quality control using a computer controlled system and to start operating the facilities immediately upon their completion. When STC starts operating these facilities, sufficient technical assistance based on the soft component plan is to be provided. As headquarters, STC is expected to set up the operation system immediately, to establish the management method in compliance with the system and to promote steady operation.

In cooperation with UNICEF and MI, STC is expected to monitor salt iodine levels, to establish the monitoring system and to educate the salt dealers.

(2) Increasing public awareness

IEC activities targeted at the consumers are to be conducted to popularize the iodized salt packed into small bags and to reduce the consumption of phoda salt. As a part of these activities, an iodized salt social marketing campaign (ISSMAC) should be promoted, expanded and continued.

(3) Legislation on Iodized Salt

The act on iodized salt (production, sale, and distribution) was published in the Nepal Gazette in January 1999 after having the Royal Seal from His Majesty the King on it. The parliament had enacted the legislation in the year 1998. However, this is not yet been effective, pending the bylaws and regulations to implement and enforce it. These regulations do not cover the import and distribution of iodized salt. Uniodized or inappropriately iodized salt is still imported from India by some illegal routes. The establishment and enforcement of related regulations are urgently required.

(4) Regular Surveillance of Salt Iodine at the Consumption Level

The Ministry of Health conducts fixed-point observations in five to six districts to evaluate the public recognition of the necessity for iodized salt, to obtain the latest information on the iodized salt purchasing trends and to measure the content of iodine in commercial salt. These surveys are to be continued in the future. Regarding the measurement of urine iodine level, a key factor of IDD monitoring, the technical cooperation for Iodine monitoring (epidemiological survey) and an epidemiological survey using the index that is adjusted to the progress of IDD prevention project are anticipated.

BASIC DESIGN DRAWINGS

Biratnagar Site Location

1. Site Plan
2. Plan
3. Elevation, Section

Janakpur Site Location

4. Site Plan
5. Plan
6. Elevation, Section

Birganj Site Location

7. Site Plan
8. Plan
9. Elevation, Section

Bhairahawa Site Location

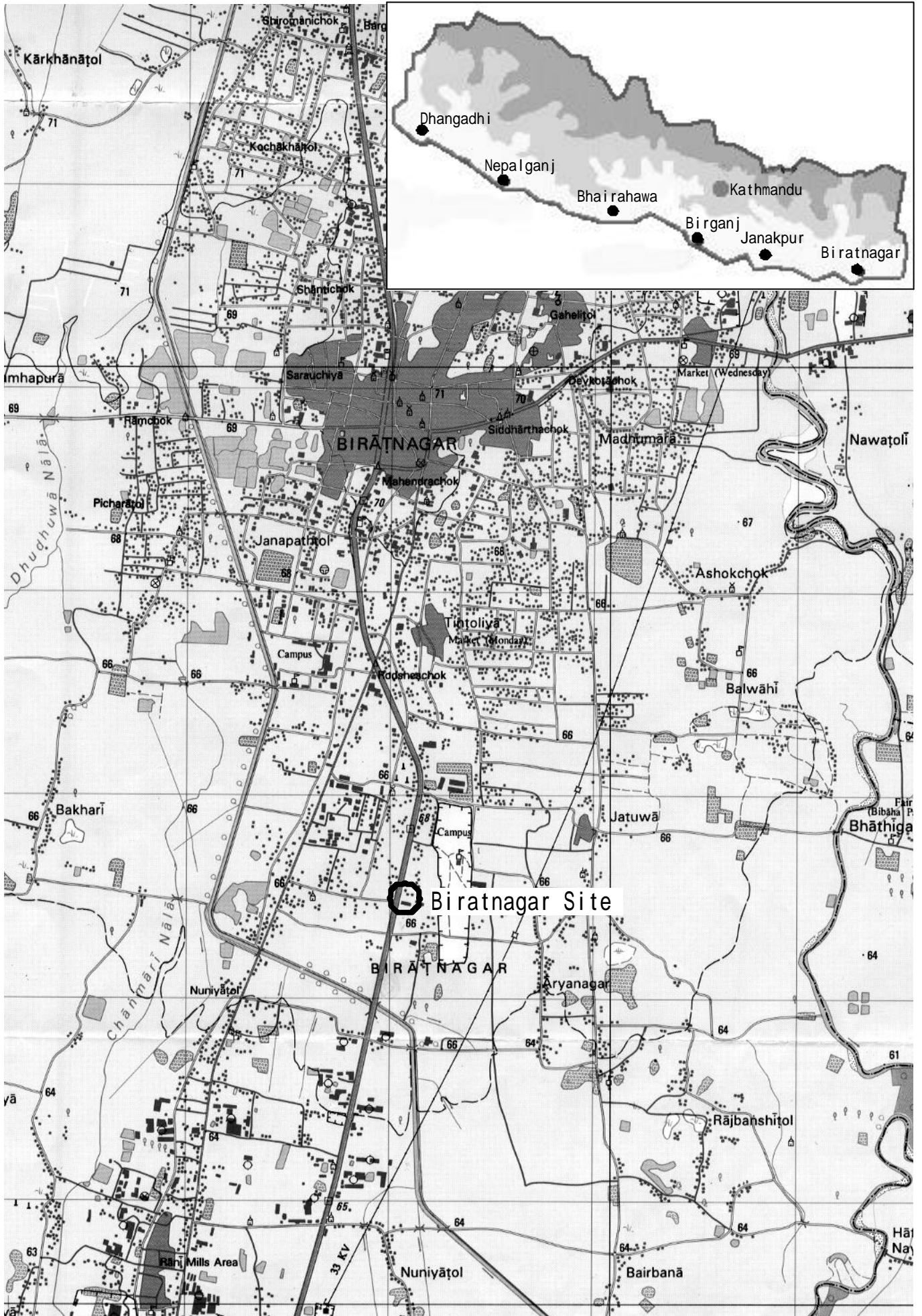
10. Site Plan
11. Plan
12. Elevation, Section

Nepalganj Site Location

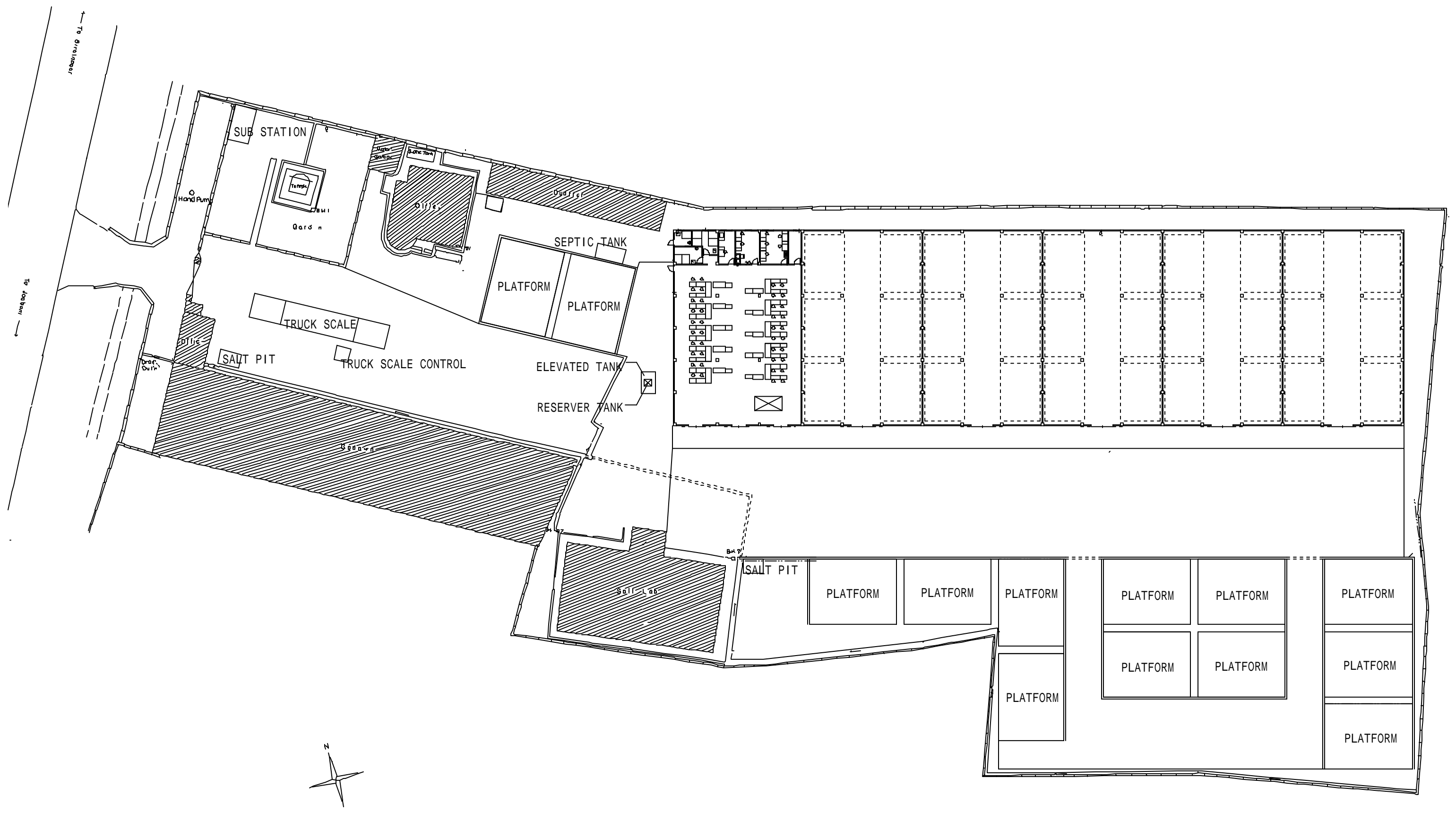
13. Site Plan
14. Plan
15. Elevation, Section

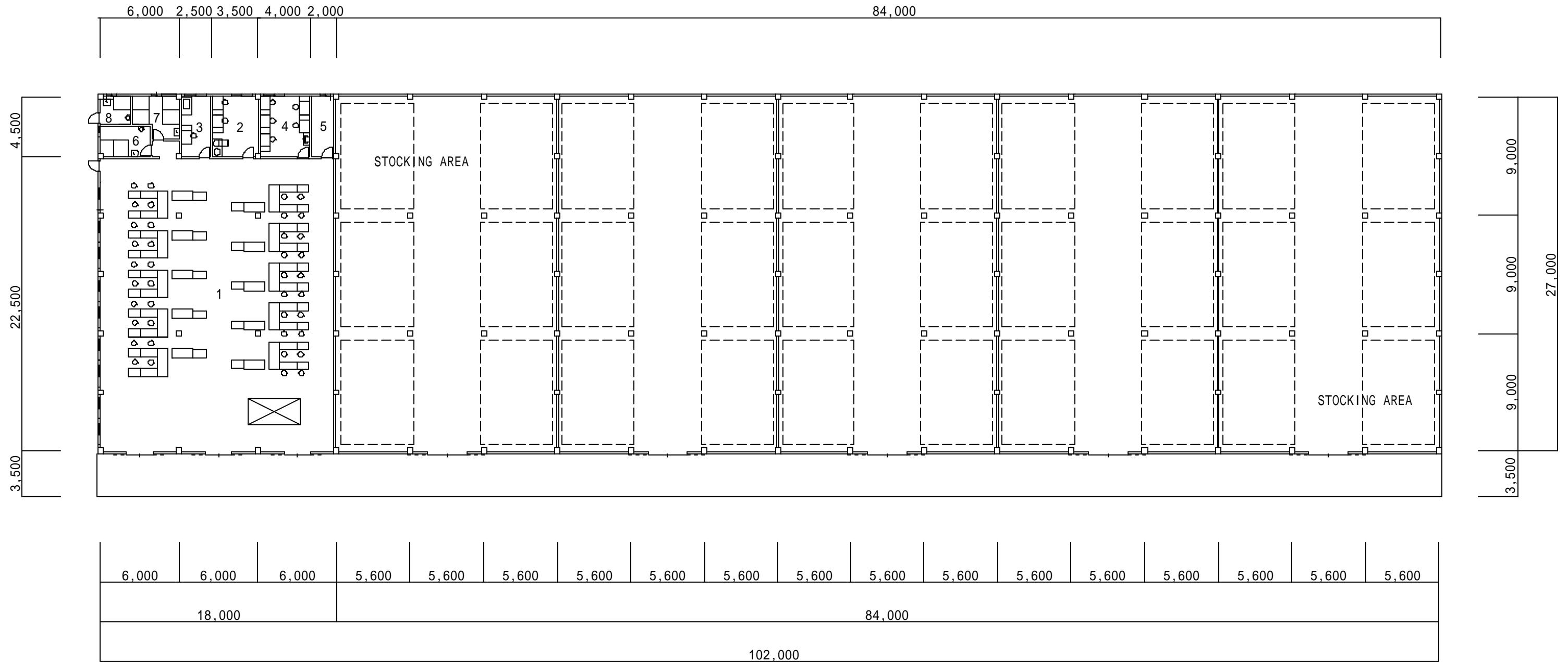
Dhangadhi Site Location

16. Site Plan
17. Plan
18. Elevation, Section

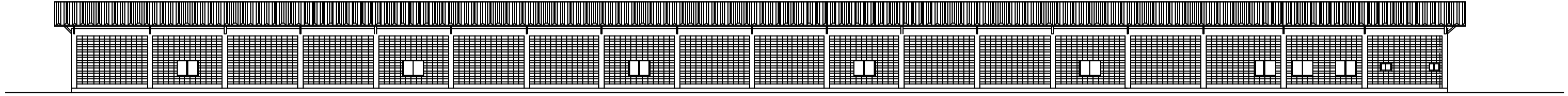


Biratnagar Site Location

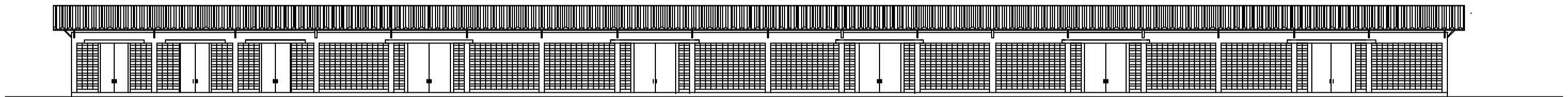




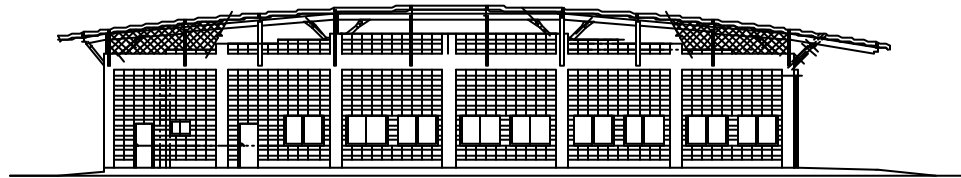
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- 2 QUALITY CONTROL
- 3 IODINE INSPECTION
- 4 DATE PRINTING
- 5 STOCK YARD
- 6 MEN'S TOILET
- 7 WOMEN'S TOILET
- 8 MEN'S TOILET



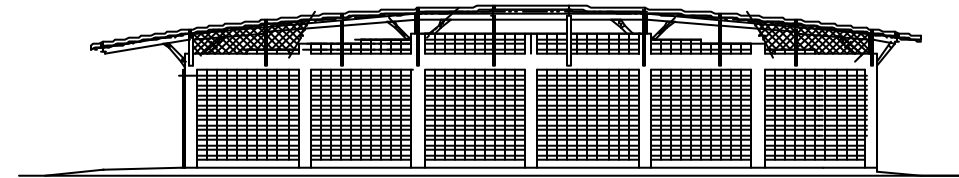
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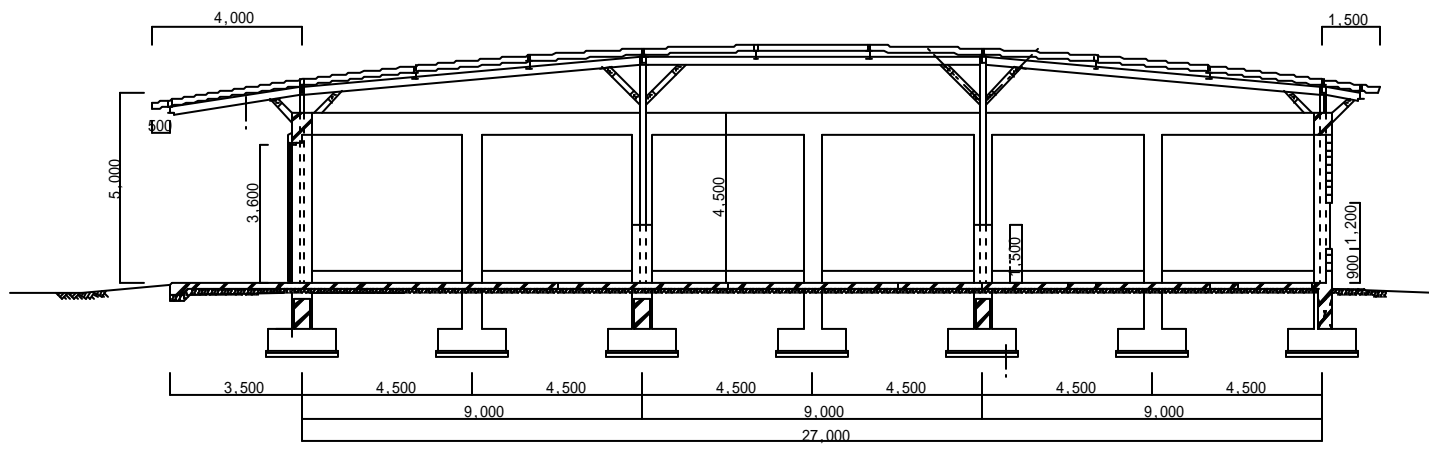
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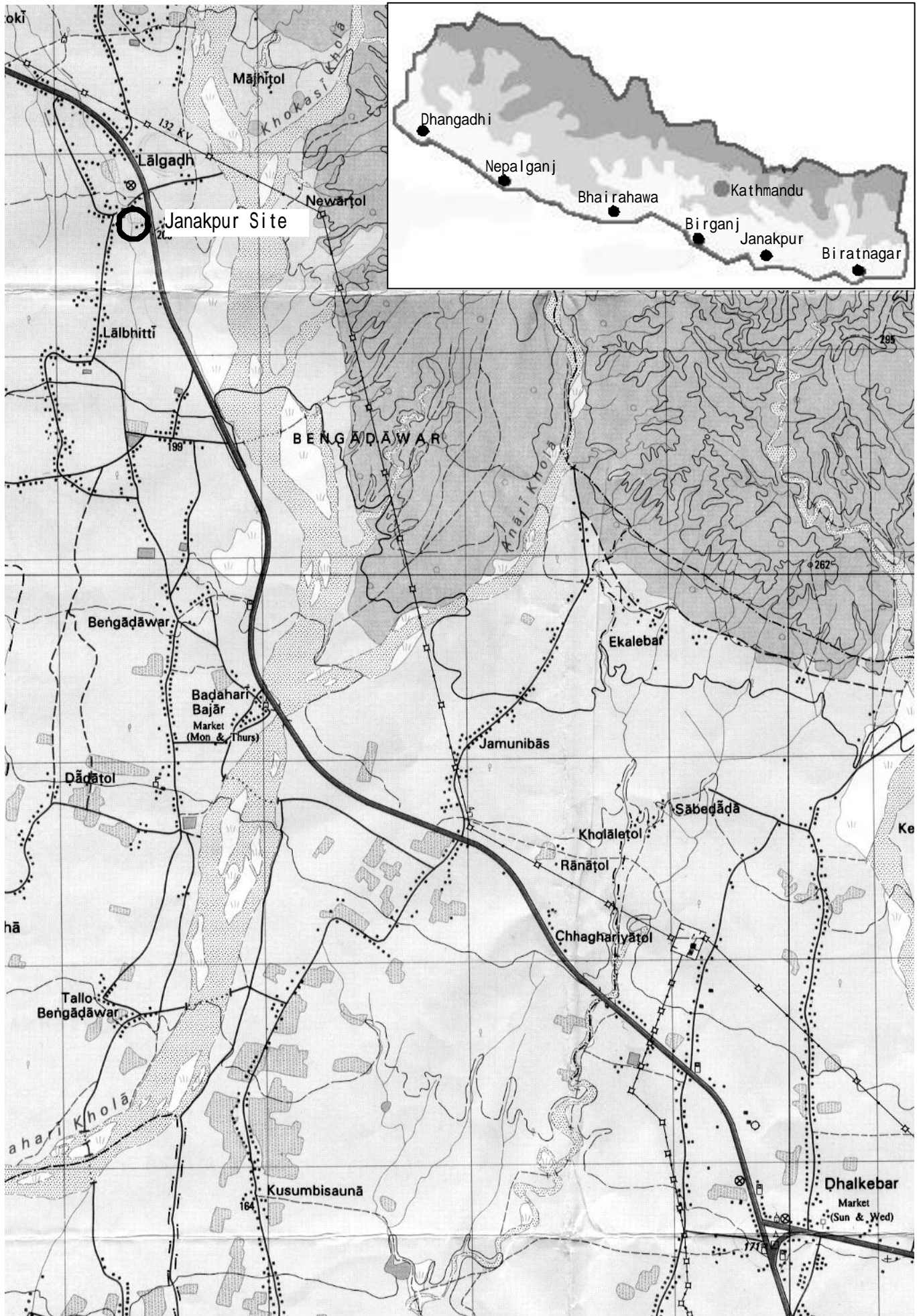
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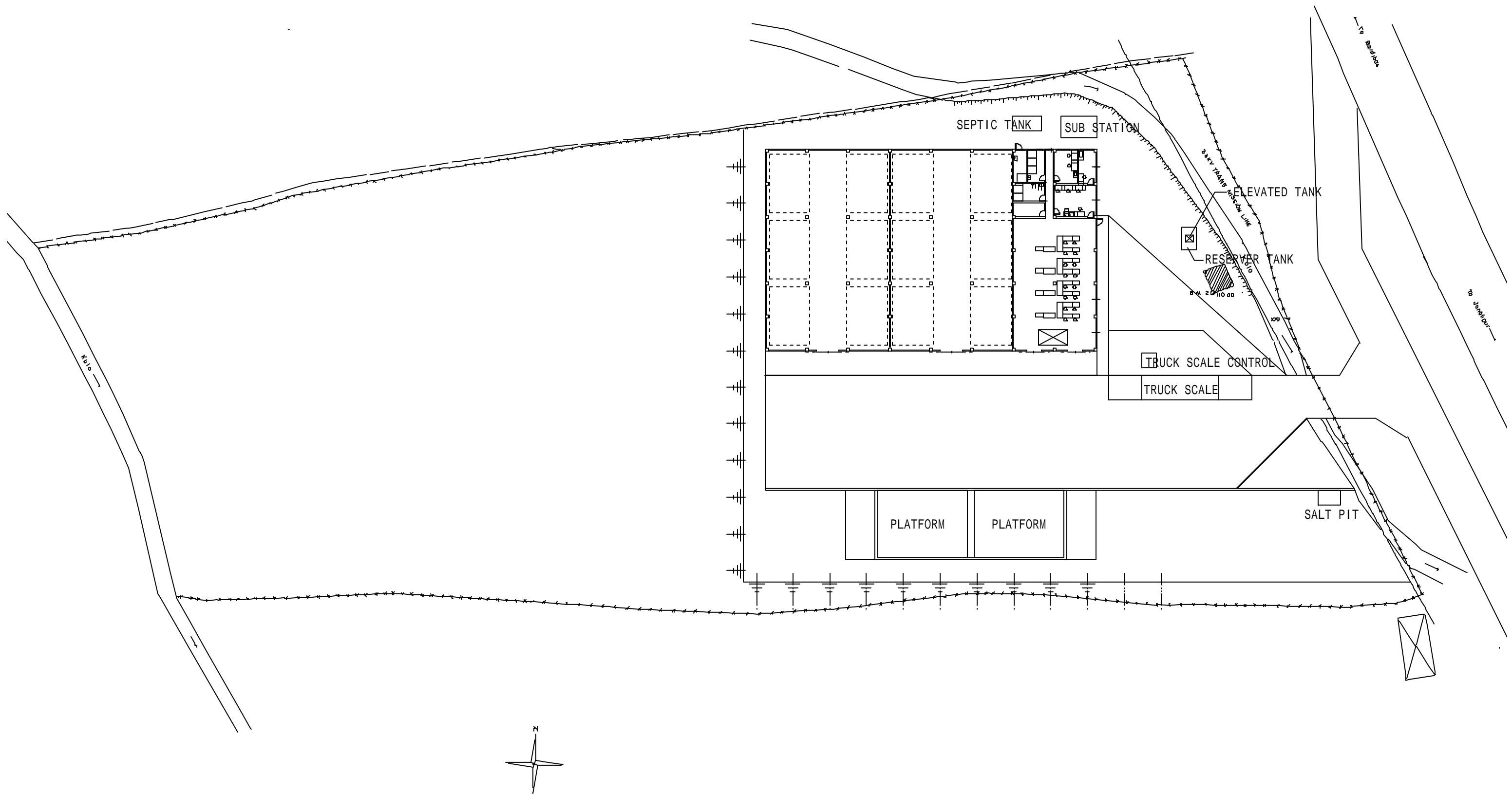
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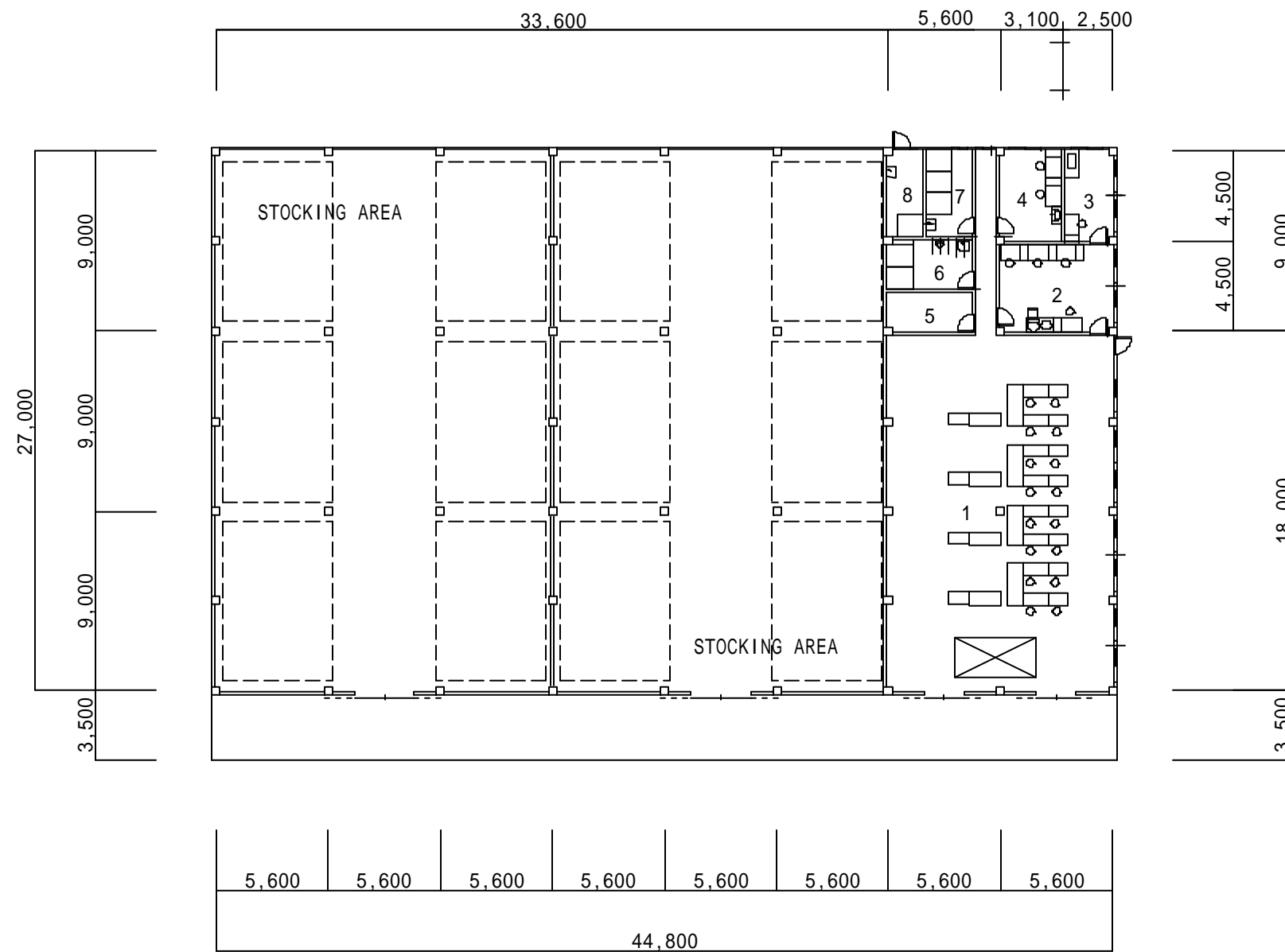
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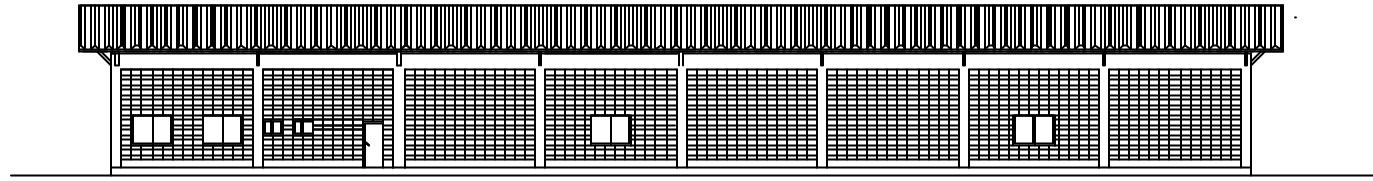
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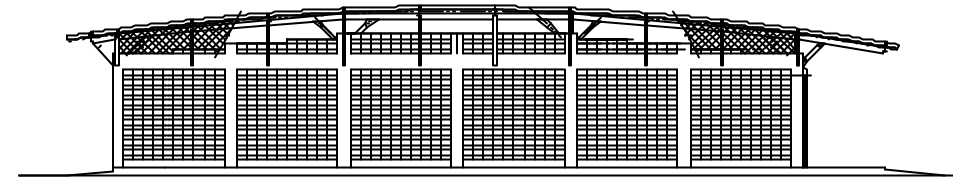
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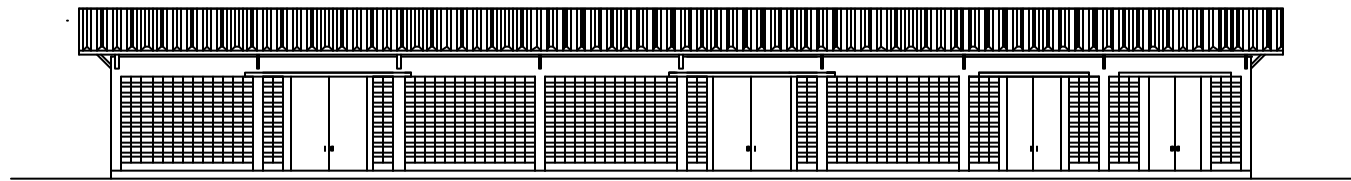
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- 3 IODINE INSPECTION
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- 5 STOCK YARD
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- 7 WOMEN'S TOILET
- 8 MEN'S TOILET



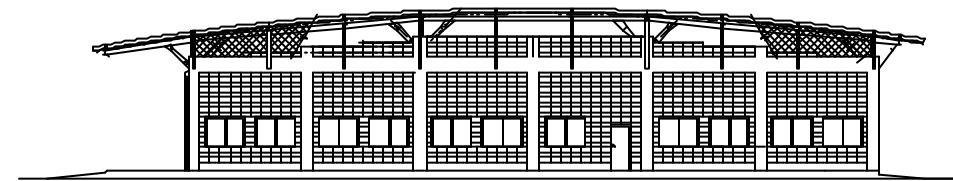
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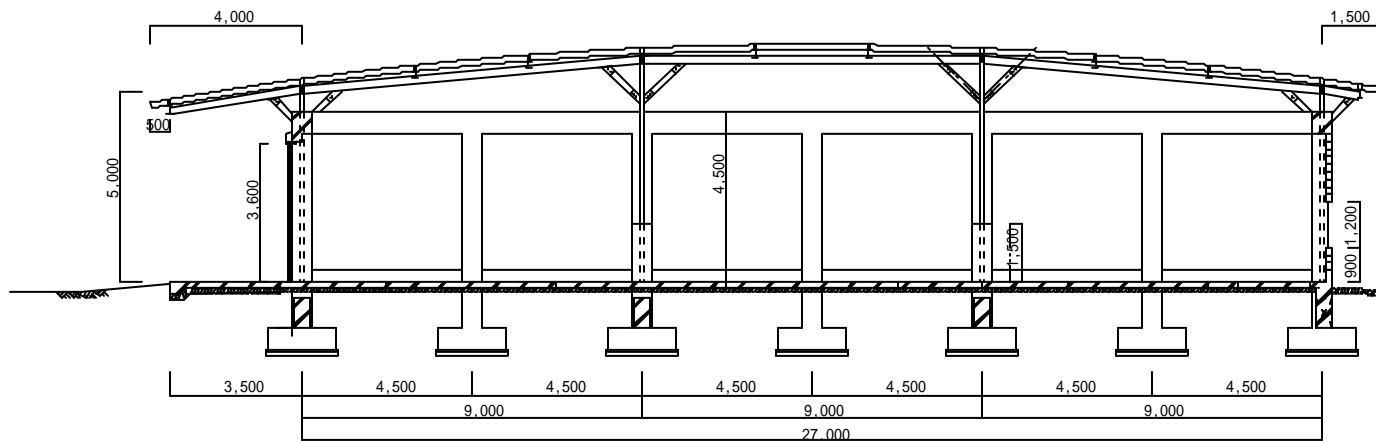
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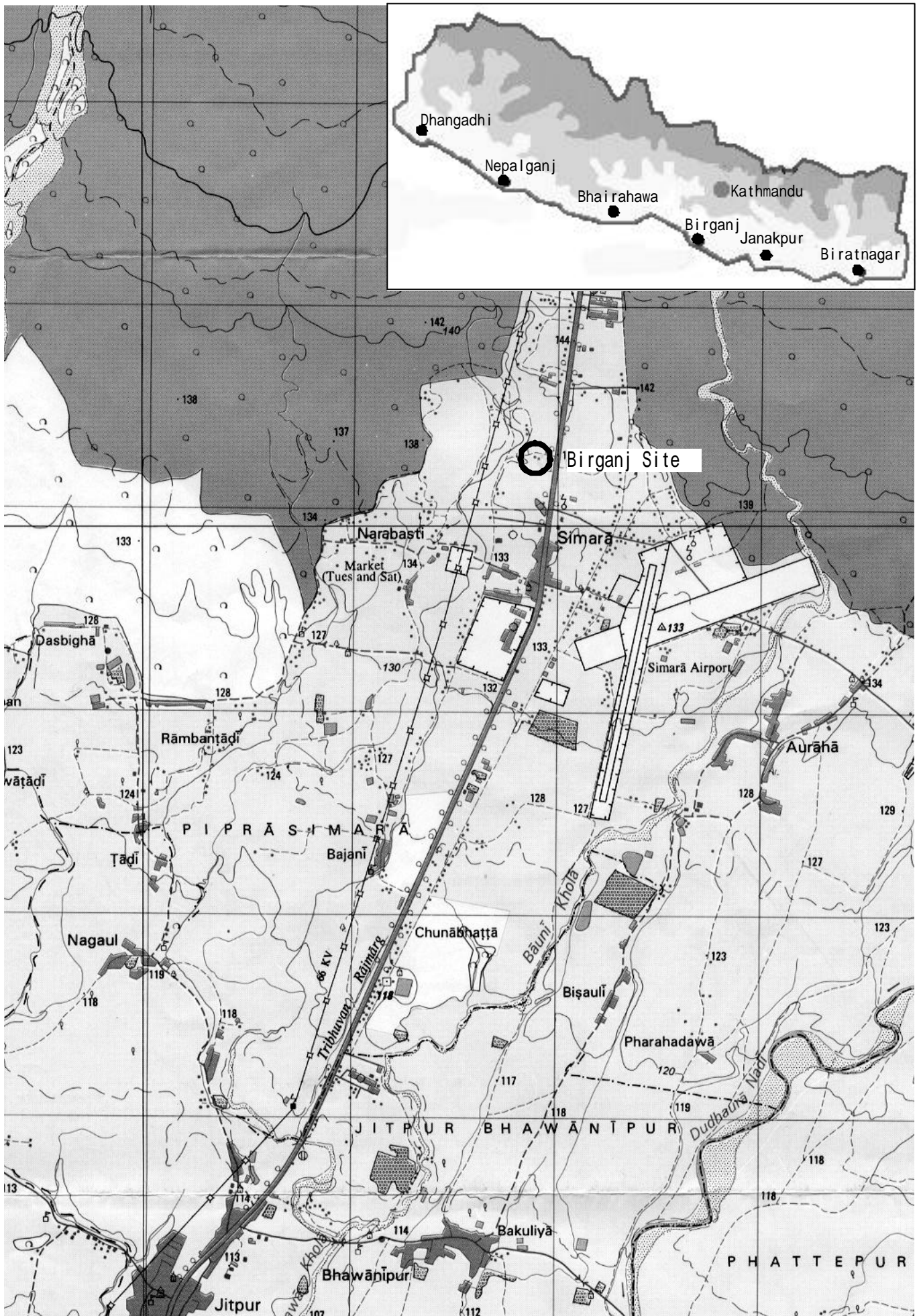


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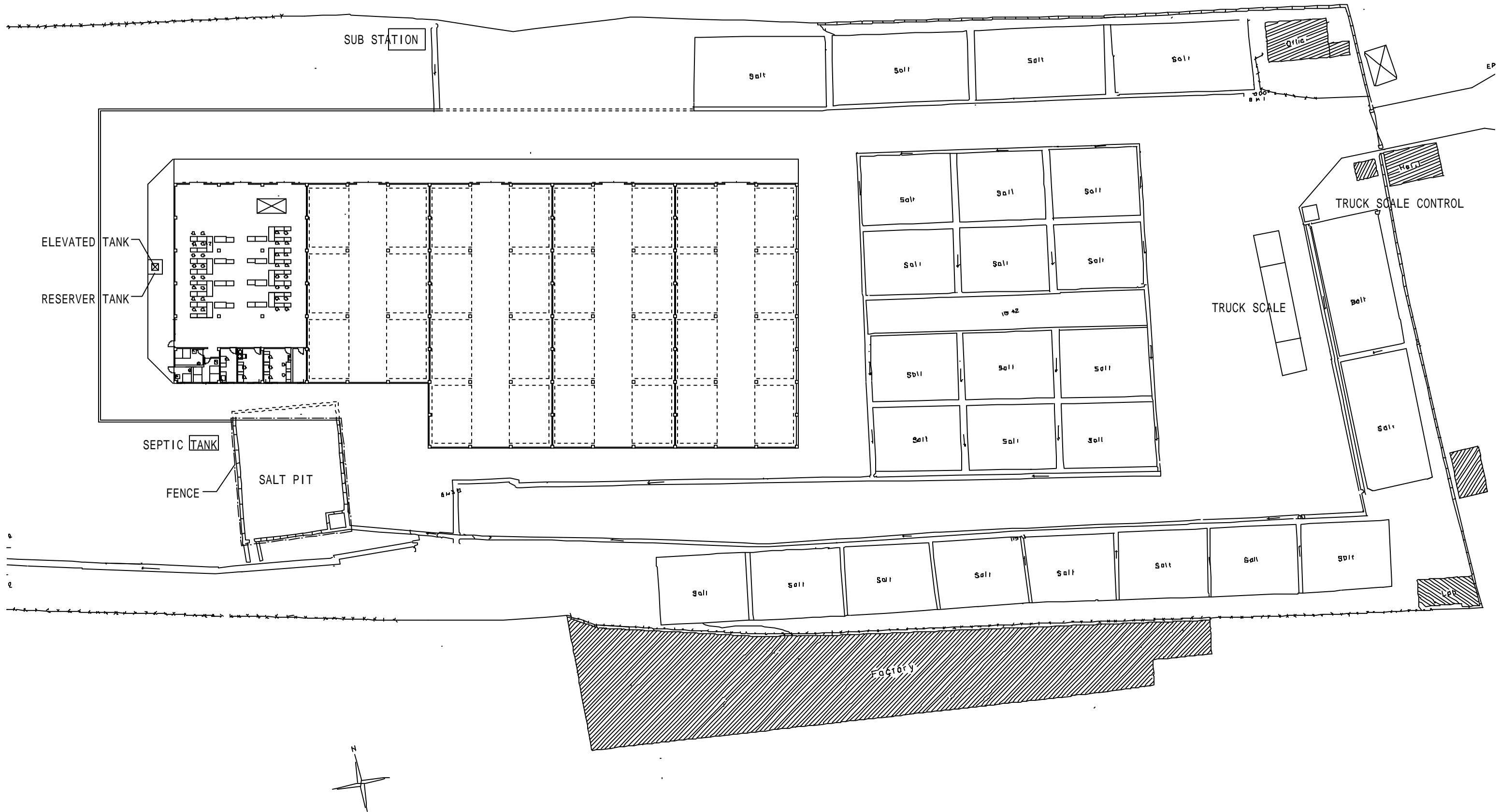


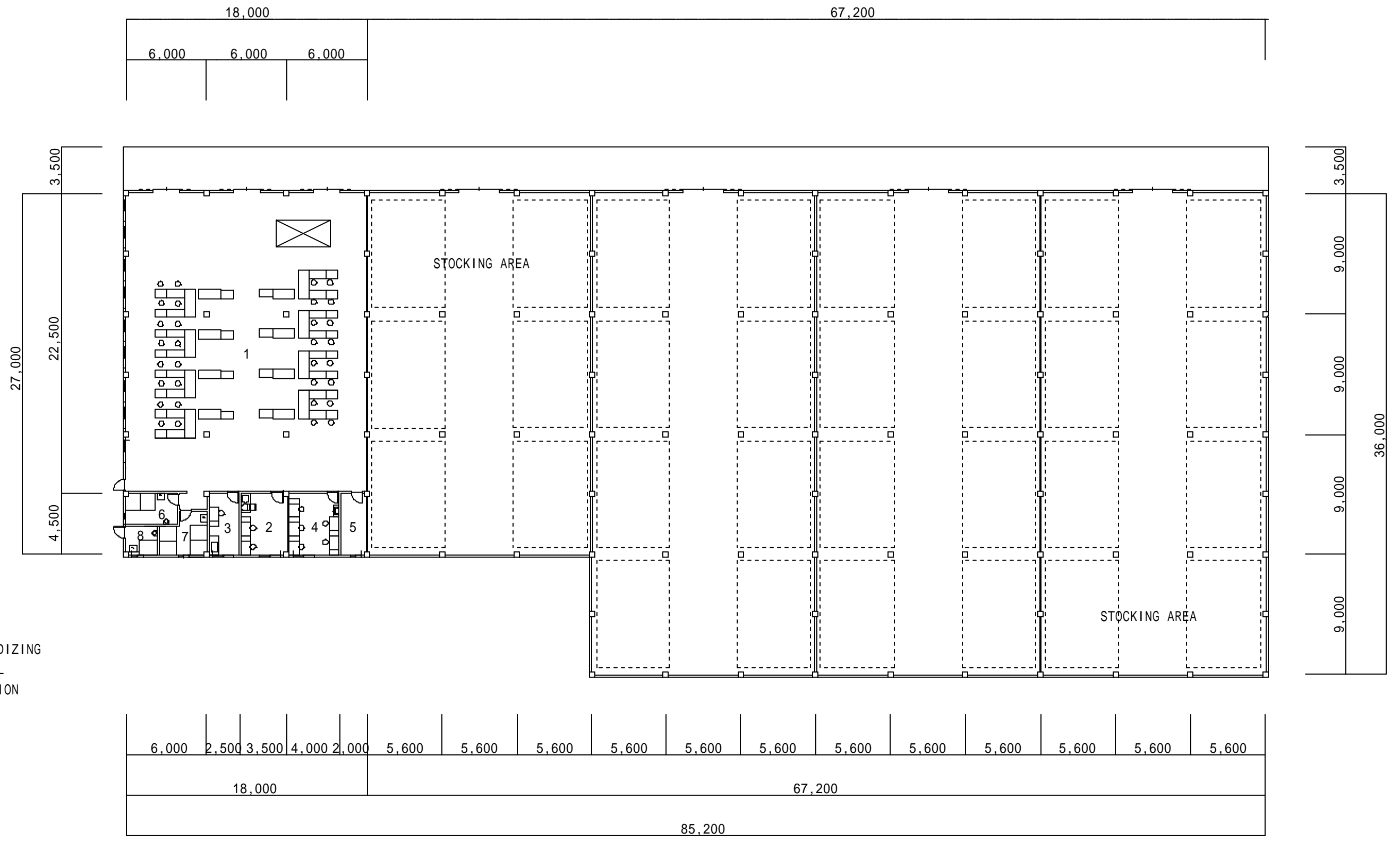
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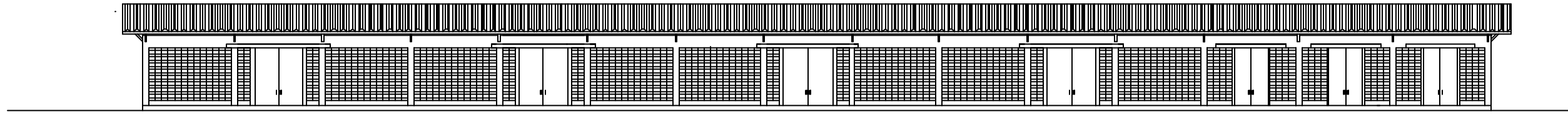


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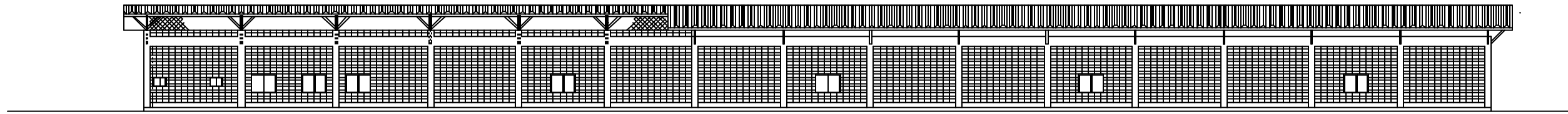




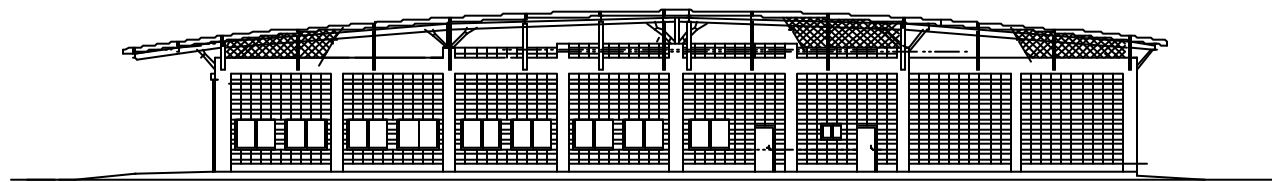
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- 3 IODINE INSPECTION
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- 6 MEN'S TOILET
- 7 WOMEN'S TOILET
- 8 MEN'S TOILET



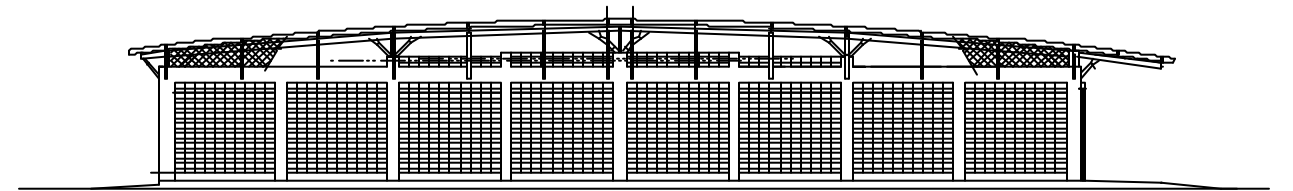
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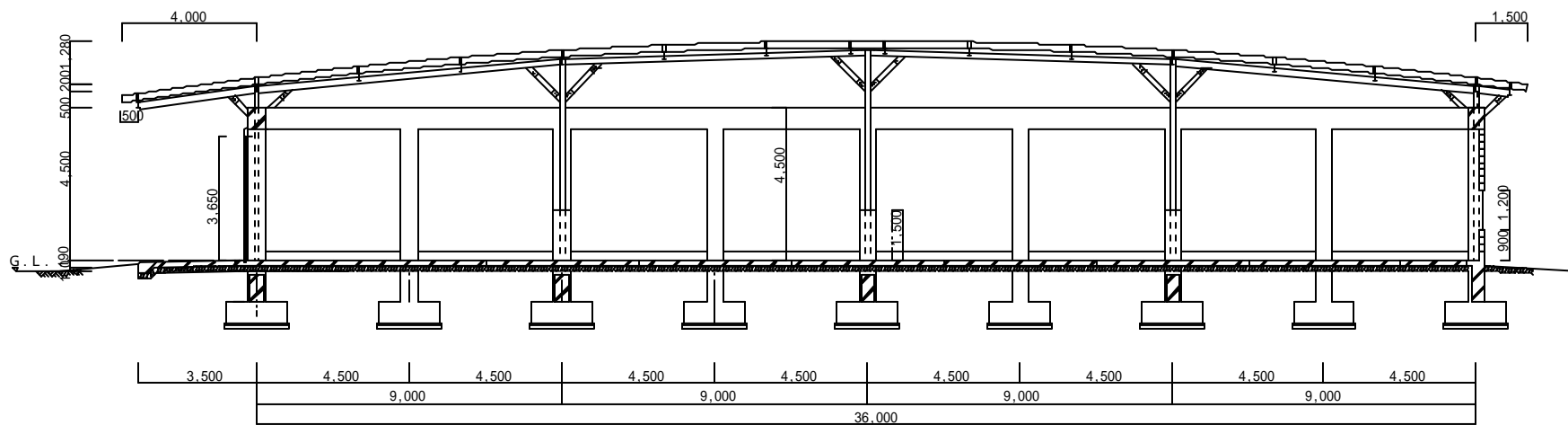
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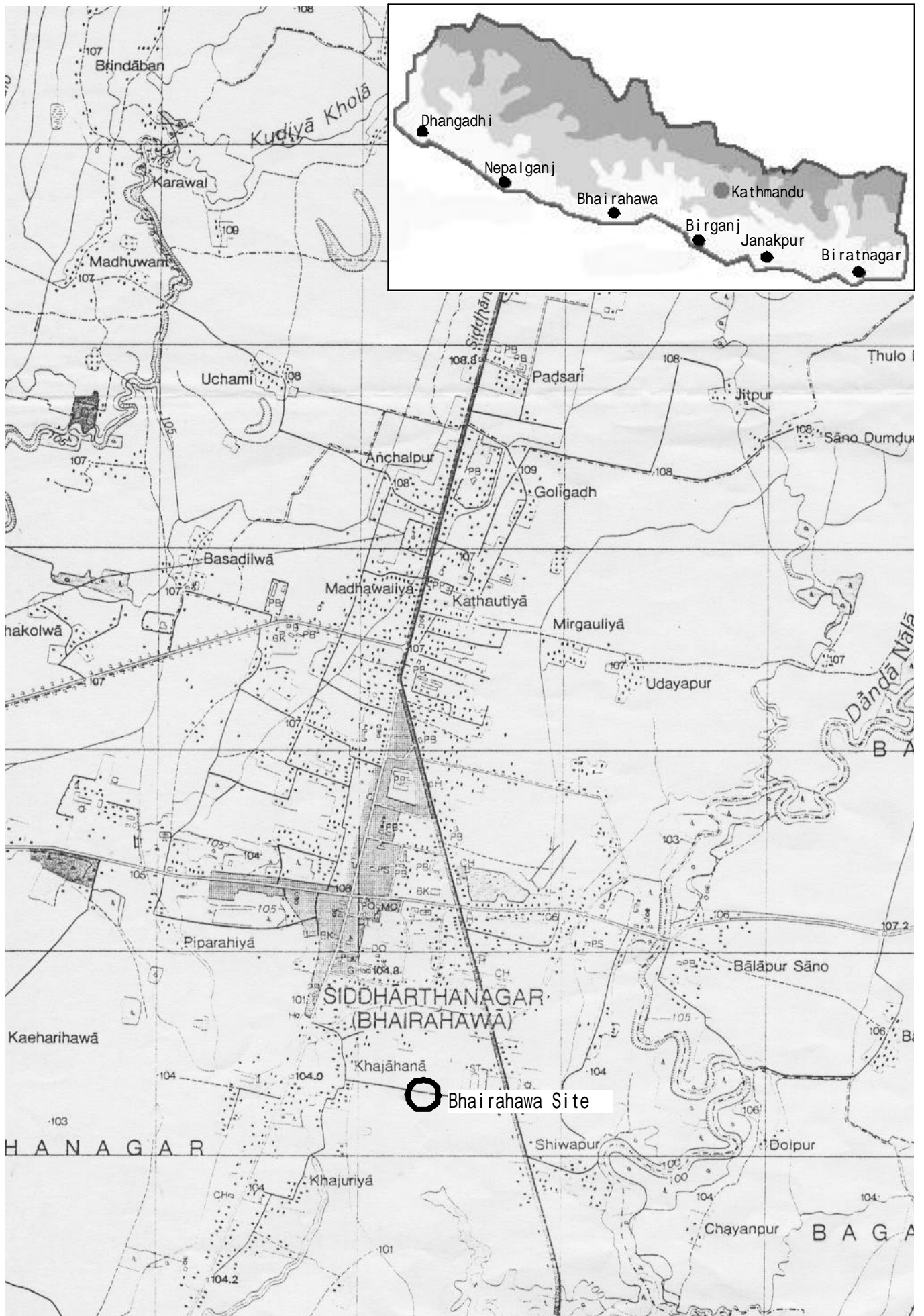
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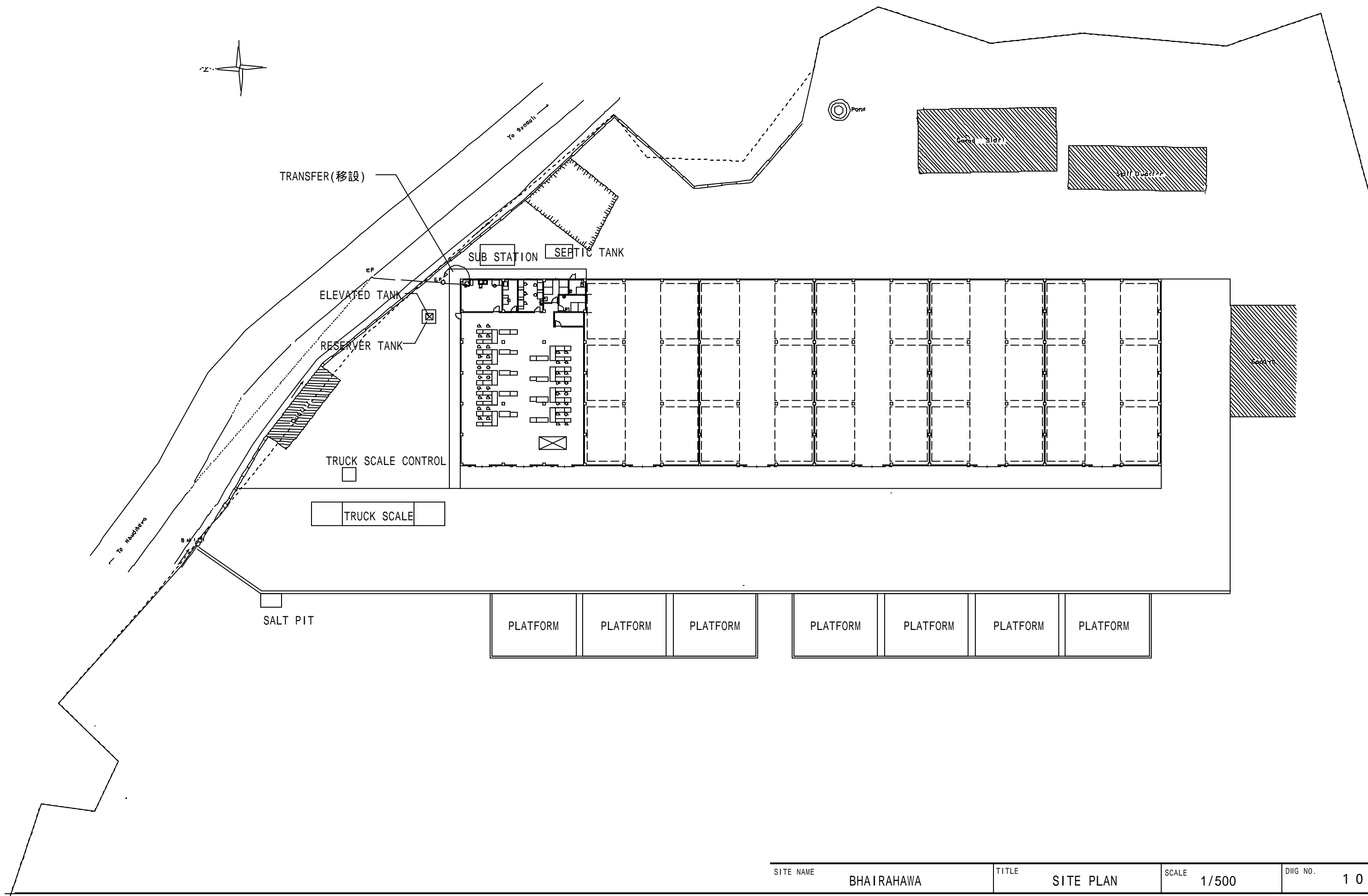
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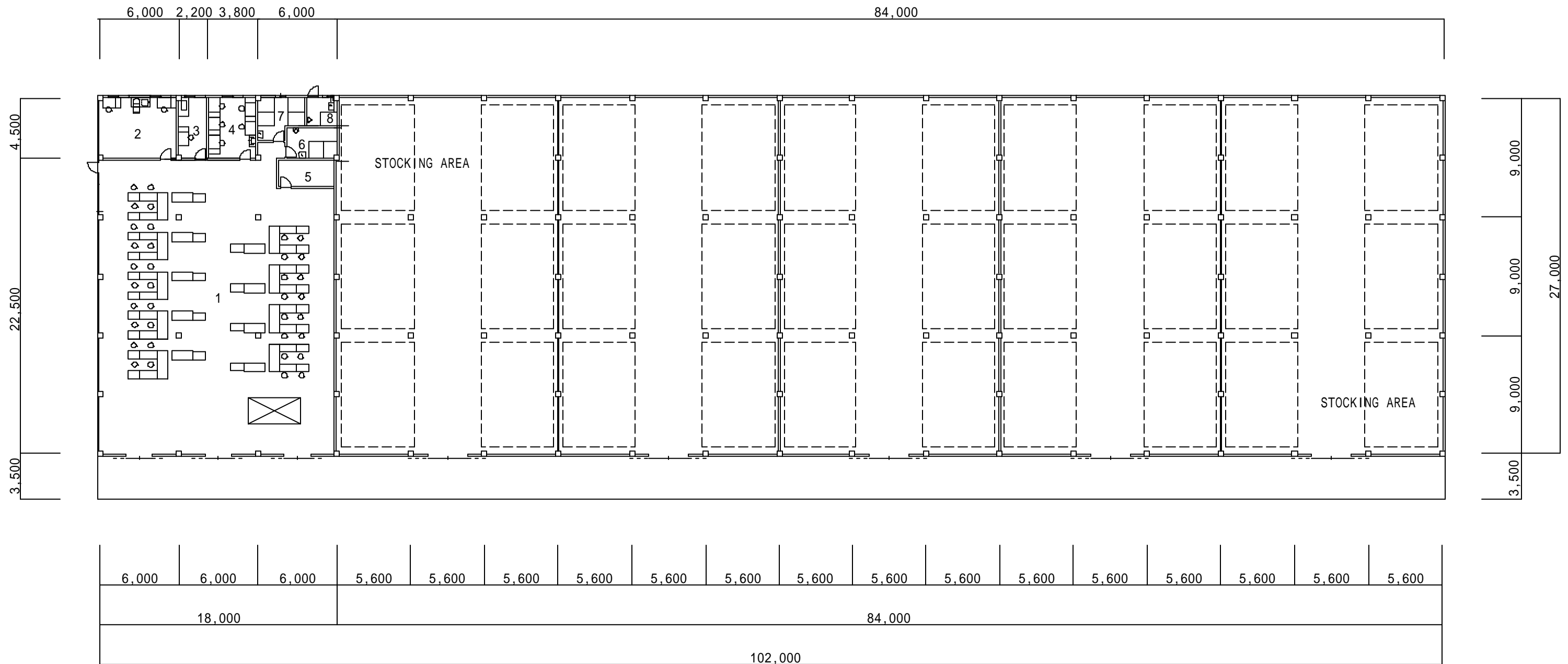


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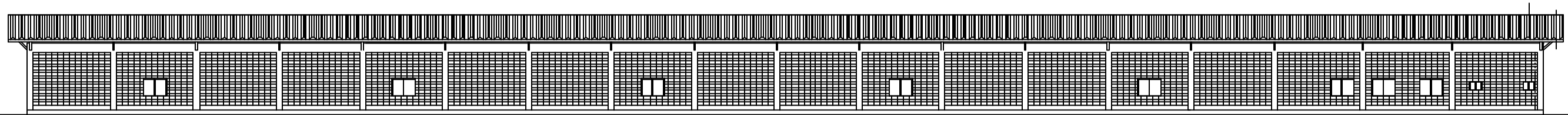


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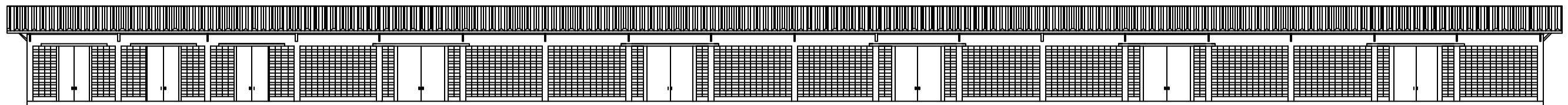




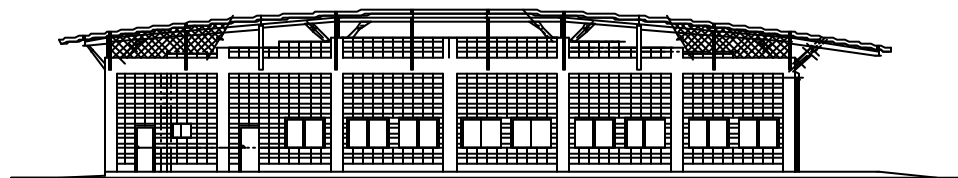
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- 4 PRINTING
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- 7 WOMEN'S TOILET
- 8 MEN'S TOILET



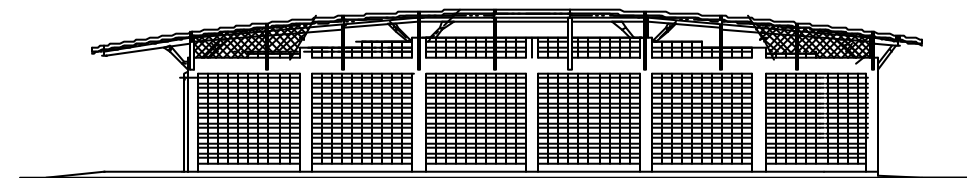
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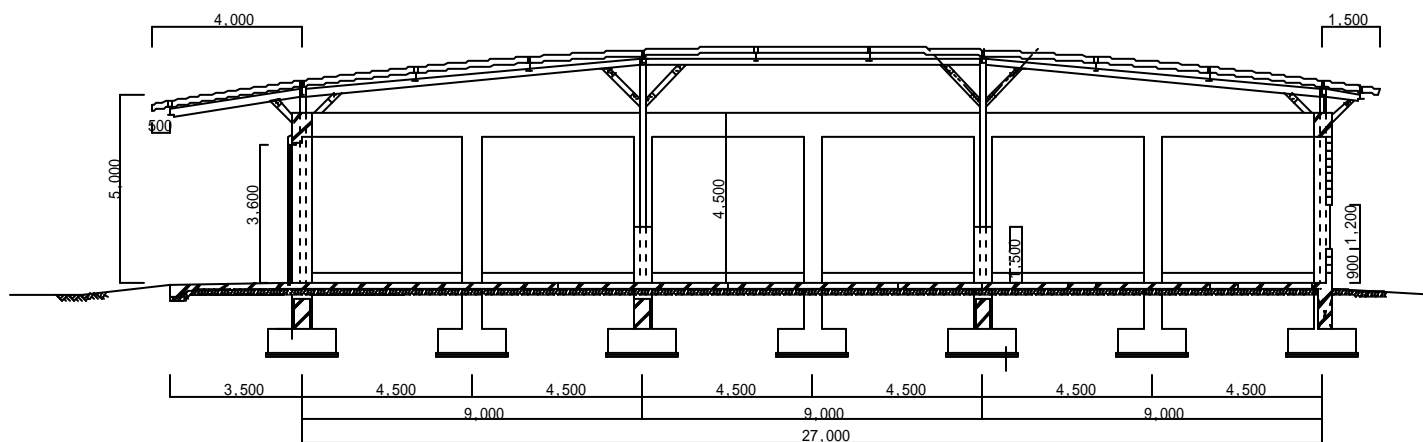
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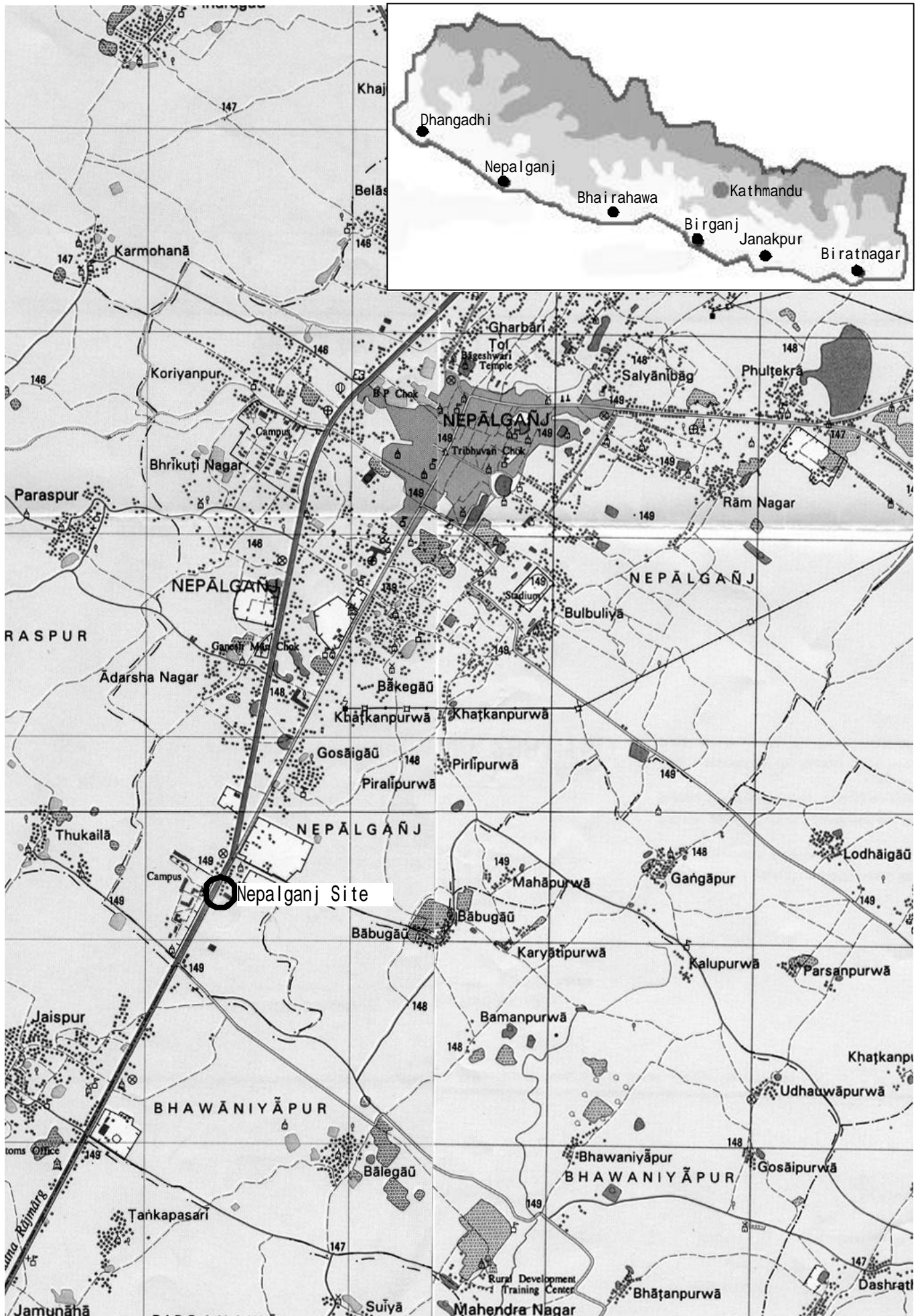
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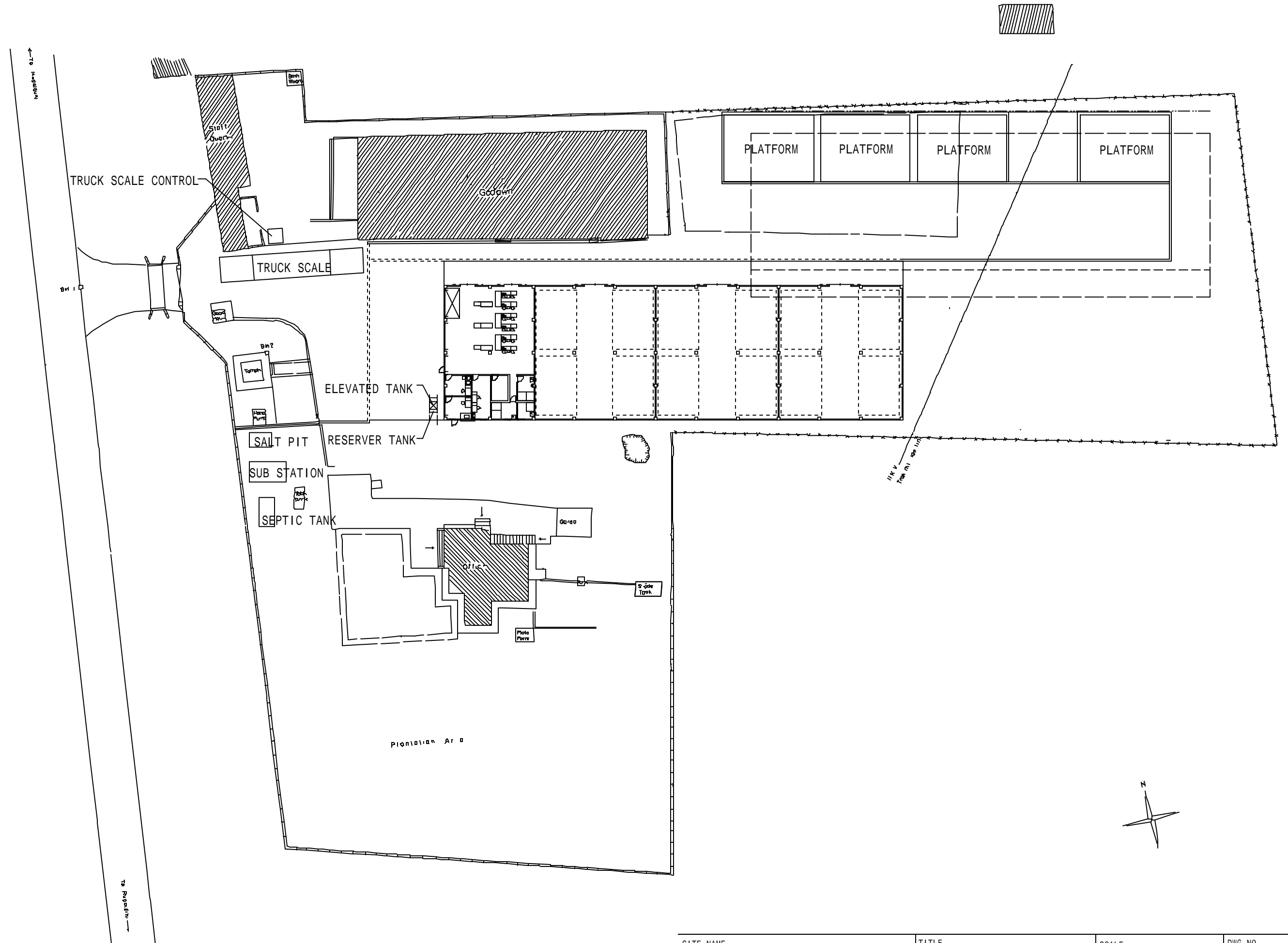
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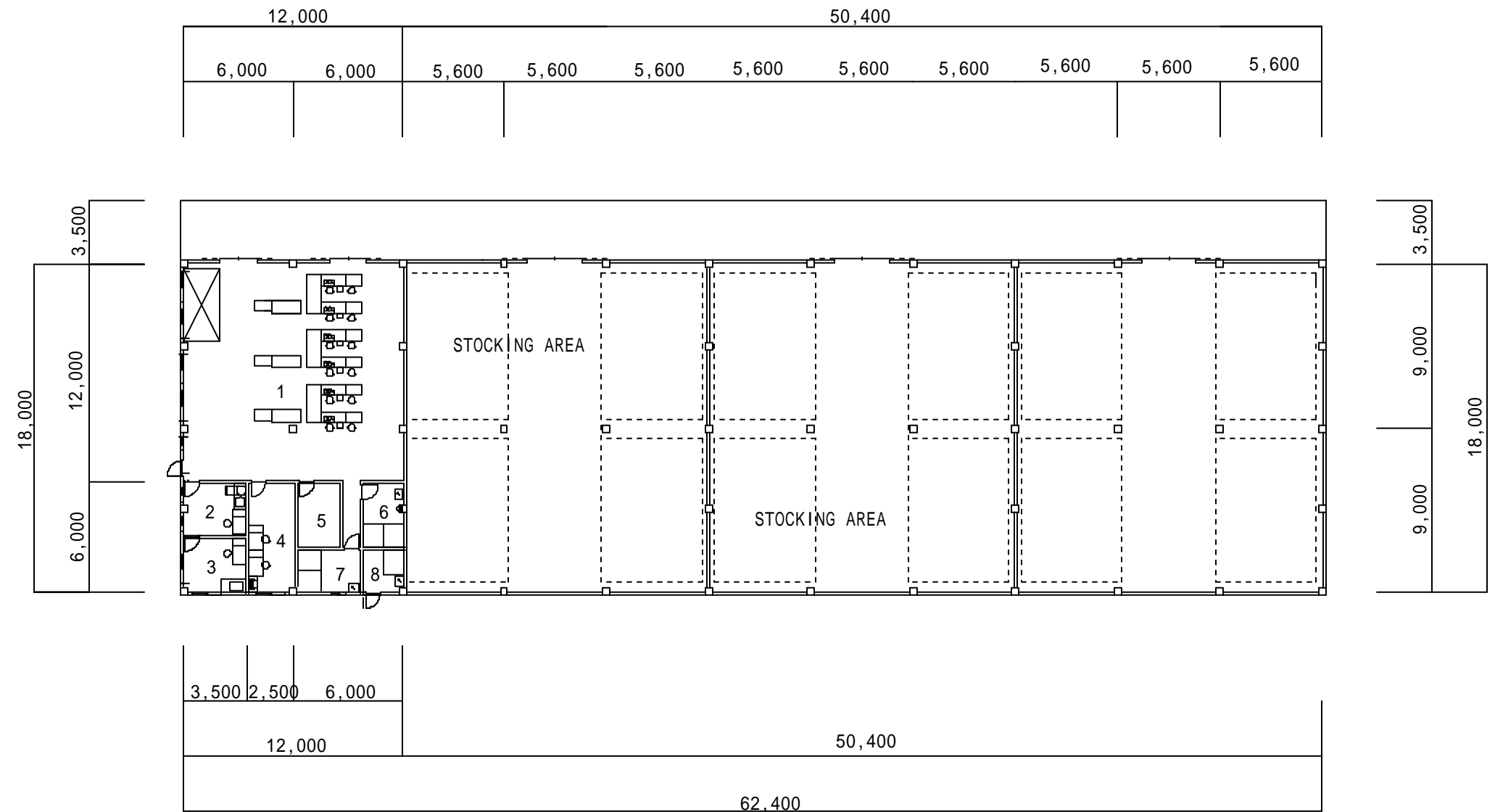
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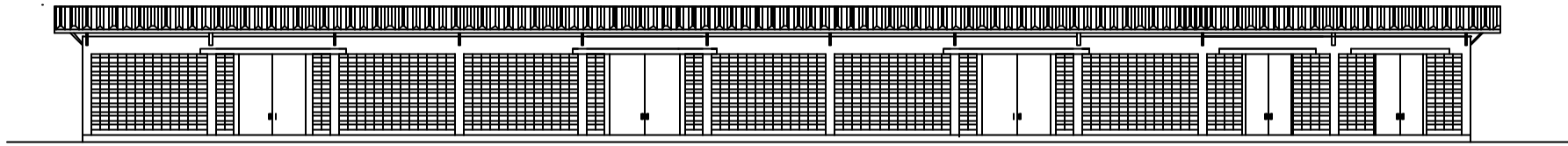


Nepalganj Site Location

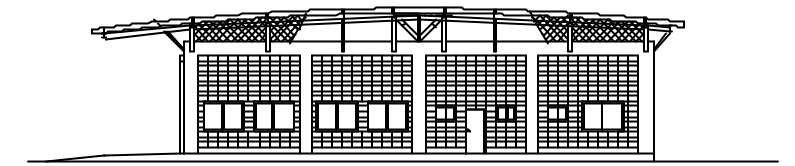


- 1 PACKING & REIODIZING
- 2 QUALITY CONTROL
- 3 IODINE INSPECTION
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- 8 MEN'S TOILET

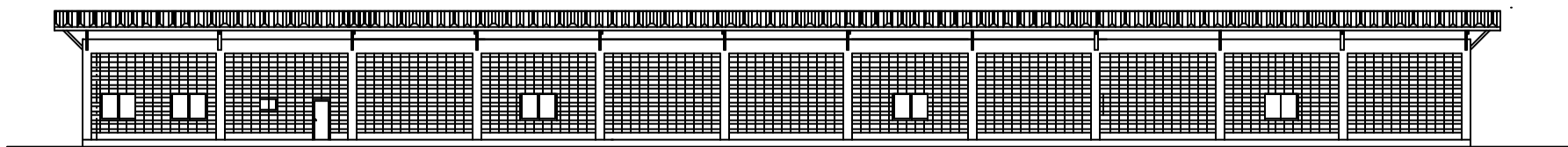




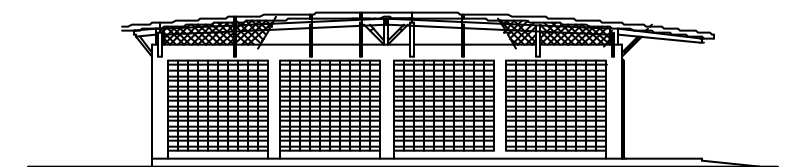
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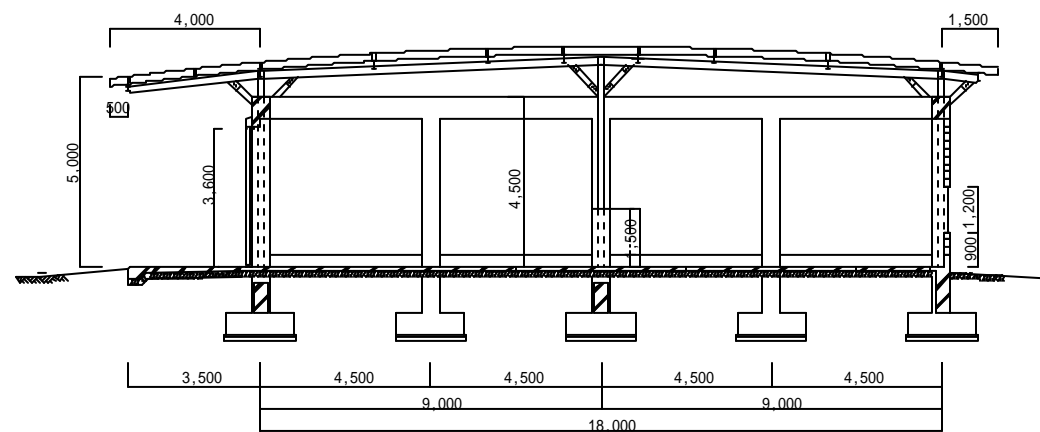
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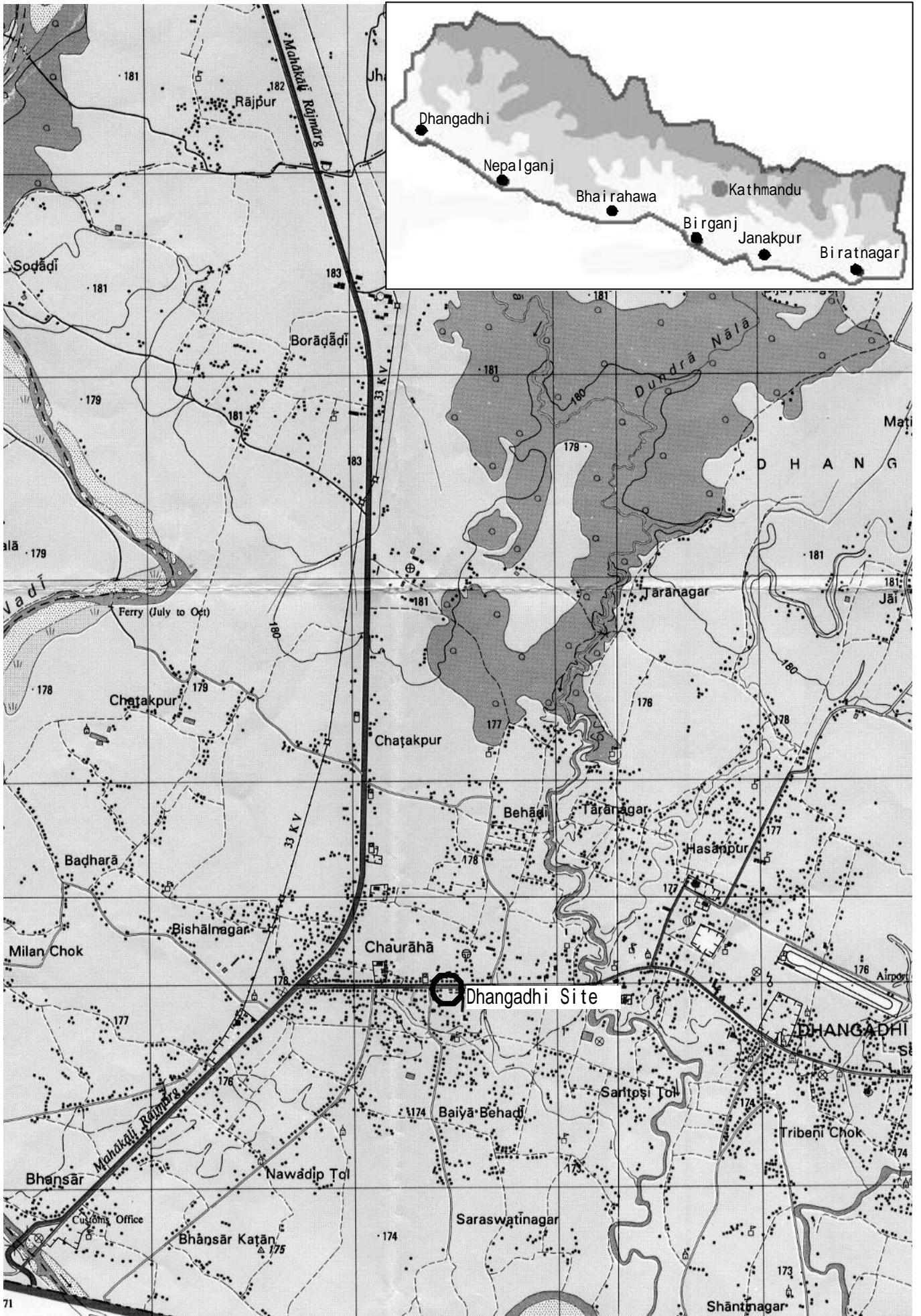
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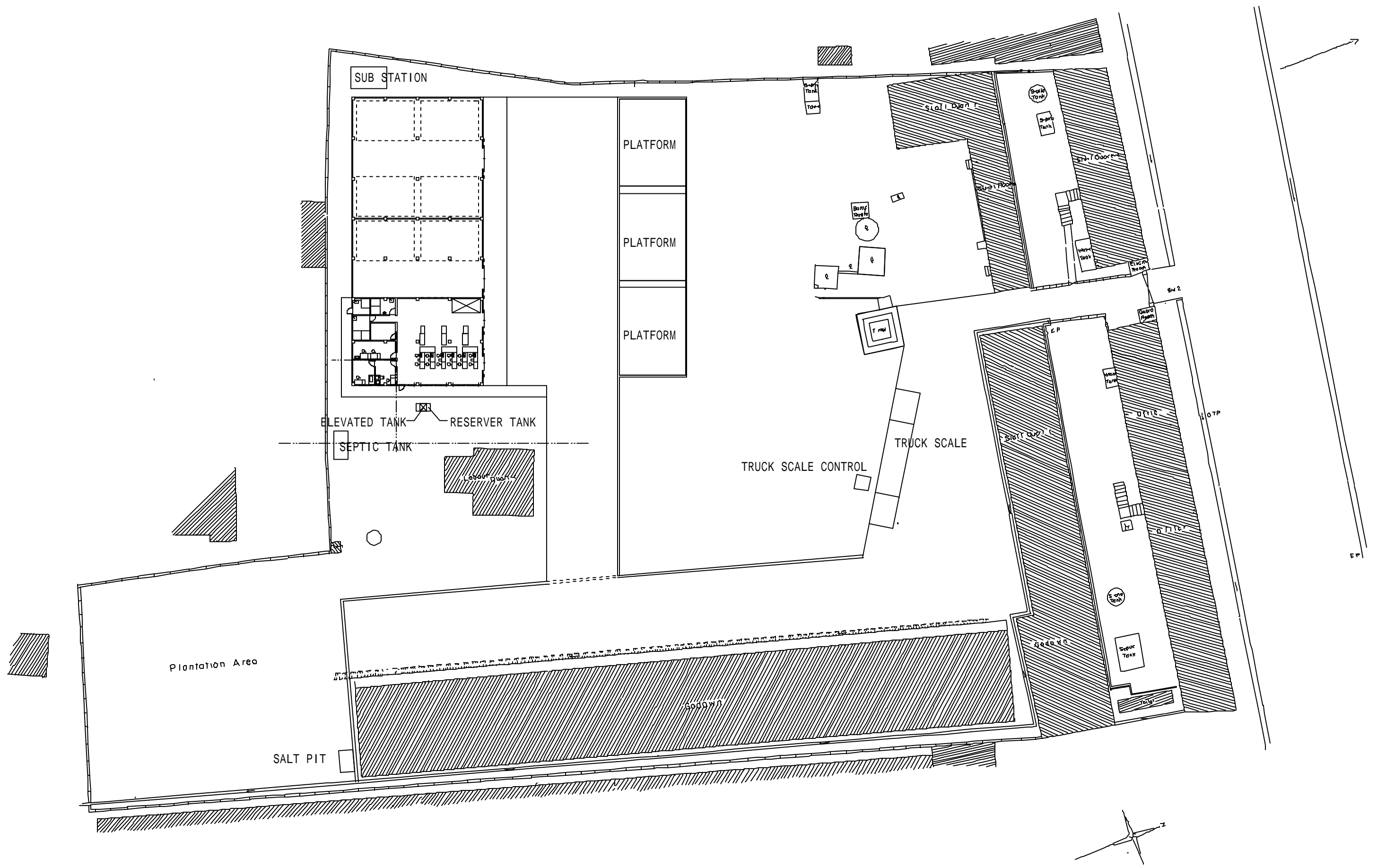
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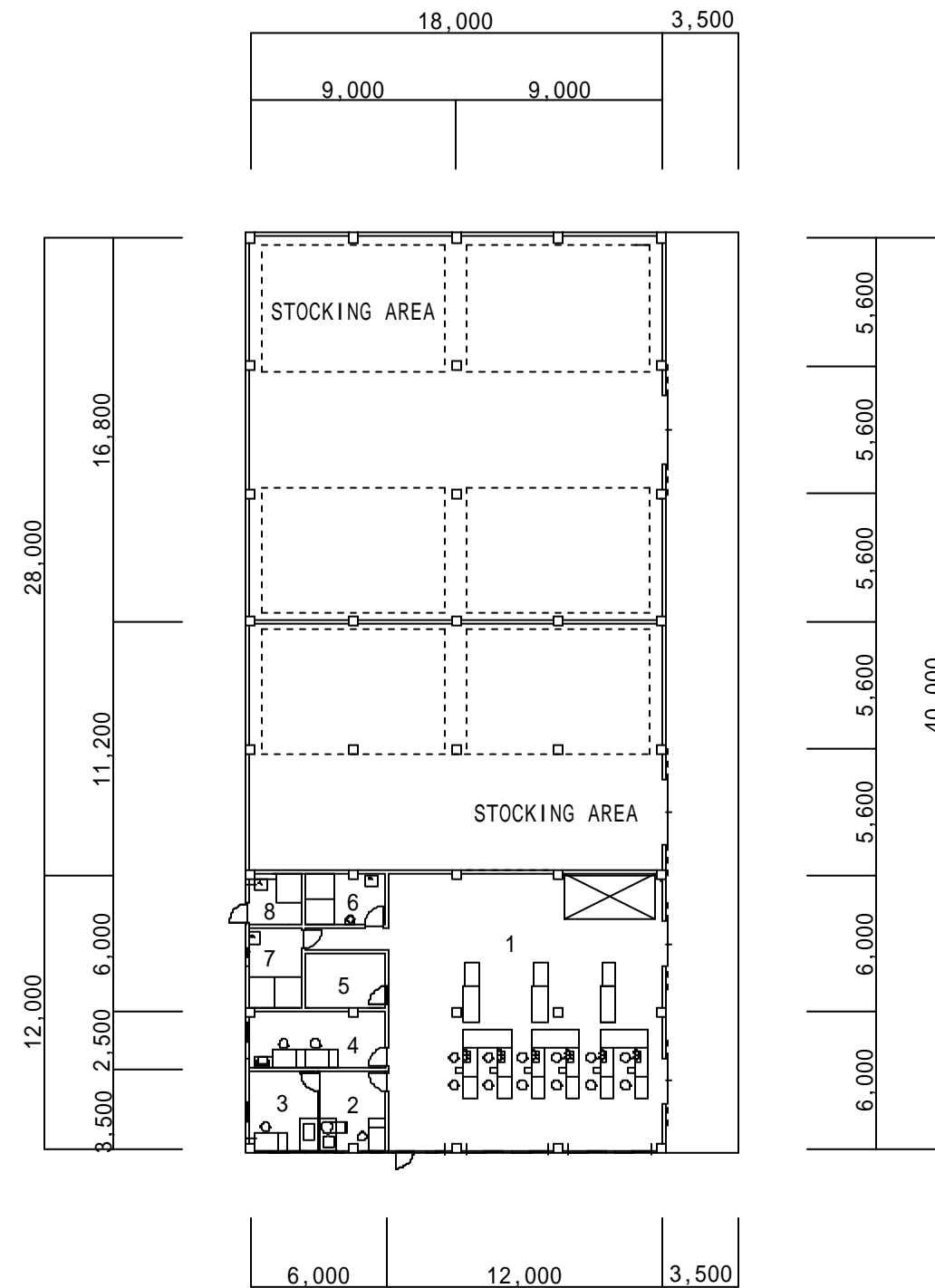
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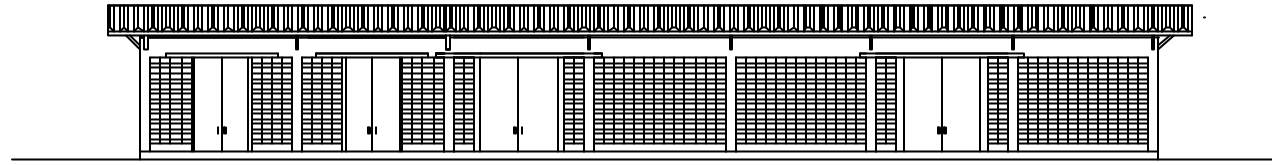
Dhangadhi Site Location



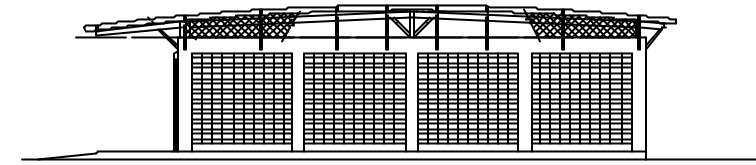
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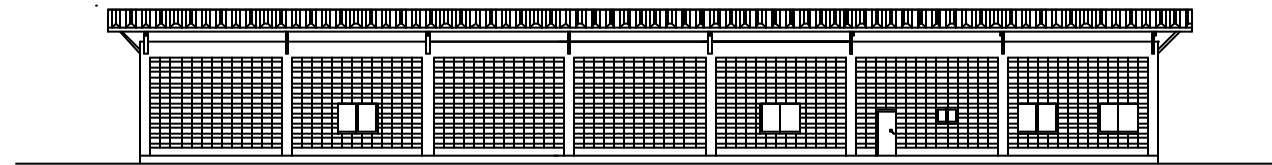
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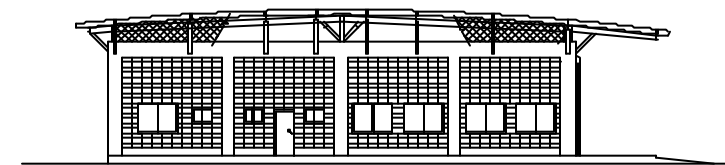
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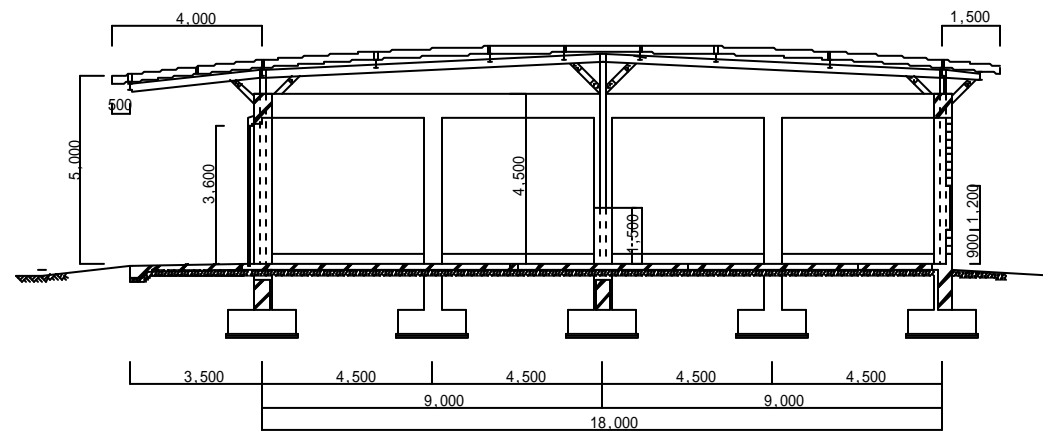
West Elevation



South Elevation



East Elevation



Section

Member List of the Survey Team

1. Basic Design Study Team

Tomoyuki IGARI	Leader	Vice President Chiba Medical Welfare Collage
Yukio IWAKI	Coordinator	JICA, Grant Aid management Department
Hideya KOBAYASHI	Technical Cooperation	JICA, Regional Department, South-West Asia and Oseania Division.
Hidejiro UCHIGASAKI	Project Manager	Consultants Zen-noh Architects and Engineers Inc.
Tsuneki NARAHARA	Logistics Planning	Consultants Zen-noh Architects and Engineers Inc.
Kentaro KIMURA	Facility Planning	Consultants Zen-noh Architects and Engineers Inc.
Teruhisa AOKI	Equipment Planning	Consultants TASK Co., Ltd.
Riichiro KITAMURA	Cost Planning	Consultants Zen-noh Architects and Engineers Inc.

2. Draft Report Explanation Team

Tomoyuki IGARI	Leader	Vice President Chiba Medical Welfare Collage
Masakatsu KOMORI	Coordinator	JICA, Grant Aid management Department
Hideya KOBAYASHI	Technical Cooperation	JICA, Regional Department, South-West Asia and Oseania Division.
Hidejiro UCHIGASAKI	Project Manager	Consultants Zen-noh Architects and Engineers Inc.
Tsuneki NARAHARA	Logistics Planning	Consultants Zen-noh Architects and Engineers Inc.
Kentaro KIMURA	Facility Planning	Consultants Zen-noh Architects and Engineers Inc.
Teruhisa AOKI	Equipment Planning	Consultants TASK Co., Ltd.

Appendix - 2

Survey Schedule: 1. Itinerary of the Basic Design Study Team

No	Date	Accommodation	Activities			
			Official	Consultant:	Uchigasaki, Narahara	Kimura, Aoki
1	8-May	BKK	Dr. Igari	NRT to BKK		
2	9-May	KTM	Mr. Iwaki	BKK to NRT Meeting with EOJ, JICA		
3	10-May	KTM		Courtesy call to the Responsible Ministry and STC		
4	11-May	KTM		Negotiating on Topographical survey work, Geological investigation		
5	12-May	KTM		Discussion with STC		
6	13-May	KTM		Confirming schedule of Study, Preparing report	NRT to BKK	
7	14-May	KTM		Internal Meeting	BKK to KTM	
8	15-May	Biratnagar		Transfer: KTM to Biratnagar Site Survey (Biratnagar)		
9	16-May	Janakpur		Site Survey (Biratnagar), Transfer: Biratnagar to Janakpur		
10	17-May	Hetauda		Site Survey (Janakpur), Transfer to Hetauda		
11	18-May	Hetauda		Site Survey (Birgunj)		NRT to BKK
12	19-May	Nepalgunj /KTM		Site Survey (Bhairahawa), Transfer: Hetauda to Bhairawa to Nepalgunj		BKK to KTM
13	20-May	Nepalgunj /KTM		Site Survey (Nepalgunj), Transfer: Bhairawa to Nepalgunj		Survey for Construction
14	21-May	Nepalgunj /KTM		Site Survey (Dhangadhi), Round Trip from Nepalgunj to Dhangadhi		Survey for Construction
15	22-May	Nepalgunj /KTM		Site Survey (Bhairahawa), Transfer: Nepalgunj to Bhairawa to KTM		Survey for Procurement
16	23-May	KTM	NRT to HK HK to KTM	Survey analysis, Report preparation, Report to JICA		
17	24-May	KTM		Meeting with EOJ, JICA, Courtesy call to Responsible Ministry, Discussion with STC		
18	25-May	Biratnagar /KTM		Courtesy call to Ministry of Health, Transfer: KTM to Biratnagar Site survey (Biratnagar)		
19	26-May	Dharan /KTM		Site survey (Eastern Region) Transfer: Biratnagar to Hile to Dharan	Survey for Procurement, Construction and Cost estimation	
20	27-May	KTM		Transfer: Dharan to Biratnagar to KTM Discussion with EoJ, JICA	Survey for Procurement, Construction and Cost estimation	
21	28-May	KTM		Preparing report, Meeting with EoJ, JICA		
22	29-May	KTM		Discussion with STC, UNICEF, M/D preparation		
23	30-May	KTM		Discussion with STC on M/D		
24	31-May	KTM		Discussion with STC, Signing on M/D		
25	1-June	KTM		Report to EoJ, JICA		
26	2-June	KTM		Courtesy call to Minister of MoICS	Survey for Procurement, Construction and Cost estimation	
27	3-June	KTM	KTM to BKK to NRT	Data analysis, Preparing report		
28	4-June	KTM		Internal Meeting, Preparing report		
29	5-June	KTM		Discussion with STC, Report to JICA		
30	6-June	KTM		Internal Meeting, Preparing report, Survey for Procurement and Construction		
31	7-June	KTM		Report to EoJ, Survey for Procurement, Construction and Cost		
32	8-June	KTM		Preparing report, Survey for Procurement, Construction and Cost		
33	9-June	KTM		Survey for Procurement, Construction and Cost estimation		
34	10-June	KTM		Data analysis, Preparing report	Survey for Procurement in India	
35	11-June	KTM		Internal Meeting, Preparing report	Survey for Procurement in India	
36	12-June	KTM		Discussion with STC		
37	13-June	KTM		Final discussion with STC		
38	14-June	KTM		Report to the Responsible Ministry, JICA		
39	15-June	BKK		KTM to BKK		
40	16-June			BKK to NRT		

Survey Schedule: 2. Itinerary of B/D team for Explanation of the Draft Report

No	Date		Activities				Accommodation	
			Official	Consultant:				
1	15-Aug	Tue	Dr.Igari, Mr.Komori	NRT BKK	Mr.Uchigasaki, Mr.Narahara	Mr.Kimura, Mr.Aoki		
2	16-Aug	Wed		BKK KTM,			KTM	
3	17-Aug	Thu		Meeting with STC, JICA			KTM	
4	18-Aug	Fri		Discussion with Ministry of ICS, STC			KTM	
5	19-Aug	Sat		Preparation of report			KTM	
6	20-Aug	Sun		Explanation of B/D Draft Report to STC	NRT BKK		KTM	
7	21-Aug	Mon		Explanation of B/D Draft Report to STC	BKK KTM		KTM	
8	22-Aug	Tue		Explanation of B/D Draft Report to STC			KTM	
9	23-Aug	Wed		Explanation of B/D Draft Report to STC			KTM	
10	24-Aug	Thu	NRT HK KTM	Modification of B/D Draft Report, Preparing report			KTM	
11	25-Aug	Fri	Meeting with STC, Participating IDD Technical Working Committee Meeting	Meeting with NEA			KTM	
12	26-Aug	Sat	Internal Meeting, Discussion with STC on M/D (Mr. Kobayashi arrive)				KTM	
13	27-Aug	Sun	Confirming discussion for B/D Draft Report and Discussion on M/D with STC				KTM	
14	28-Aug	Mon	Courtesy call to Ministry of Health, Meeting with JICA				KTM	
15	29-Aug	Tue	Discussion with VAT Department				KTM	
16	30-Aug	Wed	Confirmation of M/D contents with STC				KTM	
17	31-Aug	Thu	Signing on M/D, Report to EOJ, JICA				KTM	
18	1-Sep	Fri	KTM BKK (Kobayashi)	B/D additional Discussion with STC	(Kimura)		KTM	
19	2-Sep	Sat	NRT KTM BKK	B/D additional Discussion with STC	KTM BKK		KTM	
20	3-Sep	Sun	NRT	B/D additional Survey	BKK NRT		KTM	
21	4-Sep	Mon		B/D additional Survey			KTM	
22	5-Sep	Tue		Meeting for D/D with STC			KTM	
23	6-Sep	Wed		Final Meeting with STC Report to JICA			KTM	
24	7-Sep	Thu		KTM BKK				
25	8-Sep	Fri		BKK NRT				

NRT: Narita, HK: Hongkong, BKK: Bangkok, KTM: Kathmandu

List of Party Concerned in Nepal

HMG Ministry of Health	
Dr. R.V. YADAV	Minister
Dr. B.B. KARKI	Director General, Department of Foreign Relations
Dr. B.D. CHATAUT	Director General, Department of Health Service
Dr. Sharada PANDY	Chief, Nutrition Section, Child Health Division
HMG Ministry of Industry, Commerce and Supply	
Mr. Ramkrishna TAMRAKAR	Minister
Mr. Mohan Dev PANT	Secretary
Mr. Narayam Pd. SANJEL	Under Secretary
Mr. Chandi P. SHRESTHA	Joint Secretary
Mr. Ram K. SHRESTHA	Joint Secretary, Supply and Industries Under Public Sector Div.
HMG Ministry of Finance Value Added Tax Department	
Mr. Lal Mani JOSHI	Deputy Director General, Value Added Tax Department
STC: Salt Trading Corporation Ltd.	
Mr. Kamal Mani DIXIT	Chairman
Mr. H.B. Malla	President
Mr. R.P. JOSHI	Special Advisor
Mr. P.MAHASETH	General Manger
Mr. C.S. SINGS	General Manager
Mr. U. D. SHRESTHA	Divisional Manager, Salt Division
Mr. Kumar RAJBHANDARI	Chief Officer, Salt Division
Mr. Krishna SHAKYA	Technical Officer, Salt Division
Mr. P.B. THAPA	Divisional Manager, Birganj
Mr. M.P. TIMALSINA	Divisional Manager, Bhairahawa
Mr. Manoj ACHARYA	Zonal Manager, Biratnager
Mr. R.C. MAURYA	Zonal Manager, Nepalghanj
Mr. K.P. PANDEY	Zonal Manager, Dhangadhi
Mr. Navin C. JHA	Brunch Manager, Janakpur
NEA: Nepal electricity Authority	
Mr. Bishnu Bam MALLA	Managing Director
Tribhawan Univercity	
Dr. H.G. SHRESTHA	Dean of the Institute of Medicine
UNICEF	
Mr. P.O. BLOMQUIST	Chief of Nutrition & Children Care Section
Ms. Pragyan MALLIEVA	In charge of IDD
Mr. Liv TORHEIM	NutritionSection
MI (Micro nutrient Initiatives)	
Mr. Macha Raja MAHARJAN	In charge of National Plan
ISSMAC	
Mr. Rajeeb SATYAL	Member of IDD Technical Working Committee
Embassy of Japan	
Mitsuaki KOJIMA	Ambassador of Japan
Hideyuki ONISHI	First Secretary
JICA Nepal Office	
Ken HASEGAWA	Resident Representative
Testuo YABE	Deputy Resident Representative
Shigeki FURUTA	Assistant Resident Representative
Ayako TOKUNAGA	Planning Coordinater
Masamine JINBA	JICA Expert, Project Team Leader of SCHP

**MINUTES OF DISCUSSION
ON THE BASIC DESIGN STUDY
ON THE PROJECT FOR IMPROVEMENT
OF STORAGE FACILITIES OF IODIZED SALT
IN THE KINGDOM OF NEPAL**

In response to a request from His Majesty's Government of the Kingdom of Nepal (hereinafter referred to as "HMG/N"), the Government of Japan decided to conduct a Basic Design Study on the Project for Improvement of Storage Facilities of Iodized Salt in the Kingdom of Nepal (hereinafter referred to as "the Project") and entrusted the Study to the Japan International Cooperation Agency (JICA).

JICA sent to the Kingdom of Nepal the Basic Design Study Team (hereinafter referred to as "the Team") which is headed by Dr. Tomoyuki Igari, Vice-President of Chiba Medical Welfare College, and is scheduled to stay in the country from May 9 to June 15, 2000.

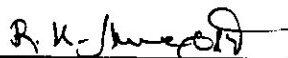
The Team held discussions with the officials concerned of HMG/N and conducted site surveys.

In the course of the discussions and site surveys, both parties confirmed the main items described on the attached sheets. The Team will proceed to further work and prepare the Basic Design Study Report.


Kathmandu, May 31, 2000

緒 特 友 行

Dr. Tomoyuki Igari
Leader,
Basic Design Study Team
JICA



Mr. Ram Kumar Shrestha
Joint Secretary
The Ministry of Industry,
Commerce and Supply



Mr. H.B. Malla
President
Salt Trading Corporation Ltd.

ATTACHMENT

1. Objective

The objective of the Project is to improve the storage facilities of iodized salt through building new warehouses and procuring related equipment in order to decrease Iodine Deficiency Disorders in the Kingdom of Nepal.

2. Project Sites

The sites of the Project are as described in Annex 1.

3. Responsible and Executing Organizations

(1) The responsible agency is the Ministry of Industry, Commerce and Supply.
(hereinafter referred to as "the Ministry")

(2) The implementing agency is Salt Trading Corporation Ltd.
(hereinafter referred to as "STC").

4. Items Requested by HMG/N

After discussions with the Team, items listed in Annex 1 and 2 were finally requested by HMG/N. JICA will further assess the appropriateness of the request in Japan to prepare a draft report.

(1) Construction of the Warehouses: Details are as listed in Annex 1.

(2) Procurement of the Equipment: Details are as listed in Annex 2.

5. Japan's Grant Aid System

5-1. The Nepalese side understands the Japan's Grant Aid Scheme as described in Annex 3.

5-2. The Nepalese side will take the necessary measures as described in Annex 4 for smooth implementation of the Project as a condition for the Japanese Grant Aid Project to be implemented.

6. Schedule of the Study

6-1. The consultant members of the Team will proceed to further study in Nepal until June 15, 2000.

6-2. JICA will prepare a draft report in English and dispatch a mission in order to explain its contents around August, 2000.

6-3. If the contents of the draft report are accepted in principle by the Nepalese side, JICA will complete the final report and send it to the Nepalese side around November, 2000.

7. Other Relevant Issues

7-1. Relations between the Ministry and STC

a) The new warehouses for iodized salt under the Japanese Grant Aid will be constructed on the land owned by STC, but the ownership of the newly constructed warehouses will go to the Ministry.



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- b) The warehouses will solely be used by STC for storing and distributing iodized salt, which is a part of the program of the Government on eliminating Iodine Deficiency Disorders from the country. There will be no charge on STC for the use of the warehouses.
- c) All the equipment to be received under the Japanese Grant Aid will be owned by the Ministry. STC will use them solely for storing and distributing iodized salt without any charges.
- d) STC will be responsible for the maintenance of the warehouses and the equipment.
- e) In case that (1)STC withdraws from its current salt business or (2) HMG/N prohibits STC from salt business, STC will sell the land covered by the proposed warehouses to HMG/N. The price settlement will be done by a HMG/N valuation committee, which will include a representative from STC.

7-2. Measures to be taken by HMG/N

- a) HMG/N shall secure sufficient land for the proposed warehouses and clear, level, and reclaim the land for the construction works. In addition, HMG/N shall make electricity, water, telephone line, and drainage available on the construction sites.
- b) HMG/N shall make all necessary arrangements for the construction works, such as obtaining building construction permit.
- c) HMG/N shall exempt taxes, duties, and all other fiscal levies, which might be imposed on the Project in Nepal, as provided to other Japanese Grant Aid Projects.
- d) The Ministry, as the responsible agency for the Project and the line Ministry of STC, shall make all necessary arrangements for the smooth implementation of the Project and assist STC in implementing the Project.

7-3. Measures to be taken by STC

- a) STC shall take all necessary measures, such as allocating sufficient budget and human resources, in order to secure the effective use and proper maintenance of the warehouses and the equipment.
- b) STC shall make all possible efforts to supply only packed refined and crushed salt by phasing out Phoda salt from the market as early as possible.

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- c) STC shall make a plan of establishing a quality control system of iodized salt in STC's warehouses, which contains the following elements:
- its procedures in detail,
 - an allocation of human resource,
 - an allocation of budget,
 - training programs for workers,
 - a schedule of its implementation.
- STC will submit its detailed plan to JICA Nepal office.

7-4. Technical Co-operation

- a) HMG/N requested the Team for a technical assistance for transfer of technology in fields of Storage Management, Inventory Management, Distribution Management & Quality Control and Monitoring System.



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1) Construction of warehouses

Requested Sites	Requested Capacity
a) Biratnagar	<u>5,000 MT</u>
b) Janakpur	<u>1,000 MT</u>
c) Birgunj	<u>5,000 MT</u>
d) Bhairahawa	<u>5,000 MT</u>
e) Nepalgunj	<u>2,000 MT</u>
f) Dhangadhi	<u>2,000 MT</u>

Note:

A capacity and design of each warehouse will be determined after the Team conducts further analysis on the information and the data collected during this mission. The Team will explain the results of its analysis and propose the facility plan in the next mission expected to be dispatched in August, 2000.



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Requested Equipment List

Description	Newly Requested	Priority
1) Weighing Facilities a) Truck Scale (30Ton) b) Platform Scale (100Kg)		A A
2) Transportation a) Hand Cart b) Forklift (3Ton) c) Pallet for Forklift d) Truck (4Ton)	<input type="radio"/>	A A A C
3) Iodization & Packing a) Crusher Mixer (Re-Iodization Machine) b) Balance Scale (2Kg) c) Manual Bag Sealer d) Semi-automatic Sealing Machine e) Automatic Packing Machine f) Date Printer for bags g) Diesel Generator h) Packing Work Table with Salt Pan	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	A A A A C A A A
4) Iodine Monitoring & Laboratory Equipment a) Handy Iodine Checker b) Analysis Equipment c) Water Distillation Apparatus d) Laboratory Table with Sink and Taps	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	A C A A
5) Others a) Tent Warehouse b) Water Resistant Cover Sheet c) Computer with Accessories d) Facsimile Machine e) Filing Cabinet f) Table and Chairs for office	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	C A A A A C

Note : Items of equipment to be included in the Project will be determined based on the priorities above, and a number of each item will be determined based on the facility plan. The Team will explain the result of its analysis and propose the equipment list in the next mission expected to be dispatched in August, 2000.

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Japan's Grant Aid Scheme

1. Grant Aid Procedures

1) Japan's Grant Aid Program is executed through the following procedures.

Application	(Request made by a recipient country)
Study	(Basic Design Study conducted by JICA)
Appraisal & Approval	(Appraisal by the Government of Japan and Approval by Cabinet)
Determination of Implementation	(The Notes exchanged between the Governments of Japan and the recipient country)

2) Firstly, the application or request for a Grant Aid project submitted by a recipient country is examined by the Government of Japan (the Ministry of Foreign Affairs) to determine whether or not it is eligible for Grant Aid. If the request is deemed appropriate, the Government of Japan assigns JICA (Japan International Cooperation Agency) to conduct a study on the request.

Secondly, JICA conducts the study (Basic Design Study), using (a) Japanese consulting firm(s).

Thirdly, the Government of Japan appraises the project to see whether or not it is suitable for Japan's Grant Aid Program, based on the Basic Design Study report prepared by JICA, and the results are then submitted to the Cabinet for approval.

Fourthly, the project, once approved by the Cabinet, becomes official with the Exchange of Notes signed by the Governments of Japan and the recipient country.

Finally, for the implementation of the project, JICA assists the recipient country in such matters as preparing tenders, contracts and so on.

2. Basic Design Study

1) Contents of the Study

The aim of the Basic Design Study (hereafter referred to as "the Study"), conducted by JICA on a requested project (hereafter referred to as "the Project") is to provide a basic document necessary for the appraisal of the Project by the Japanese Government. The contents of the Study are as follows:

- a) Confirmation of the background, objectives, and benefits of the requested Project and also institutional capacity of agencies concerned of the recipient country necessary for the Project's implementation.
- b) Evaluation of the appropriateness of the Project to be implemented under the Grant Aid Scheme from a technical, social and economic point of view.
- c) Confirmation of items agreed on by both parties concerning the basic concept of the Project.
- d) Preparation of a basic design of the Project
- e) Estimation of the costs of the Project

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The contents of the original request are not necessarily approved in their initial form as the contents of the Grant Aid Project. The Basic Design of the Project is confirmed considering the guidelines of Japan's Grant Aid Scheme.

The Government of Japan requests the Government of the recipient country to take whatever measures are necessary to ensure its self-reliance in the implementation of the Project. Such measures must be guaranteed even though they may fall outside of jurisdiction of the organization in the recipient country actually implementing the Project. Therefore, the implementation of the Project is confirmed by all relevant organizations in the recipient country through the Minutes of Discussions.

2) Selection of Consultants

For the smooth implementation of the Study, JICA uses (a) registered consultant firm(s). JICA selects (a) firm(s) based on proposal submitted by interested firms. The firm(s) selected carry (ies) out the Basic Design Study and write(s) a report, based upon terms of reference set by JICA. The consulting firm(s) used for the Study which is (are) recommended by JICA to the recipient country to also work on the Project's implementation after the Exchange of Notes, in order to maintain technical consistency.

3. Japan's Grant Aid Scheme

1) What is Grant Aid ?

The Grant Aid Program provides a recipient country with non-reimbursable funds needed to procure the facilities, equipment and services (engineering services and transportation of the products, etc.) for economic and social development of the country under the principals in accordance with the relevant laws and regulations of Japan. Grant Aid is not supplied through the donation of materials as such.

2) Exchange of Notes (E/N)

Japan's Grant Aid is extended in accordance with the Notes exchanged by the two Governments concerned, in which the objectives of the Project, period of execution, conditions and amount of the Grant Aid, etc., are confirmed.

3) "The period of the Grant Aid" means the one fiscal year in which the Cabinet approves the Project for. Within the fiscal year, all procedure such as exchanging of the Notes, concluding contracts with (a) consultant firm(s) and (a) contractor(s) and final payment to them must be completed. However in case of delays in delivery, installation or construction due to unforeseen factors such as weather, the period of the Grant Aid can be further extended for a maximum of one fiscal year at most by mutual agreement between the two Governments.

4) Under the Grant Aid, in principle, Japanese products and services including transport or those of the recipient country are to be purchased.

When both Governments deem it necessary, the Grant Aid may be used for the purchase of the products or services of the third country.

However the prime contractors, namely, consulting contracting and procurement firms, are limited to "Japanese nationals". (The term "Japanese nationals" means persons of Japanese nationality or Japanese corporations controlled by persons of Japanese nationality.)

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5) Necessity of "Verification"

The Government of recipient country or its designated authority will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be verified by the Government of Japan. This "Verification" is deemed necessary to secure accountability to Japanese taxpayers.

6) Undertakings required of the Government of recipient country

In the implementation of the Grant Aid Project, the recipient country is required to undertake such necessary measures as the following:

- a) To secure land necessary for the sites of the Project and to clear, level and reclaim the land prior to commencement of the construction.
- b) To provide facilities of the distribution of electricity, water supply and drainage and other incidental facilities in and around the sites.
- c) To secure buildings prior to the procurement in case the installation of the equipment.
- d) To ensure all the expenses and prompt execution for unloading, customs clearance at the port of disembarkation and internal transportation of the products purchased under the Grant Aid.
- e) To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which will be imposed in the recipient country with respect to the supply of the products and services under the Verified Contracts.
- f) To accord Japanese nationals whose services may be required in connection with the supply of the products and services under the Verified contracts, such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work.

7) "Proper Use"

The recipient country is required to maintain and use the facilities constructed and the equipment purchased under the Grant Aid properly and effectively and to assign the necessary staff for operation and maintenance of them as well as to bear all the expenses other than those covered by the Grant Aid.

8) "Re-export"

The products purchased under the Grant Aid shall not be re-exported from the recipient country.

9) Banking Arrangements (B/A)

- a) The Government of the recipient country or its designated authority should open an account in the name of the Government of the recipient country in a bank in Japan (hereinafter referred to as "the Bank"). The Government of Japan will execute the Grant Aid by making payments in Japanese yen to cover the obligations incurred by the Government of the recipient country or its designated authority under the Verified Contracts.
- b) The payments will be made when payment requests are presented by the Bank to the Government of Japan under an authorization to pay issued by the Government of the recipient country or its designated authority.



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Major Undertakings to be taken by Each Government

NO	Items	To be covered by Grant Aid	To be covered by Nepalese side
1	To secure land		●
2	To clear, level and reclaim the site when needed		●
3	To construct gates and fences in and around the site		●
4	To construct the parking lot	●	
5	To construct roads		
	1) Within the site	●	
	2) Outside the site		●
6	To construct the building	●	
7	To provide facilities for the distribution of electricity, water supply, drainage and other incidental facilities		
	1)Electricity		
	a. The distributing line to the site		●
	b. The drop wiring and internal wiring within the site	●	
	c. The main circuit breaker and transformer	●	
	2)Water Supply		
	a. The city water distribution main to the site		●
	b. The supply system within the site (receiving and/or elevated tanks)	●	
	3)Drainage		
	a. The city drainage main (for storm, sewer and others) to the site		●
	b. The drainage system (for toilet sewer, ordinary waste, storm drainage and others) within the site	●	
	4)Gas Supply		
	a. The city gas main to the site		●
	b. The gas supply system within the site	●	
	5)Telephone System		
	a. The telephone trunk line to the main distribution frame / panel (MDF) of the building		●
	b. The MDF and the extension after the frame / panel	●	
6)Furniture and Equipment			
a. General furniture		●	
b. Project equipment	●		
8	To bear the following commissions to a bank of Japan for the banking services based upon the B/A		
	1) Advising commission of A/P		●
	2) Payment commission		●
9	To ensure prompt unloading and customs clearance at the port of disembarkation in recipient country		
	1) Marine(Air) transportation of the products from Japan to the recipient country	●	
	2) Tax exemption and customs clearance of the products at the port of disembarkation		●
	3) Internal transportation from the port of disembarkation to the project site	●	

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10	To accord Japanese nationals whose services may be required in connection with the supply of the products and the services under the verified contract such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work		●
11	To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which may be imposed in the recipient country with respect to the supply of the products and services under the verified contract		●
12	To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant Aid		●
13	To bear all the expenses, other than those to be borne by the Grant Aid, necessary for construction of the facilities as well as for the transportation and installation of the equipment		●

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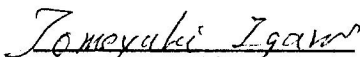
**MINUTES OF DISCUSSION
ON THE BASIC DESIGN STUDY
ON THE PROJECT FOR IMPROVEMENT
OF STORAGE FACILITIES OF IODIZED SALT
IN THE KINGDOM OF NEPAL
(EXPLANATION ON DRAFT REPORT)**

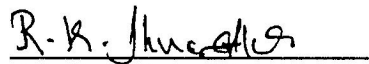
In May 2000, the Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched a Basic Design Study Team on the Project for Improvement of Storage Facilities of Iodized Salt (hereinafter referred to as the "Project") to His Majesty's Government of the Kingdom of Nepal (hereinafter referred to as "HMG/N"), and through discussions, site survey, and technical examination of the result in Japan, JICA has prepared the draft report of the study.

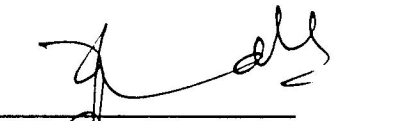
In order to explain and to consult the HMG/N on the components of the draft report, JICA sends to Nepal the Draft Report Explanation Team (hereinafter referred to as the "Team") which is headed by Dr. Tomoyuki Igari, Vice-President of Chiba Medical Welfare College, from August 16 to Sep 7, 2000.

As a result of discussions, both parties have confirmed the main items described on the attached sheet.

Kathmandu, August 31, 2000


Dr. Tomoyuki Igari
Leader,
Draft Explanation Team
JICA


Mr. Ram Kumar Shrestha
Joint Secretary
The Ministry of Industry,
Commerce and Supply


Mr. H. B. Malla
President
Salt Trading Corporation Ltd.

ATTACHMENT

1. Components of draft report

The HMG/N agreed and accepted in principle the components of the draft report.

2. Japan's Grant Aid System

The Nepalese side understands the Japan's Grant Aid Scheme and the necessary measures to be taken by the HMG/N as explained by the Team and described in Annex-3 and Annex-4 of the Minutes of Discussions signed by both parties on May 31,2000.

3. Schedule of the Study

JICA will complete the final report in accordance with the confirmed items and send it to the HMG/N around November 2000.

4. Other Relevant Issues

4-1. The consultants will proceed to further studies in Nepal until September 7,2000.

4-2. The Nepalese side understands that the specification of the equipment is confidential and should not be duplicated or released to any outside parties.

4-3. The transportation of the equipment and materials to each site shall be covered by Grant Aid. The installation of the equipment shall be also covered by Grant Aid.

4-4. The electricity distribution line to the site in Janakapur shall be covered by Nepal side. Before the tendering, which is scheduled in February 2001, Nepal side shall secure the use of land for the distribution line, finish the contract for the lining work and report to JICA.

4-5. HMG/N shall take necessary measures to secure the exemption of VAT which might be imposed on the Japanese contractor/supplier for the procurement of equipment/material under the Grant Aid. This is not limited to the imported items but also local procurement.

4-6. The main objective of the project is to increase storage capacities for proper storage of iodized salt, which entails reduction of storage loss. Therefore, there will be no increase in retail price of iodized salt due to the implementation of the Project.

4-7. STC and Ministry of Industry, Commerce and Supply shall make every possible effort to supply only packed refined salt and crushed salt by phasing out Phoda salt from the market as early as possible.

4-8. The warehouses and equipment to be covered by Japanese Grant Aid shall be used by STC without any charges from the Ministry of Industry, Commerce and Supply.

4-9. STC shall make assessment of the impact of the project particularly in terms of controlling iodine loss in salt, and reduction the loss of salt, in the manner as described in draft report. STC will report the result of the assessment to JICA.

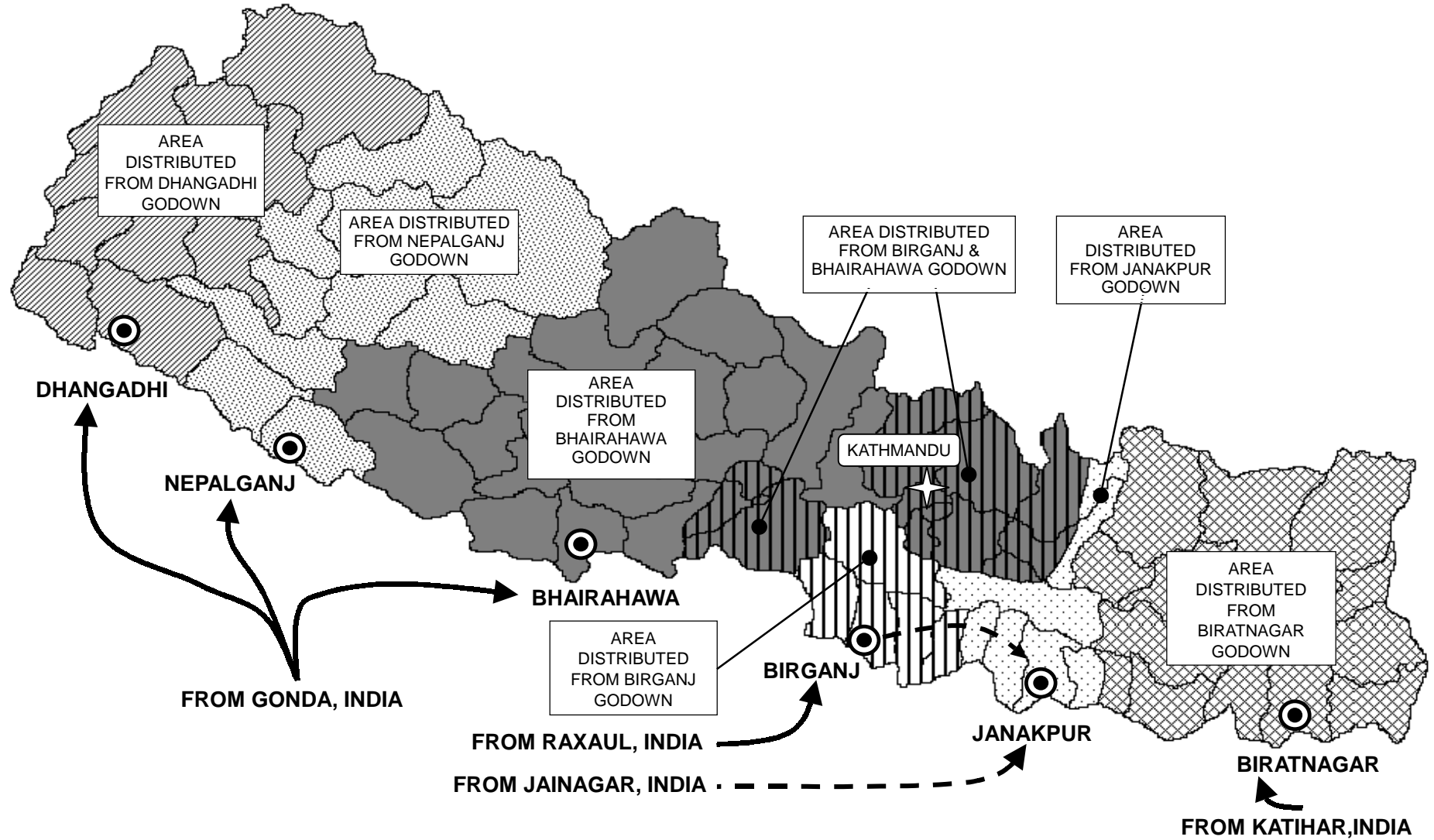
4-10. This Grant Aid Project covers the technical assistance in the field of efficient warehouse management and logistic management.

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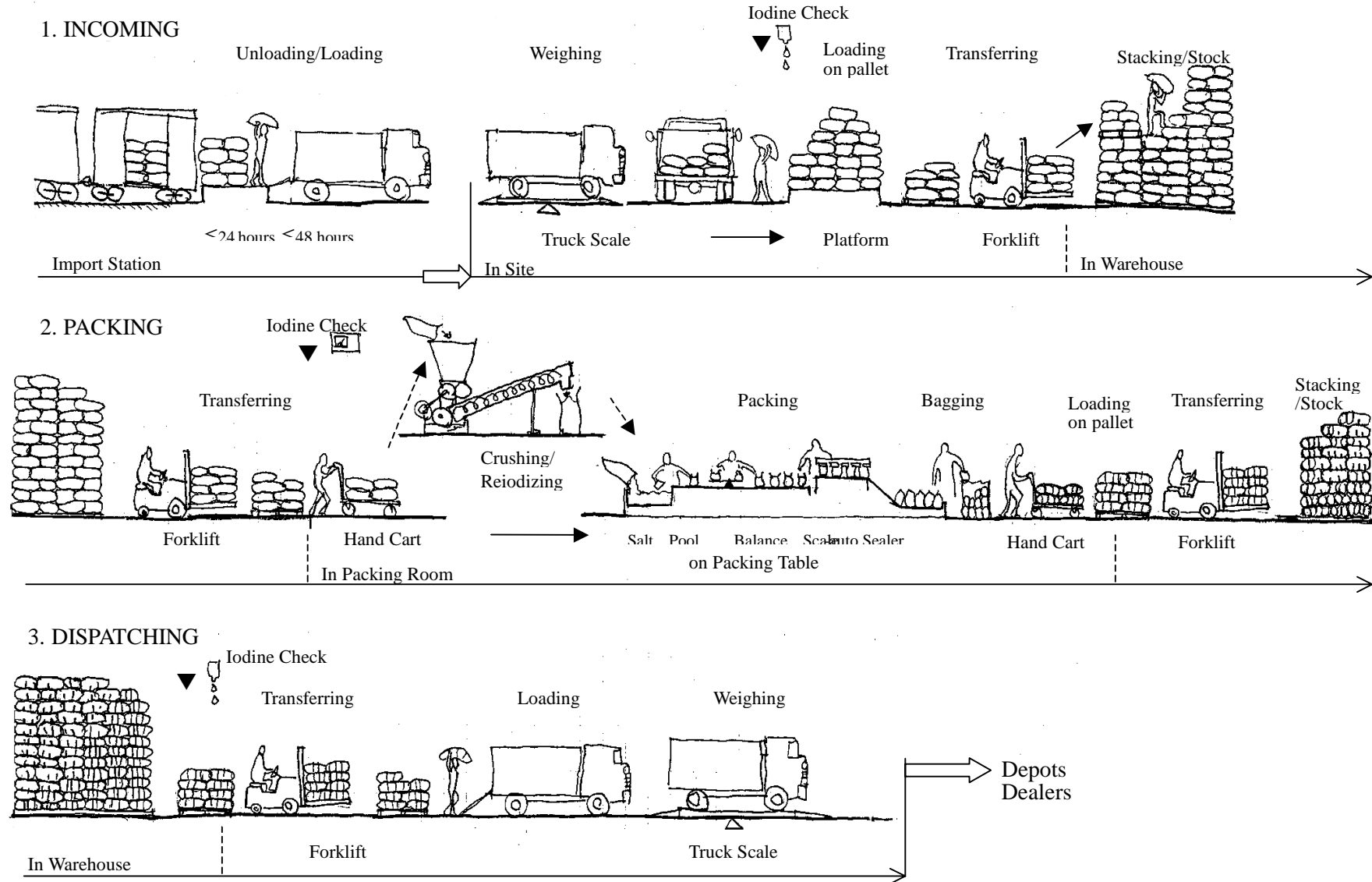
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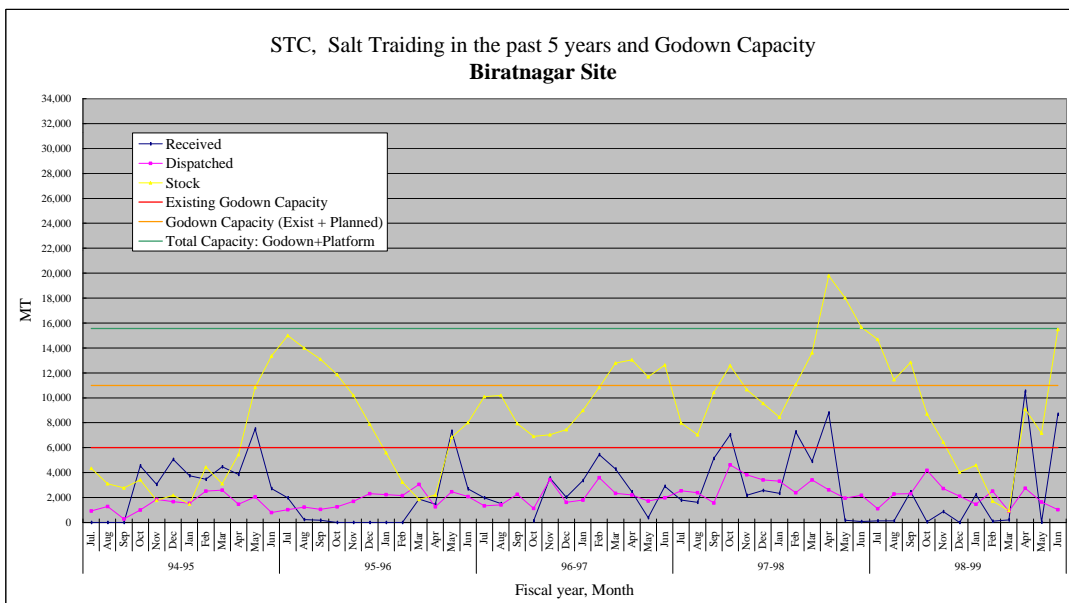
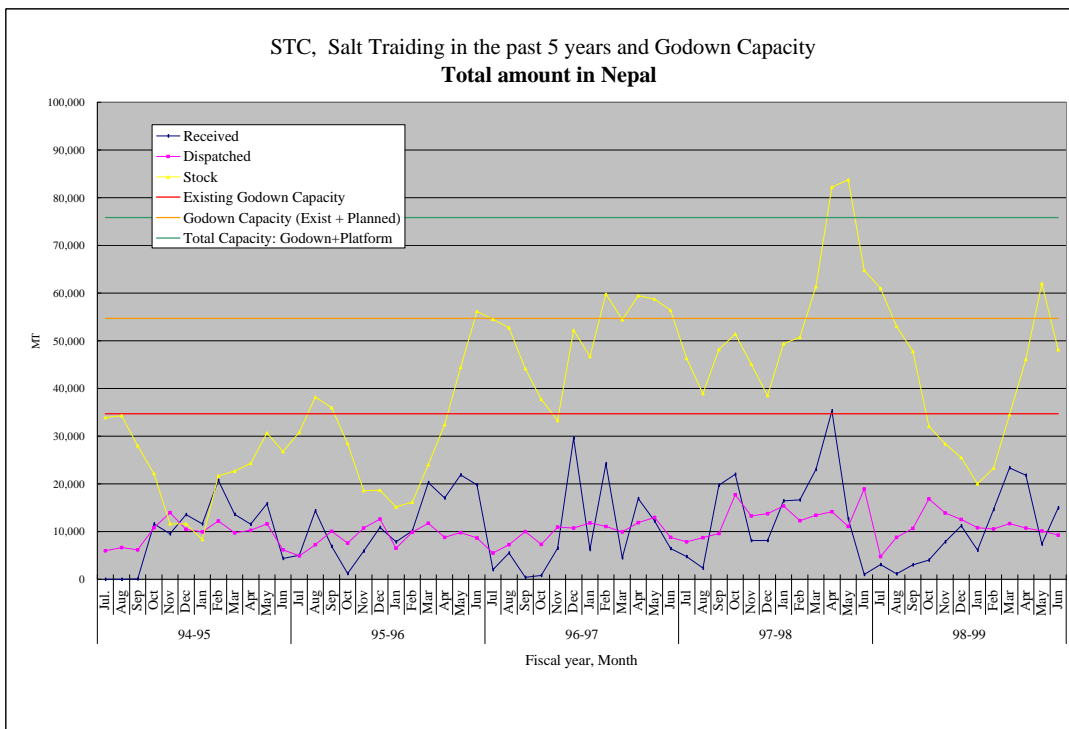
STC DISTRIBUTION TERRITORY



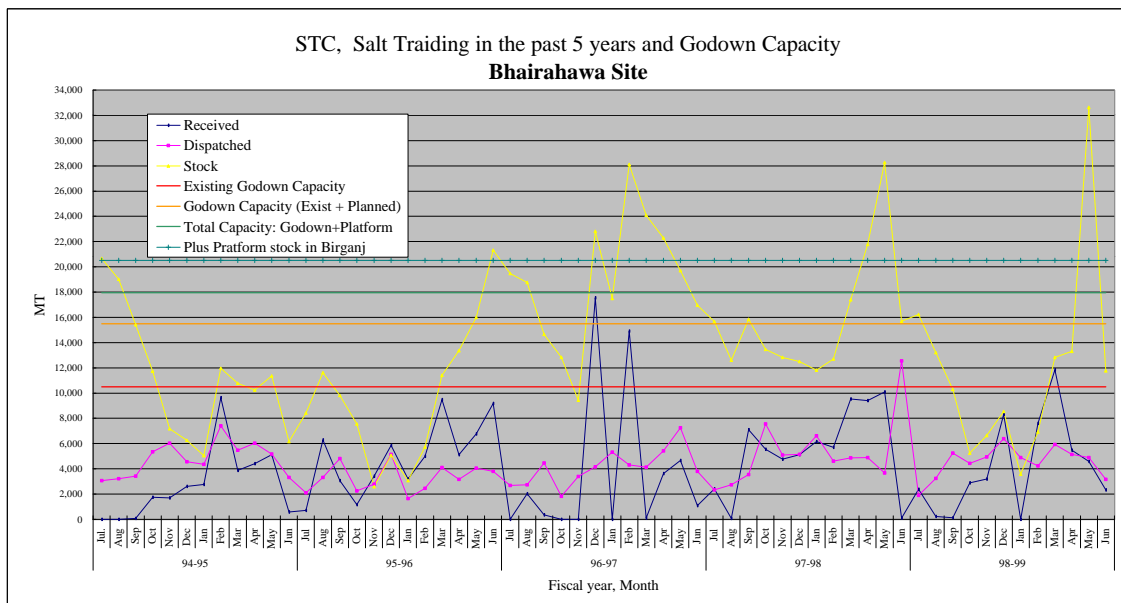
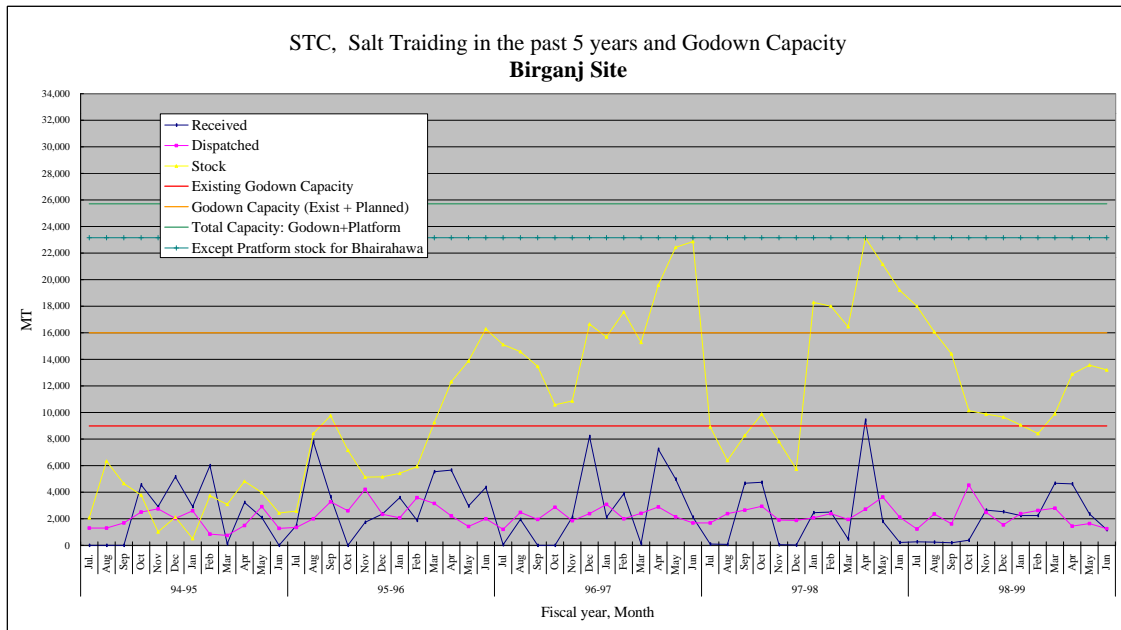
GODOWN FLOW CHART



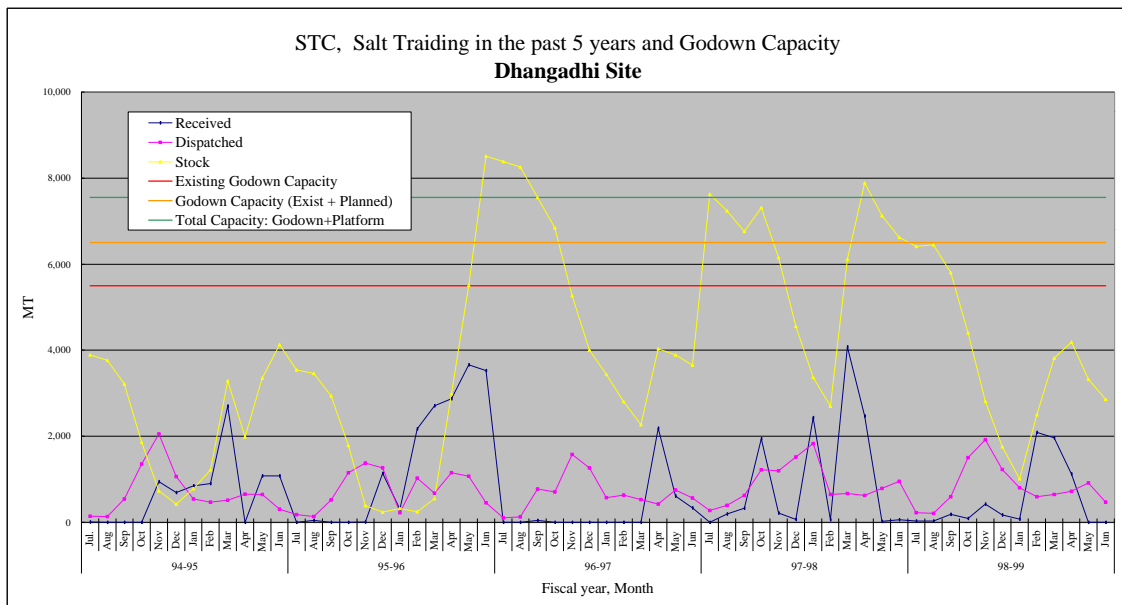
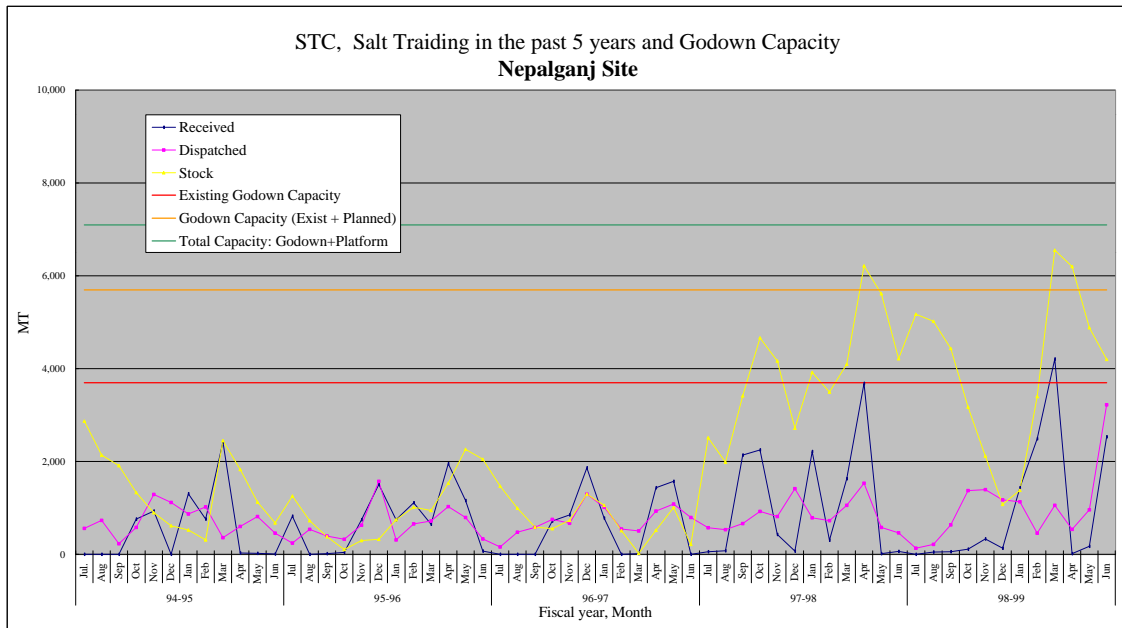
3. STC Trading Data of Iodized Sslt and Godown Capacity 1/3



3. STC Trading Data of Iodized Sslt and Godown Capacity 2/3



3. STC Trading Data of Iodized Sslt and Godown Capacity 3/3



Laws and regulations relating to building permission

According to the General Rules of Municipality, it is necessary for buildings in urban areas to obtain written permission from the local administration or supervising committee.

- a) Relation between the proposed site of building construction, main road, existing buildings, roads, sewer line etc. shown on the site plan. For example road line, road, width, location of trees existing or to be planted on the right or left of road, sewer line etc. if any, should be shown on the site plan.
- b) Application from to construct a building should include site plan, floor plan, elevation and section of proposed building.
- c) During construction approved drawing including site plan should be at the site.
- d) Drawings for presentation:

Plan	Section	1: 100, 1: 50
Site plan	508 m ² or less	1: 100
	509 - 1,524 m ² or less	1: 200
	1,529 m ² or more	1: 400

- e) 4 copies of application from with 5 sets drawing should be submitted for approval.
- f) Drawing shall be supported by two copies of each Land ownership documents, land tax receipt and survey map of the site in duplicate for approval.
- g) After completion of the construction the owner is responsible to make verification and approval from the concerned Municipality.
- h) Construction materials should not be dumped near by roads during construction period, i.e. no obstruction to the pedestrian is allowed.
- i) Necessary precautions/protection should be provided if the building is being constructed in between existing buildings.

Appendix – 5. 4

- j) Pre-approval from the executive committee of the District Town Planning committee is required for any type of land use or to change the land use pattern.
- k) As per the rules, no extension is allowed if maximum ground coverage and FAR exceeds for the proposed plot area.
- l) For the approval of drawing with Plinth area up to 1000sft or 3 stored buildings, floor plan, elevation, section, site plan, location plan etc. prepared by registered designer is acceptable, but for more than the above mentioned criteria architectural drawings, structural design and sanitary design prepared by degree holder registered designer should be included. For those type of buildings approval from Architect or Building engineer is necessary.
- m) During construction Building designer essentially shall supervise the construction. The designer shall certify for the buildings construction completion certificate from the Municipality.
- n) Maximum height of boundary wall connected to road should not be more then 1.65 m. Above this height up to 2.15m more can be of railing or concrete mesh boundary.
- o) Provision of cantilever, verandahs, septic tanks, water tanks, and staircase is not allowed to the public road area and up to set back distance.
- p) Buildings shall be separated from power cables by the following distances:
11 kV: 1.25 m or more, 33 kv: 2.00 m or more
- q) Buildings shall be separated from national highways by at least 25 m.
- r) Buildings shall be separated from compound Wall by at least 1.5 m.
- s) Municipality tax for drawing approval NRs 10.00 per sq feet. NRs 5.00 per sq feet will be return after the completion of construction work.