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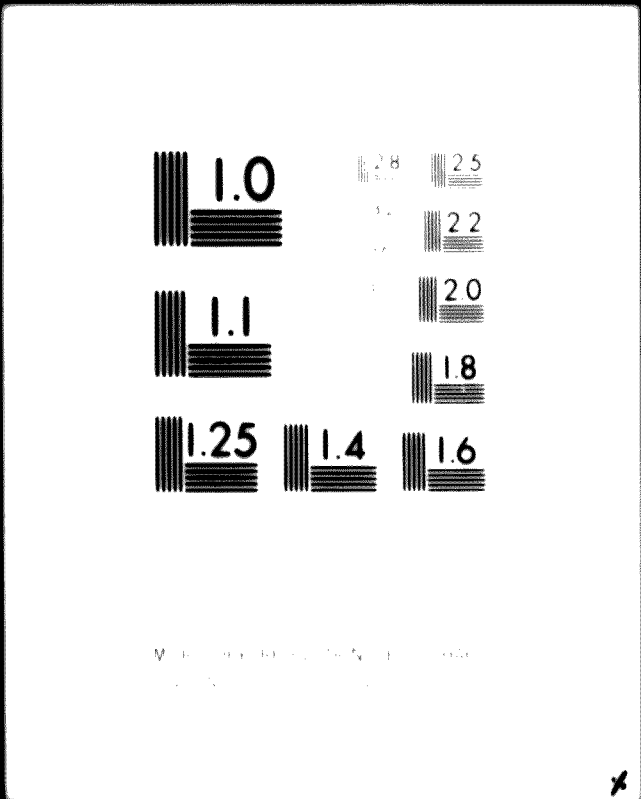
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**A study of the
Masan Free Export Zone .**

Final Report .

**For United Nations
Industrial Development Organization
Vienna, Austria**

Project IIS 70/1125

UNIDO Contract No. 71/10

8921.5

August 1971

REC'D 5.8.71

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Masan Free Export Zone

Final Report

For United Nations
Industrial Development Organization
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Project SIS 70/1135
UNIDO Contract No. 71/19

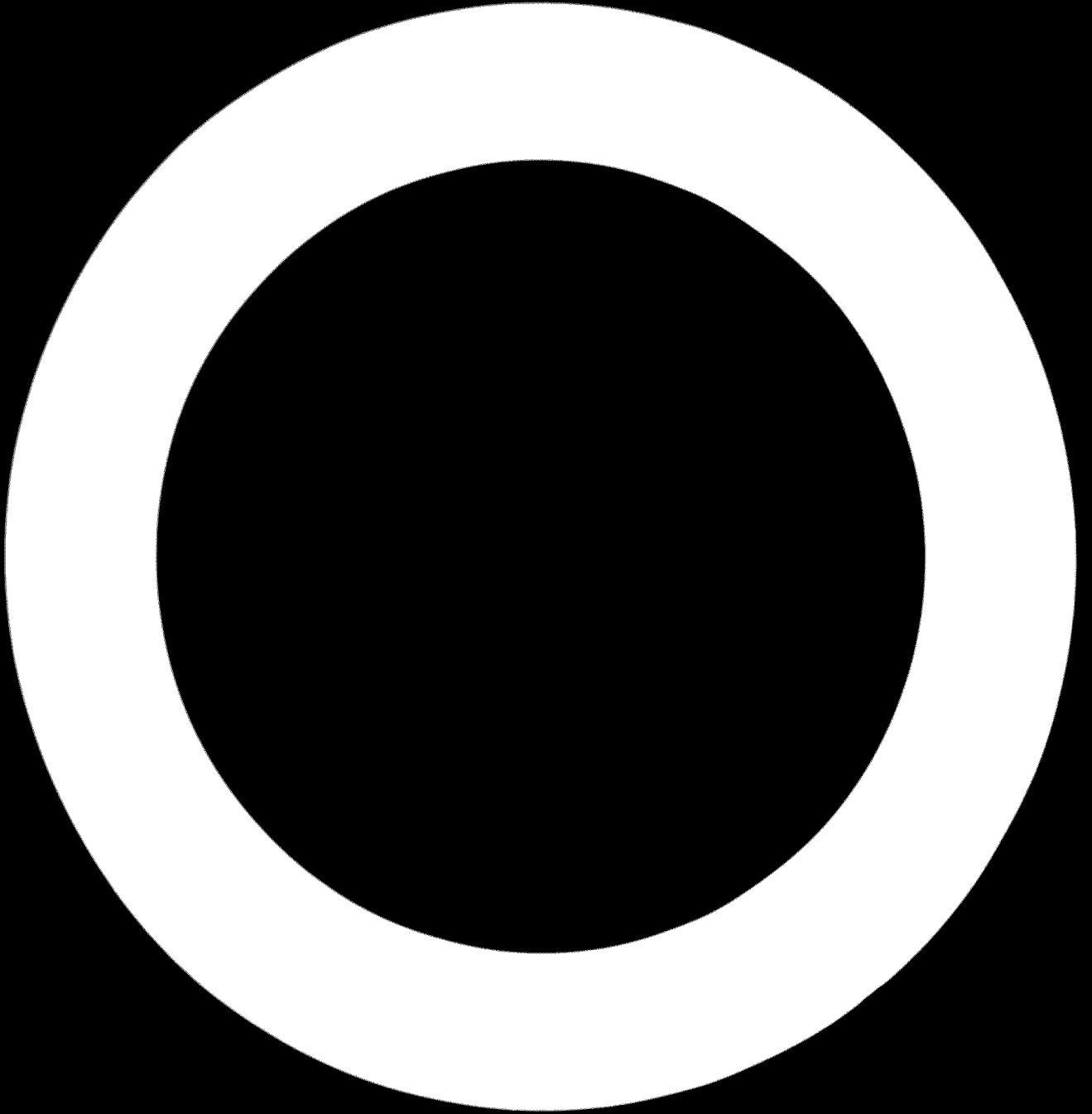
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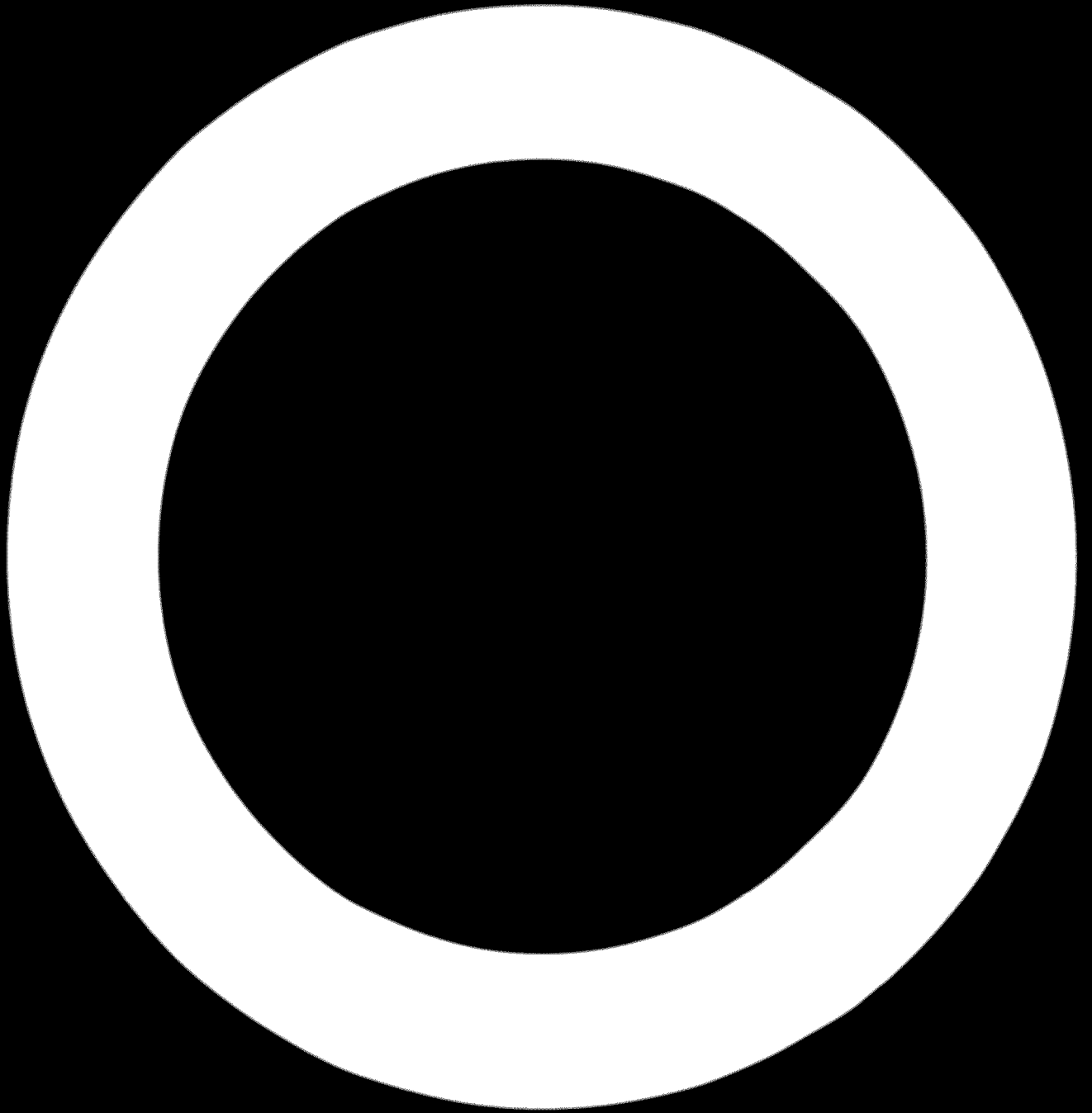
MAFFZ Site Aerial View



SYNOPSIS

The United Nations Industrial Organization (UNIDO), requested Bechtel International Corporation to undertake an engineering and economic evaluation of the Masan Free Export Zone (MAFEZ) in Korea. This study was conducted between April and August, 1971, during which time Bechtel reviewed the existing development plans and construction activities already underway and found them for the most part to be technically sound and well conceived. The major recommendations of the study are that (1) provisions be made for the eventual integration of industries locating in the zone back into the domestic economy and (2) the time period for development of MAFEZ be lengthened. While this will help eliminate undesirable impact on the surrounding community, the need for new economic and social infrastructure will be substantial. Specifically a major housing program with the attendant infrastructure will be necessary to accommodate the influx of workers and their families attracted to MAFEZ.

The overall benefits accruing to the Korean economy from the MAFEZ development should be substantial, and will help Korea to industrialize and to increase exports and foreign exchange earnings. Similar activities such as future free export zones and the existing export industrial estates should be centralized under a common agency to assure efficient administration and promotion and to maximize the national economic benefits.



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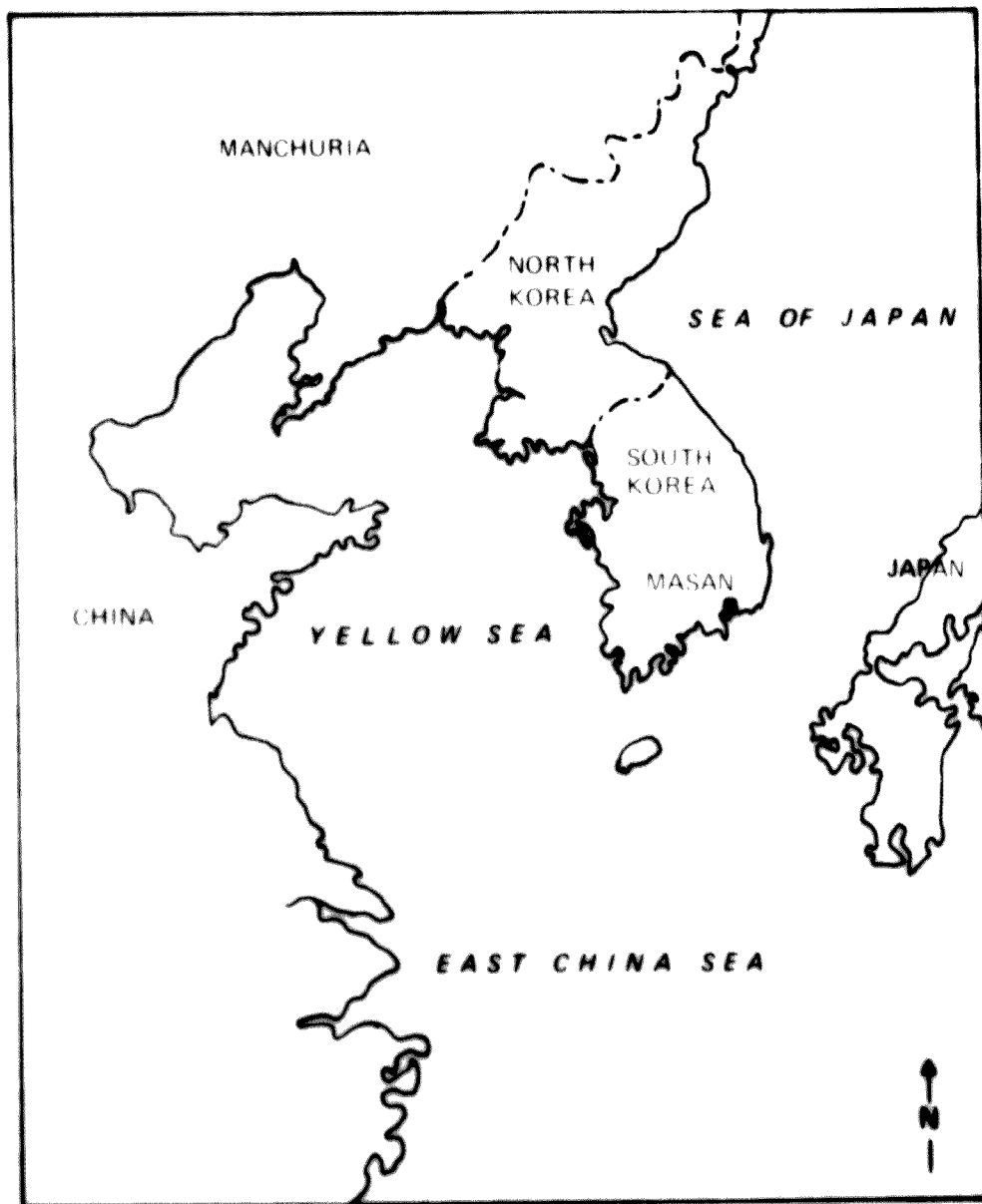
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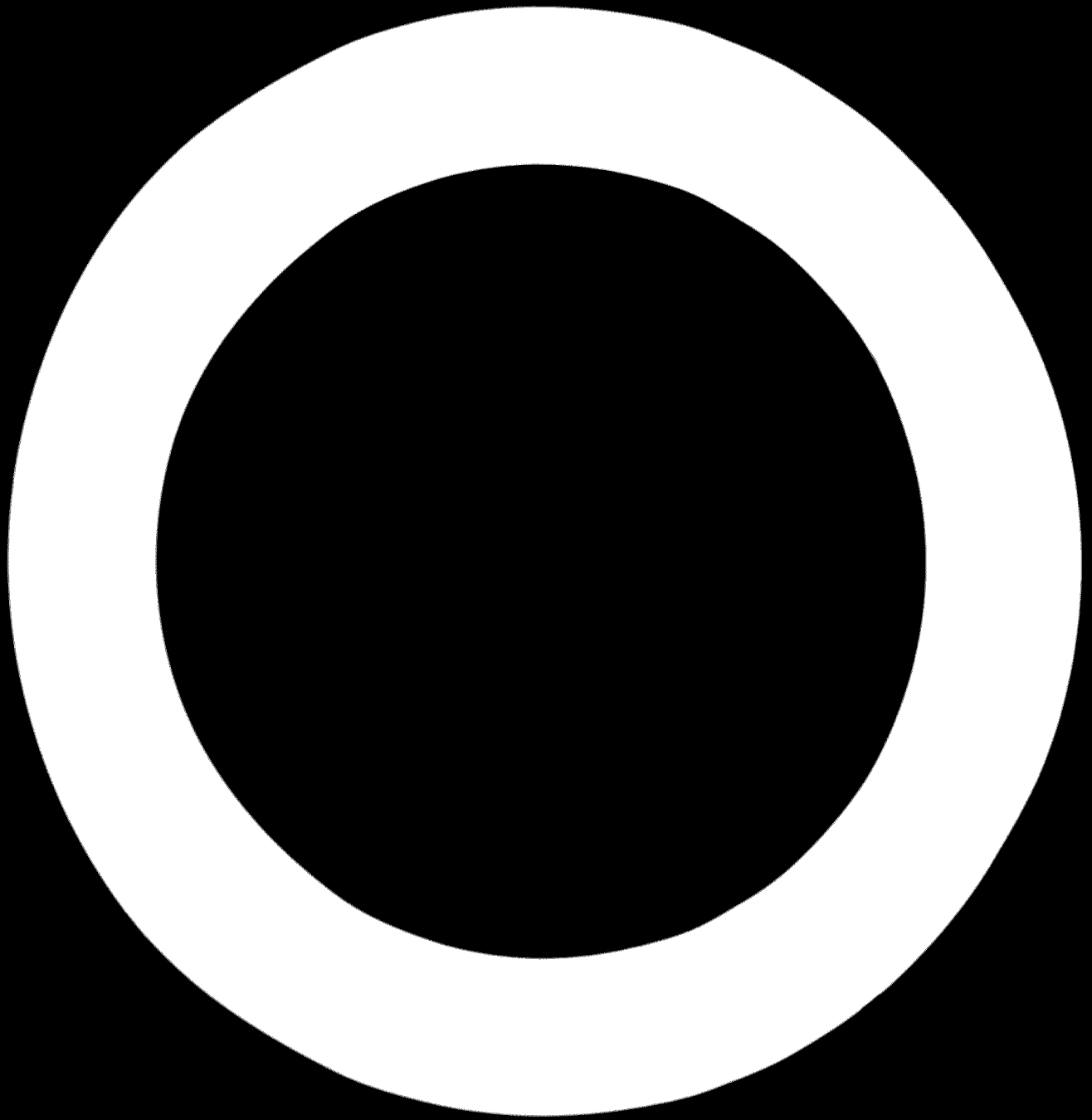
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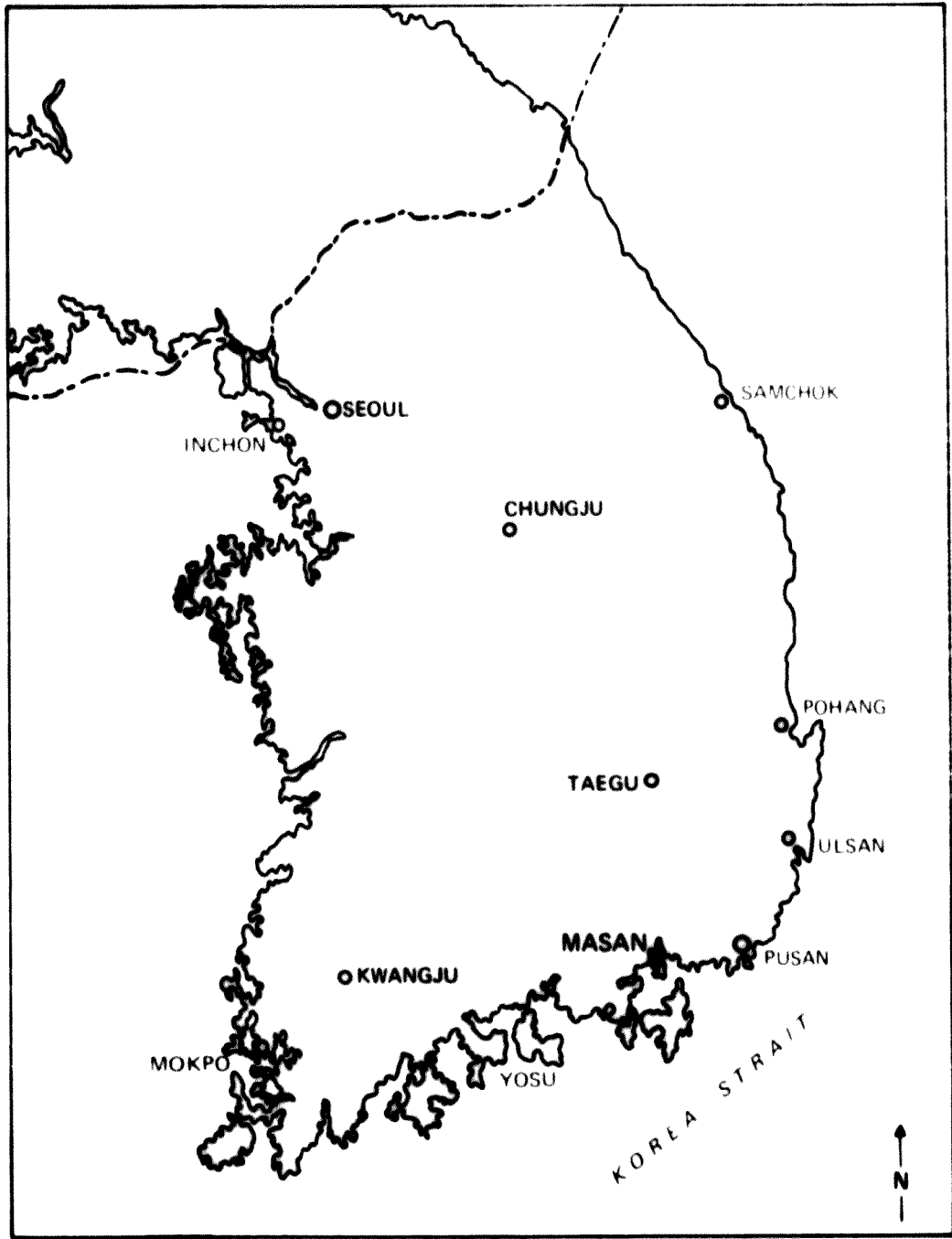
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Northeast Asian Area





South Korean Coast

section 1

Introduction

Section 1

INTRODUCTION

The Masan Free Export Zone (MAFEZ) located in the northeastern portion of the City of Masan, was formally established in January 1970 in accordance with Korean Law Number 2180. The purpose of its establishment was to provide a means of attracting foreign investors to construct and operate commercial manufacturing facilities for processing raw materials into export products.

Since the Free Export Zone at Masan is important to the industrial development strategy of Korea and represents the first of possibly several other developments, the Zone Administration asked the United Nations Industrial Development Organization (UNIDO) in Vienna for assistance in securing an overall study of the free export zone concept. UNIDO selected Bechtel International Corporation to perform a survey-type study and authorized by Contract No. 71/19 the performance of 13-1/2 man-months of onsite and home-office services to this end. The Bechtel team was dispatched to Korea on April 23, 1971, and returned on June 4. The final report which follows presents their findings, conclusions, and recommendations.

The UNIDO Statement of Work encompassed a broad spectrum of technical assistance including the following significant items:

- Review of and recommendations regarding existing implementation plans
- Identification of candidate industries for MAFEZ
- Examination of changes in the international markets

- Analysis of the labor force available to MAFEZ
- General survey of transportation and planning
- Analysis of utility requirements
- Development of physical plans
- Overview of engineering phases
- Economic and financial studies
- Analysis of current problems

By its very nature, such a list of activities implies a general survey with further penetration as feasible into specific areas of maximum urgency or importance.

The team found the Korean Zone Administration had completed the planning and were well along with construction of Section I of the Free Export Zone. The MAFEZ site has been divided into three sections and the first of these sections has been purchased, filled, and improved for use. Several buildings are under construction; one factory has already been completed and is currently in production. Approval has been granted for eleven firms to locate there, and several more applications are currently being processed. (See Figures 1-1 and 1-2.)

The MAFEZ organization is actively engaged in promoting the zone with foreign manufacturing firms. Such promotion activity, of course, is premised on already completed engineering plans and development programs. The Bechtel team was able to start immediately at the outset of the planning analyses with an examination of the adequacy and flexibility of the planning already accomplished.

The broad details of the MAFEZ program are encompassed in the "Report on Master Plan and Final Design for Masan Free Export Zone," published in September, 1970, by the Ministry of Construction and revised in December 1970. In conference with the engineers and planners responsible for



Figure 1-1. Standard Factory Building Under Construction

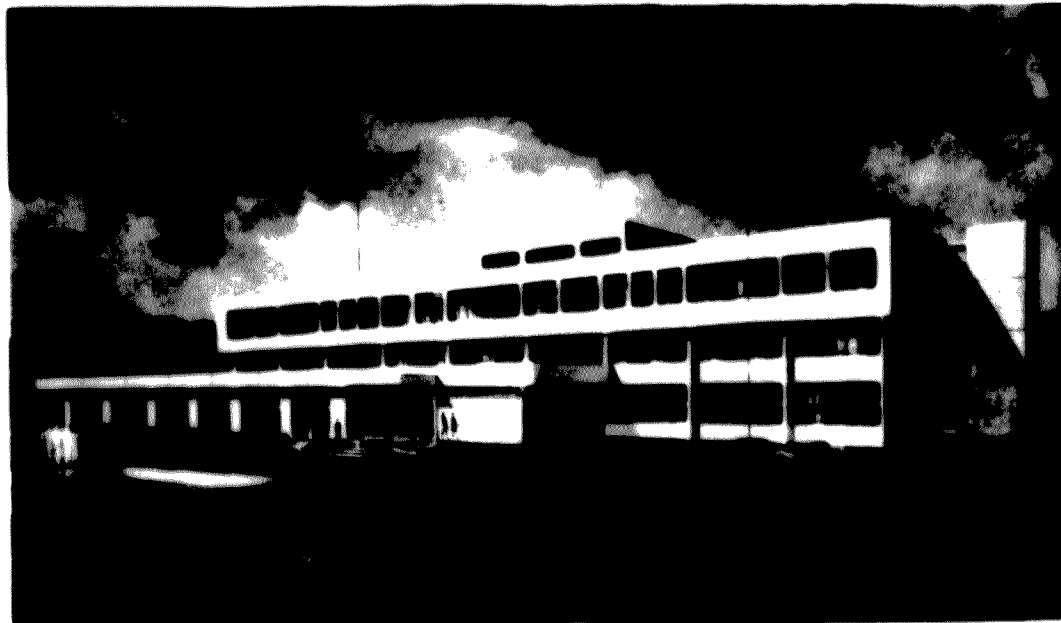


Figure 1-2. Perspective of Administration Building Under Construction

this document and the body of engineering effort flowing from it. Bechtel's specialists were able to determine to their satisfaction that the effort was properly directed and professionally competent. However, by drawing upon their broader perspectives in regional planning they were able to provide a number of suggestions on the further course of action which are described later in this report.

Since the generally satisfactory nature of the engineering and design work already completed significantly reduced the amount of effort necessary in certain of the anticipated problem areas, the team was able to turn its attention to the important and urgent considerations of the impact of the zone on the surrounding community - in housing, skill availability, and training programs, and in the downstream prognosis for survival of such zones as MAFEZ in changing markets, increasing labor sophistication, and new competition. Several significant conclusions and recommendations have emerged from this analysis.

A small portion of the team's time was spent to review the status of preliminary planning for a free export zone at Yosu. The general thrust of this effort is included as Appendix A to this report.

section 2

**Findings, Conclusions, and
Recommendations**

Section 2

FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

Korea has made a good start in integrating the free export zone concept into the commercial economy. This activity is represented by MAFEZ as well as other free export zones and the export industrial estates. These are collectively a significant effort to overcome some of the problems of an underdeveloped industrial and commercial infrastructure and to enhance exports and foreign exchange earnings.

The present plans and programs for MAFEZ have been evaluated in the context of maximizing the return to Korean economic and social development as a result of these investments. The following findings, conclusions, and recommendations have been developed as a result of this analysis.

2.1 FINDINGS AND CONCLUSIONS

Organization and Management of MAFEZ

MAFEZ has been modeled after KEPZ in Taiwan, stressing labor intensive light industrial occupancy, and export orientation. Korean ownership of enterprises is limited to 50 percent of the total investment. MAFEZ is a transitional undertaking which can accelerate the training of Korean managerial and technical personnel, eventually serve domestic as well as foreign markets, and increase the availability of hard currency. The effectiveness of MAFEZ as a transitional device in industrial development will be enhanced by integrating it more fully into the Korean economy.

The MAFEZ administration was created by the "Law for the Establishment of Free Export Zones," which assigns this administration authority only over the zone of Masan. The zone is administered independently from other free trade zones and export industrial estates which differ very slightly from MAFEZ in the provisions and inducements for prospective tenants. The Korean economy would benefit from an integrated management approach for all export processing zones and export industrial estates.

Candidate Industries

The dominant industries in the Masan area are machinery, metalworking, and textiles. Similar industries which locate at MAFEZ will be relatively more viable, use more local raw materials and service, and be able to make an easier transition into the domestic economy as trade barriers and consequent needs for a free export zone are reduced. Because of site characteristics, MAFEZ is poorly suited for industries that require (1) land with heavy load-bearing capacity, (2) large ships to transport raw materials or finished products, or (3) large tracts of inexpensive land.

International Market Considerations

The recent advent of multinational companies and current regional international commodity flows confirm the potential of success for MAFEZ and complementary developments in Korea. Trade barriers which favor the establishment of free ports will eventually be eliminated, thus diminishing this particular advantage of MAFEZ. Therefore, a development pattern should be established which will result in the integration of industries back into the Korean economy.

Promotional Concepts

Korea is only beginning to emerge as a site for foreign investment, and a coordinated promotional approach for MAFEZ, the export industrial estates, other free trade zones, and all other industrial zones has national advantage. A direct solicitation of interest - a "rifle-shot" approach - in seeking out foreign investment is the most effective means of promoting MAFEZ. The fiscal and physical incentives offered potential investors are a means of creating a special appeal for MAFEZ and a compensation for the required minimum level of value added in the zone. Many incentives now apply and most of these also apply to the export industrial estates. Table 2-1 compares selected characteristics of the various types of opportunities available in Korea to foreign investors. The minor differences between MAFEZ and the export industrial estates does not necessarily provide a distinct advantage for MAFEZ.

Description and Engineering Evaluation of MAFEZ Development Plan

The geographic location selected for the free export zone is the result of a concerted effort by the Korean government, and the site selected appears to be a favorable one. The Bechtel team found the overall plan for MAFEZ to be generally well conceived and supported by sound engineering design and construction capability. An additional water system will be required for the MAFEZ expansion into Sections II and III, and this project should be coordinated with future expansion of water supplies for the city of Masan.

Human Resources

Based on the experience of Korean export industrial estates, KEPZ, and types of firms already attracted to MAFEZ, there will be a large demand for unskilled workers, especially young females. The employment target

Table 2.1

COMPARISON OF FREE EXPORT ZONES AND
OTHER INVESTMENT OPPORTUNITIES

Item	Free Export Zone	Other Investment Opportunities
1. Location	Coastal areas	Anywhere
2. Size	Small	Large
3. Investment	Low	High
4. Taxation	Low	High
5. Labor	Unskilled	Skilled
6. Infrastructure	Basic	Advanced
7. Government	Central	Local
8. Risk	Low	High
9. Flexibility	High	Low
10. Security	High	Low
11. Services	Basic	Advanced
12. Transportation	Good	Poor
13. Utilities	Good	Poor
14. Environment	Good	Poor
15. Social	Good	Poor
16. Political	Good	Poor
17. Economic	Good	Poor
18. Cultural	Good	Poor
19. Historical	Good	Poor
20. Future	Good	Poor

of 65,000 workers in the zone, which, based on a ratio of 11 workers per hectare, an unpublished worker-density criterion, will far exceed the available supply of this type of worker in Masan, and importation of workers from throughout Gyeongsangnam Province and other parts of Korea will be necessary. Skilled labor is in short supply in Korea. Industries in MAFEZ cannot expect to meet their requirements by importing from other parts of the country. Training facilities must be expanded in Masan and must be closely tailored to industrial needs.

Transportation

A substantial fraction of the cargo generated in NAFEPZ will be imported from abroad and, therefore, be trucked to El Paso for international shipment. Present provisions of shipping cargoes into and out of NAFEPZ appear to be insufficient to justify the necessary investment to make El Paso an international port.

The present highway network in the north represents a restriction on the flow of traffic in and out of the zone.

Transportation of the large number of workers within the zone and the absence of street parking could be a serious problem.

Community Impact

The local labor force available in El Paso City is insufficient to meet the projected development schedule; workers will have to be imported.

As well as with the attendant commercial and community facilities and infrastructure will have to be built to the north of the existing city. The most critical housing problem will be the accommodations for young female workers. Figure 2-1 illustrates the need for housing in El Paso during the period 1978 through 1990 and the supply on the basis of 19800 new units entering the inventory each year, assuming simplified straight line growth of demands and supply.

Facilities such as a western style hotel, trade center, and recreation facilities are needed to improve the quality and environment of both visitor life and residents of El Paso.

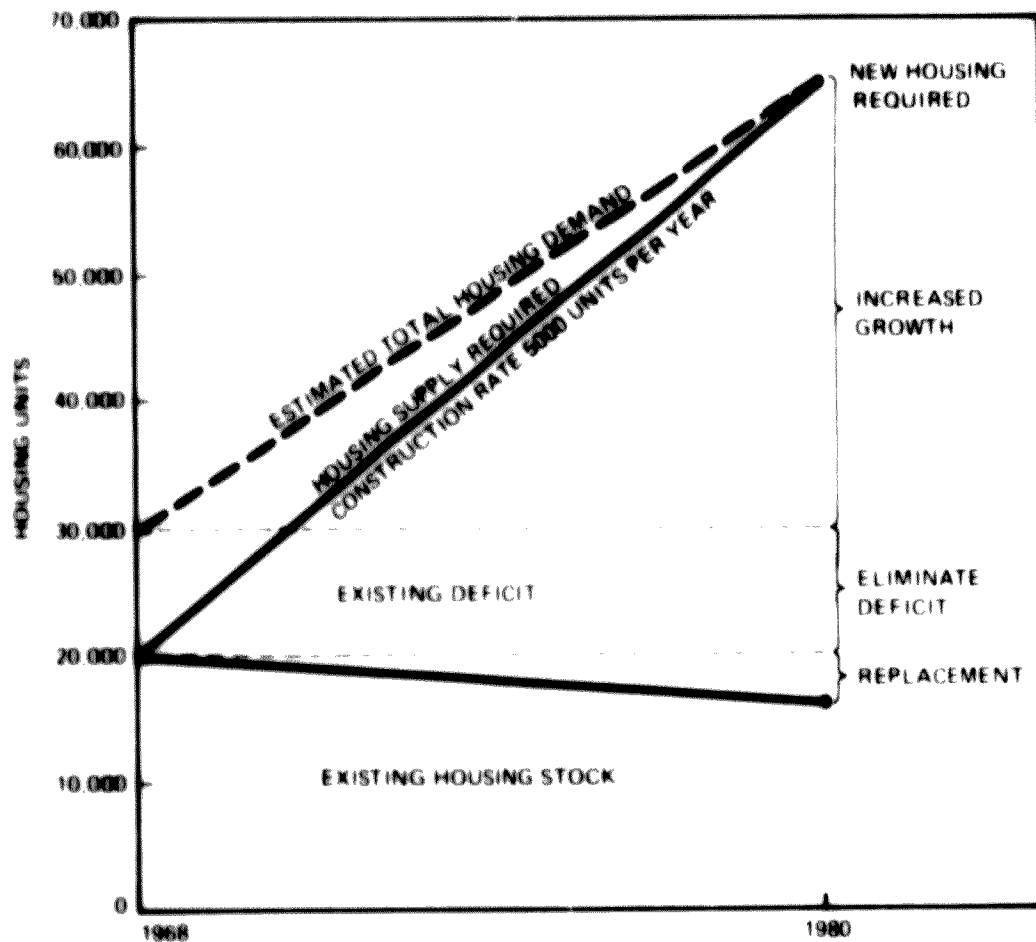


Figure 2-1 Housing Situation in Masan 1968-1980

The expanded need for water created by the planned development of Sections II and III will require a cooperative effort in order to expand the supply for this purpose and for newly developing urban areas.

Financial Studies

The internal rate of return on the investment in MAFEZ is approximately one half of one percent over a 50-year time period. Since higher rates of return are presumably available from alternative investments, this represents a subsidy to the industries locating in the zone. However,

this subsidy is well within the framework of other incentives given to these industries and should be evaluated in terms of the substantial benefits, both direct and indirect, accruing to the Korean economy. Economic benefits from industries locating in MAFEZ could be increased by selecting companies that (1) employ a greater proportion of skilled workers, (2) use more Korean raw materials and services, (3) require more utilities, (4) provide technological infusion and (5) contribute to the overall industrialization program of Korea. Figure 2-2 indicates the direct leverage of increased skill-level of employment in MAFEZ.

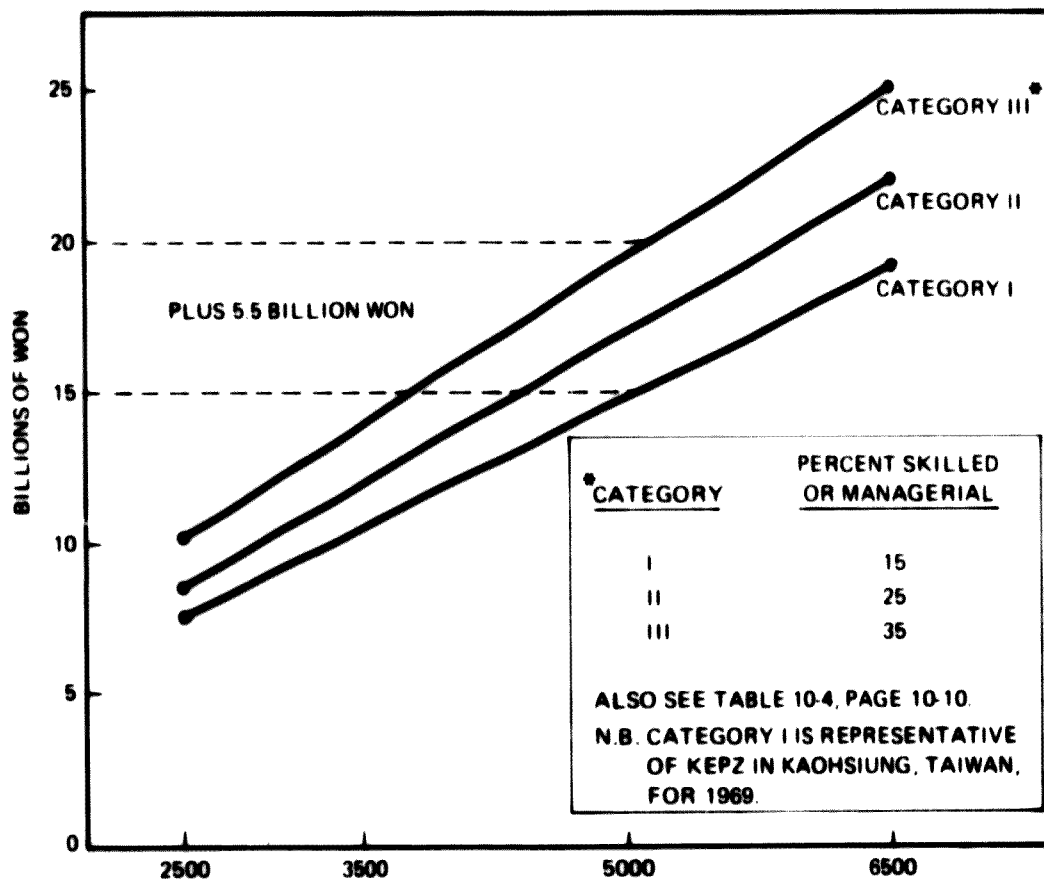


Figure 2-2. Income Leverage of Higher-Skilled Employment in MAFEZ

2.2 RECOMMENDATIONS

Following are the major recommendations based upon the above findings and conclusions:

Organization and Management of MAFEZ

- Greater Korean ownership of occupant enterprises should be permitted after an operating period of five years.
- The MAFEZ administration function should be expanded to include complete responsibility for collectively administering all of the export processing zones and export industrial estates.

Candidate Industries

- MAFEZ should emphasize industries with capabilities already found in the Masan area, such as the metal working and machinery industries.
- Industries should be selected primarily on the basis of (1) how much value added they bring to the Korean economy, (2) where the products are marketed, and (3) skill level requirements and potential for technological transfer, rather than with reference to subjective lists.

International Market Considerations

- The Korean Government should selectively allow sales to the domestic economy, encourage forward linkages, and maximize use of local raw materials.

Promotional Concepts

- Emphasis should be given to the direct approach in seeking out foreign investment. The body of the report describes several specific promotional patterns consistent with this recommendation.

- The incentives offered potential investors at MAFEZ should be reviewed periodically in relationship to priorities of the Korean Government to assure that there is appropriate advocacy of MAFEZ relative to other opportunities available to foreign investors.

Description and Engineering Evaluation of the MAFEZ Development Plan

- Korea should continue to implement and to update the master plan for MAFEZ and to bring to bear the same high levels of engineering and construction practices.

Human Resources

- The time period expected for the development of the zone should be extended, thus reducing the community impact and allowing additional time for the expansion of training facilities.
- The restrictions on the number of workers required for given occupied areas in the MAFEZ should be reduced, which will presumably reduce overall employment targets.

Transportation

- The alternative of expanding the Pusan port facilities should be studied prior to final decision on the present plan to make Masan into a major port facility.
- The major expressway between Masan and Pusan should be completed as soon as possible and include a direct connection to MAFEZ.
- A right-of-way for rail access should also be reserved until the need for rail shipment can be ascertained.
- A well-planned zone bus system should be developed to provide personnel transportation within the zone.

Community Impact

- The MAFEZ administration should cooperate with the Home Ministry, Ministry of Construction, and City of Masan in the development of a dynamic housing program, to accommodate

the 4000 to 6000 annual demand for housing units that is expected to be thrust upon the surrounding community.

- The MAFEZ administration should work actively to promote facilities such as a western-style hotel, trade center, and recreation center to serve visitors and residents of Masan.
- The MAFEZ administration should work with the proper authorities to insure that the appropriate infrastructure is developed to support activities within the zone.

Financial

- The relatively low financial return should be accepted, and continued emphasis should be given to maximizing the economic benefits of the zone.

section 3

**Organization and Management
of MAFEZ**

Section 3

ORGANIZATION AND MANAGEMENT OF MAFEZ

3.1 GENERAL

3.1.1 Functions Performed by Free Trade Zones

One primary function of a free trade zone is to create a climate attractive to foreign manufacturing firms seeking a site to establish new plants. Operating a manufacturing establishment in such a zone should be as problem-free as possible. Customs and tariffs should be eliminated to minimize detailed paperwork and expedite movement of inventory. A single government agency should be the contact concerning all official matters, from granting permission to build or lease factory workspace to handling foreign exchange, controlling smuggling, and acting as liaison with the surrounding community.

By careful planning and clustering of industrial activities, a wide variety of services can be made available and can be offered at a lower unit cost than would otherwise be possible. Likewise, efficient infrastructural requirements such as electrical power, water, waste disposal, transportation, communications, storage, warehousing space, community services, and housing can be offered, and economies of scale can be achieved insuring low costs.

3.1.2 Role of Government Agencies

The creation of an attractive business environment requires the effort of many government agencies and a dedication of national resources for

its development. Some of the government agencies in Korea that must be involved in this cooperative effort include:

- Ministry of Commerce and Industry
- Economic Planning Board
- Ministry of Home Affairs
- Ministry of Finance
- Ministry of Justice
- Ministry of Construction
- Ministry of Transportation
- Government Labor Office

Each of these agencies will play an important role in insuring that a favorable business climate, attractive to foreign investors, is maintained.

The zone administration, in turn, must ensure that business operations are greatly simplified. The administration must also be able to respond quickly to the needs of resident firms or firms contemplating investment in the zone.

One study of foreign trade zones³ lists several important reasons why these zones failed in their efforts to expand the amount of international commerce handled. Some of the more important reasons offered which will serve as guidance to the MAFEZ administration are:

"the burden of customs costs, the inflexibility of customs personnel in administering the regulations, the lack of support by government agencies, some inflexibility on the part of the Foreign Trade Zones Board, the competition of customs bonded warehouses, and other factors."

³Dymsza, William A., Foreign Trade Zones and International Business, Rutgers University, Newark, New Jersey, 1964, p. 231

The study further states:

... "Foreign trade zones have been handicapped by their inadequate facilities, small-scale operations, and to varying extents by inconvenient locations. Zones have not engaged in adequate and imaginative promotion of their services and some of them may not have had an aggressive, dynamic management. Moreover, the management of foreign trade zones seems to have placed too great an emphasis upon warehousing and simple manipulation of imported merchandise.... rather than on services, such as processing, manufacturing, exhibition, and merchandising, in which such zones have unique advantages."

3.2 A STRATEGY FOR USING MAFEZ AS A TRANSITIONAL DEVICE IN INDUSTRIAL DEVELOPMENT

The limitation of Korean ownership of the enterprises occupying MAFEZ to 50 percent of the total investment might prove disadvantageous initially since it may retard the rate of increase in the occupancy of the zone. However, there are sound reasons for this restriction in terms of the prospective gains in foreign investment, the improved access to international markets, the services of foreign technicians and management, and the increased possibilities for technological transfer to Korean nationals. This is consistent with the recommended direction of MAFEZ development toward the recruitment of firms in industries with higher skill demands, greater training efforts, and improved linkages to the Korean economy. Thus, while the restriction on ownership might exclude some otherwise potentially attractive firms, the long-run advantages to Korea should prove to be worth the greater recruiting effort and the possible delays in attaining complete occupancy of the zone.

On the other hand, there are reasons to favor relaxation of this restriction after the enterprise has been producing in Korea for a period of five years. Several considerations tend to support this course of action. In the first

instance, it can be assumed that five years is sufficient time to train a labor force, including managerial and technical personnel. The Korean economy has then gained the advantage of technological transfer to nationals who can continue whatever training effort is necessary to keep abreast of subsequent changes in techniques. Secondly, the advantages of foreign markets which are open to the Korean economy as a result of the initial foreign investment should no longer be of primary consideration. Along with the techniques of production, the enterprise, with its gradual infusion of Korean managerial and marketing personnel, should be in a position to capture new markets, widen existing sales areas, and respond to changing demand conditions as they occur.

Thirdly, the hard currency necessary to reduce foreign ownership and increase Korean equity should be more readily available five years hence because of the growth in exports in the interim, as well as the improved domestic ability to substitute for many of the goods presently being imported. Furthermore, as the balance-of-payments situation eases to permit Korean nationals to acquire additional equity in these enterprises, value added to the domestic economy will be improved by the amount of profits accruing to that portion of equity purchased by Koreans and previously expatriated by the foreign owners.

It is therefore recommended that the regulations stipulating maximum Korean ownership of occupant enterprises be relaxed after a period of five years of continuous operation to permit up to 100 percent equity by local citizens. There may be good and sufficient reasons for some firms to remain wholly or partially owned by foreigners. Subsidiary enterprises producing components on specifications dictated by a parent company are obvious examples. **Special types of manufacturing firms might also require longer periods of time to be completely integrated into the Korean economy.** Thus it would be inadvisable to attempt to increase the proportion of domestically held equity through government regulation.

The best way to increase Korean ownership in the firms would be to relax the regulation after a period of successful operation, and thereafter to permit market forces to determine the outcome.

It is also recommended that firms occupying the Masan Free Export Zone be integrated into the domestic economy by increasing the proportion of their output which they are permitted to sell in the Korean economy. The gradual increase in domestic sales might be tied to a simple formula relating value added to the Korean economy to a percentage of output sold domestically. Foreign exchange earnings can be measured by the amount of value added within the Korean economy. As additional inputs emanate from the local economy, the foreign exchange earnings increase and thus more hard currency is available for imports, including components of the finished product. Thus the occupant enterprise should be permitted to increase its penetration of the domestic market as its position as a foreign-exchange earner improves. It would of course be required to pay any applicable customs duties on the imports imbedded in the final product when sold domestically, plus any other applicable taxes. However, firms manufacturing products which are in demand in the local market would be encouraged to increase domestic value added and would also be permitted to sell at prices which reflect any lower costs which might accrue from economies of scale as a result of combined foreign and domestic sales.

3.3 PHASED OCCUPANCY PATTERNS

The MAFEZ Administration has established occupancy guidelines to ensure the proper utilization of the zone with regard to industrial development and technological transfer. One of these guidelines has been established to prohibit land speculation that would thwart the ambitions and proposed achievements for the site.

It is proposed that no land be offered for outright sale, but be secured by the tenants via long-term leases with price adjustment clauses to compensate for inflation, variable interest rates, depreciation factors, and normal site maintenance and service charges. It should not be the intention of MAFEZ to realize large profits by direct land-use charges, but to develop a solid basis for overall economic growth by the guideline outlined above.

To protect the interests of the tenants, it is also proposed that they be offered attractive options to secure adjoining vacant space for their anticipated orderly expansion plans. These options fall into categories that are closely related to the time schedule for complete zone occupancy. In the early stages, when the zone is only partially occupied, a tenant will have right of first refusal of contiguous segments of open area. When the tenant exercises the option to pick up the lease for adjacent areas, he will be required to furnish a satisfactory development schedule for the additional areas. As the zone is fully occupied, the tenant can be given the right of refusal on adjoining developed facilities that have been vacated.

Industries interested in direct land-purchase options can be accommodated in the many export industrial estates already established in Korea.

3.4 ORGANIZATIONAL CONCEPTS

The Masan Free Export Zone Administration was created by the "Law for the Establishment of Free Export Zones." This administration has authority only over the Masan Free Export Zone, and is essentially independent from other zones. Similarly, there is no provision for the coordination of the activities of the free export zones and the export industrial estates. Organizationally they both fall under the Ministry of Commerce and Industry (MCI).

The regular (local) industrial estates program in Korea is a cooperative effort between the MCI and local governing bodies. There is essentially little difference between the provisions and inducements of the free export zones and the export industrial estates. Financial assistance necessary for the establishment of these estates is provided by the central government, but they are essentially administered on a local level when they commence operating.

The following principles appear to be determinant:

- Korea is making a substantial investment in free export zones and export industrial estates in order to encourage foreign investments. These investments should be monitored at a high level to assure that maximum benefits will be achieved.
- Both the free export zones and the export industrial estates should be recognized as important tools in the execution of national policy relative to the whole subject of foreign trade and foreign investment. This requires a closely coordinated effort under the direction of a high-level governmental agency participating actively with other agencies.
- Fundamentally there is little difference between free trade zones and export industrial estates and administration requirements will essentially be the same. Both have to be "behind a fence" and use bonding for control purposes. Actually a given site might be administered utilizing the principles of both concepts, with any individual firm given the option of selecting which program it wants to join.
- By administering these programs through a single agency, a common program of data collection and dissemination can be instituted. For example, it should be possible for a foreign firm seeking a factory site in Korea to find information on all available locations from a single source.
- A single administration would assure long-term continuity for tenants. The resulting economies of scale can be achieved in both the administration and the promotional efforts.
- The artificial disciplines imposed by separate budgets should not be removed. This will allow the entities to maintain international competitiveness with other countries trying to promote exports.

Based upon the above conclusions, it is recommended that the law establishing the free export zone be amended as soon as possible to provide for a common administration of these zones under a high-level government agency.

It is further recommended that the export industrial estates be administered by the same agency

Regarding the timely question of how to organize and administer the proposed Yosu Free Export Zone, it is recommended that it be placed under the administration currently governing Masan Free Export Zone. This agency will be able to employ its experience in establishing the Yosu zone. This will also be true for any other zones organized in the future. Action should start immediately to integrate these free export zones, including the establishment of a budget for further study and beginning the development of the Yosu zone.

section 4

Candidate Industries

Section 4

CANDIDATE INDUSTRIES

4.1 GENERAL CONSIDERATIONS

It became evident early in the study that it was important for MAFEZ to develop an industrial philosophy with which to measure the value of an applicant rather than to develop a list of candidate industries.

To examine the entire universe of industrial classifications and distill them down to a list of a few selected categories or specific industries, while it could have some value, would be very subjective. Industries that should be located in MAFEZ because of their contribution to the economy might be rejected; perhaps even worse, they might not even apply or investigate the possibility of locating in MAFEZ, because their category did not appear on the list.

The critical factors are essentially: (1) how much value the specific firm will add in Korea, (2) where the product will be marketed, and (3) what the potential is for technology transfer and other benefits that will accrue to Korea, rather than what specific products are manufactured. Each firm should be judged primarily by these factors, and such considerations as whether the item is also produced elsewhere in Korea should be considered only in light of whether or not it will represent a competing firm and whether inducements offered by MAFEZ will give it a real competitive advantage over a competing firm located in a regular industrial location in Korea.

In fact, it might be beneficial in the overall industrial development strategy of the country at times to deliberately seek out an industry that will offer competition to domestic firms and therefore force them to reduce cost and become competitive in international markets.

One of the essential questions that must be asked is, "Will the firm manufacture its products locally as well as assemble them?" This question should be asked not only regarding applicant firms but also regarding industries which might be contacted directly. The manufacturing process usually sets off the following chain reaction.

- Machinery is installed
- Skilled operators are hired and trained
- Mechanics, machinists, and/or tool and die workers are required to service the machines
- Opportunities are offered for raw material inputs of goods of present or potential Korean manufacture
- Outside service industries develop

Thus the operation results in a series of backward linkages. Forward-linking industries, while important, are usually not as fertile in spawning new industries, primarily because these opportunities have been examined or tried before. Candidate industry lists are usually heavily weighted with forward-linking industry possibilities.

Taiwan, which in the past has strongly promoted assembly-type industries, now shows little interest in this kind of establishment. They are much more interested in firms that will conduct more manufacturing within the country.

Manufacturing firms can sometimes be encouraged to change their location in an evolutionary manner. The following steps might be typical:

- Determine what simple manufacturing and assembly activities can be done in MAFEZ and start these operations there.
- Work with a firm to train skilled workers so that the more complex manufacturing activities can be brought to Korea. Such training can be accomplished in several ways, including the following:
 - Send instructors from local vocational schools to the factories of foreign firms to learn what skills are needed and should be taught in Masan
 - Have staff members of the foreign firms help sponsor a program for teaching in the local vocational schools
- If there are essential raw material inputs that could be produced more economically in Korea, the possibility of their production should be explored.

For example, a manufacturing firm in the U. S. currently considering the potentiality of locating a plant in a foreign country has been visited by members of the team. The skill requirements of this firm range from sophisticated metal-working to simple assembly. Its main problem is that several years are required to train some of the higher skilled personnel. Other skills would require only one or two years of training; some of the assembly work could be taught in a few weeks.

It would take this firm several years to set up a new manufacturing operation because of the high skill requirements of a few personnel. However, it could be a candidate for the evolutionary procedures described above.

When such firms make an investment in a country, it is for a long period of time, since their production facilities cannot be moved easily like assembly-type operations.

4.2 ADMISSIBLE INDUSTRIES

Current brochures and literature circulated by MAFEZ contain a list of admissible industries. It is recommended that the next printing of these promotional folders be changed to indicate that the list is typical of those industries which are encouraged and which normally occupy free zones but is not intended to be all-inclusive. It is also recommended that no industries be specifically listed as excluded, other than those types deemed to be unsuitable due to shipping, land, or pollution requirements subsequently discussed.

There may be specific exclusions which affect only MAFEZ and not other potential industrial areas in Korea. If a particular firm has its attention called to Korea by some recruitment effort on the part of MAFEZ, it should not be left with the impression that there are no other possible locations in the country. The application of the potential investor should be studied with the intention of making a Korean investment possible, and not excluded because it cannot be accommodated in a particular location. The recommendation made elsewhere in this report urging an institutional change toward consolidation of the recruiting and administration aspects of all free export zones and export industrial estates would obviate this jurisdictional problem.

The list of typical industries might be followed by a short discussion of the kinds of firm which would be desirable because of complementary production in the area. For example, the steel plant in Masan could produce various specialty products for other manufacturers in the zone. The very large (9,600 employees) textile plant in Masan could also be used as a linkage to industries locating in MAFEZ. The diesel engine manufacturing plant in Masan could be linked to plants in the zone who have a need for components similar to those producible with the basic machinery and expertise at that plant.

The functions an industry performs are most important in determining the acceptability of a firm. As an example, the list in the brochure includes "electronic products." This could refer to a small, routine operation utilizing unskilled labor to assemble parts manufactured elsewhere. It could also refer to a sophisticated manufacturing operation producing and assembling complicated components with demands for many skilled and semi-skilled employees and using basic materials originating elsewhere in the Korean economy. Obviously, the latter is preferable because of its much greater impact on the Korean economy.

4.2.1 Industries that Locate in Free Ports

The primary competitive areas in Asia for industries that might prefer to locate in MAFEZ or some other freeport-type area are the KEPZ in Taiwan and the industrial complexes of Hong Kong and Singapore. These areas, however, have become less attractive in recent years for a variety of reasons. KEPZ has filled up. New zones are now being created, but, as indicated previously, greater selectivity is being exercised in approving new industries. Both Hong Kong and Singapore are old, established free ports that have developed into mature well rounded manufacturing centers.

Table 4-1 contains a list of industries that are located at the above free ports. From this table it can be seen that heavy industries such as steel rolling mills and shipbuilding are both located in Hong Kong and Singapore. On the other hand, KEPZ has attracted more light manufacturing and assembly-type industries.

There are a number of site-related factors that will tend to limit the types of industries that are likely to locate in MAFEZ. Some of these are listed below:

- The port can not easily be developed for the transport of bulk materials. Thus industries that require large amounts of imported bulk raw materials should be discouraged.
- The land-fill methods used will not support large loads without expensive piling and construction methods. Thus, industries that use large machinery or buildings that require land that has a heavy load-bearing capacity should be discouraged.
- The site development costs result in relatively high costs for space. Thus, industries that require large tracts of inexpensive land should be discouraged.
- The water and air pollutant absorption capacity is low compared to other sites. Thus, industries that tend to waste-disposal problems should be discouraged.

Table 4-1

MANUFACTURING INDUSTRIES
COMMONLY LOCATED AT FREE PORTS

Manufacturing Industries	Hong Kong	Singapore	KEPZ
Ship and Boat Building and Repair	X	X	
Other Transportation Equipment	X	X	
Ship Breaking	X		
Steel Rolling Mills	X	X	
Precision Machinery	X	X	X
Textiles	X	X	X
Textile Products	X	X	X
Leather Products	X		X
Plastic Products	X		X
Wood Manufacturers	X	X	X
Pharmaceuticals	X		
Chemical Products (≠Petrochemicals)	X	X	X
Food Processing			X
Electronic Components Manufacturing and Assembly	X		X
Light Consumer Manufacturers	X	X	X

The following additional specific arguments are presented in partial support of the above arguments. It has been proposed that a copper refining and smelting complex be located in Masan. This facility would use 60 percent imported ores and 40 percent domestic. The trend in bulk ore carriers is similar to that in other forms of transportation; they are getting larger and larger. For example, 50,000-ton ore carriers will be used to carry copper ore from two new major mines that are being opened in Bougainville and West Irian to Japan where it will be processed. Such ore carriers could never be brought into Masan Bay because of their size.

However, investigations in the Yosu area indicate that, with little improvement, large ships could be brought into several areas near that city. There is a deep channel offshore and large 150,000-ton tankers currently negotiate it, delivering crude oil to the Honam Oil Refinery north of Yosu.

Another category of industry that would not be desirable in MAFEZ, but which would probably be acceptable at Yosu, includes industries that might tend to create a pollution problem. MAFEZ occupies a key location at the head of Masan Bay. Water pollutants would not be subject to the extensive tidal flushing actions found at other ports. MAFEZ is also in the same air basin as the city of Masan, and air pollutants or odors could cause discomforts for the residents of the city. The proposed free export zone site at Yosu, while only a few kilometers from the city, nevertheless enjoys relative isolation from the main city by mountains.

The proposed zone at Yosu is also located on "hard" land, and therefore is an excellent location for industries with heavy equipment or buildings. Foundation costs will be much lower at the Yosu site than at MAFEZ. However, the City of Yosu is much smaller than Masan and has a less well developed infrastructure. It has only a limited number of existing

industries and therefore it lacks the industrial tradition of Masan. Overland transportation distances are greater from Yosu to Pusan, whence most of the general cargo will probably be shipped.

4.3 INDUSTRIAL STRUCTURE IN MASAN

The desirability of various types of new industries for MAFEZ is also inter-tied to a considerable degree with the existing industries in that they will either compete or complement them.

Major industries presently located in the Masan area are textiles, machinery, and metalworking. The textile industry is dominated by a few large firms that employ over 80 percent of the workers in this category. One such large firm has a reported employment total of over 9,600 persons, and constitutes by far the largest single employer in the area.

The metalworking and machinery industries, on the other hand, comprise a large number of small and medium-sized firms. The largest of these, the Korea Steel and Iron Company, employs approximately 800 workers. Table 4-2 contains a summary of the major industries by size.

4.3.1 Machine and Metalworking Industries

The Korea Steel and Iron Company produces both bar, mill, and plate products. These products are shipped throughout the country. The company has two electric furnaces with a capacity of 190,000 tons annually.

The second largest industry in this category is the Jinil Machine Company, a producer of diesel engines. This company produces several different sizes of engine and has a capacity of 5,000 to 10,000 engines annually. Other industries in the machinery category produce parts for automobiles, bicycles, and other types of machinery. There are a large number of machine shops, casting firms, and plating companies.

Table 4-2

SUMMARY OF MAJOR INDUSTRIES IN MASAN

	Number of Enterprises	Number of Employees	Amount Produced (Mil. Won)
Large Firms			
Machinery and Metalworking	2	974	7,500
Textiles	4	10,706	20,600
Chemicals	1	136	800
Medium and Small Firms			
Machinery and Metalworking	84	1,393	1,600
Textiles	34	1,834	1,000
Chemicals	42	1,477	2,800
Others	32	1,064	2,400
Total	<u>199</u>	<u>17,584</u>	<u>36,700</u>

Source: "A Guide to Masan Free Trade Zone," p. 10.

A total of 53 firms employing 10 or more workers are listed in this classification. These firms employ approximately 2,500 workers. Table 4-3 lists these firms, the type of product, and the estimated employment.

Major items of export listed for this category are radiators to the Philippines, diesel engines to Thailand, and pumps to Japan.

4.3.2 Textiles

There are 28 textile firms that employ 10 or more workers. A wide variety of products is manufactured by these firms, including both natural and man-made fibers. Textile products are exported by this industry to the United States, Canada, Sweden, Finland, West Germany,

Table 4-3

MACHINE AND METALWORKING INDUSTRIES IN MASAN

(Industries employing 10 or more persons)

<u>Name of Company</u>	<u>Type of Industry</u>	<u>Number of Employees</u>
Korea Steel and Iron Co.	Metal Sheet	881
Jinil Machine Co.	Diesel Engine	331
Choong-Ang Casting Machine	Castings	28
Choong-Ang Machine	Lathe	25
Korea Metal Machine	Lathe	13
Chonwoojae Steel Plant	Castings	16
Sung Kwang Casting Plant	Castings	12
Kukjae Plating Plant	Aluminum Tableware	23
Shinkwange Light Metal Plant	Aluminum	16
Daeyoung Co.	Aluminum Pot	23
Tong Sung Co.	Aluminum	19
Il Shin Co.	Aluminum	20
Tae Kwang Co.	Aluminum	20
Hoong In Co.	Diesel Engine	20
Yong San Steel Mill	Motors	24
Nambu Machine Shop	Motors	15
Chosun Steel Mill	Motors	14
Sam Yang Machine Shop	Motors	15
Jaeil Machine Shop	Lathe	40
Dae Dong Machine Shop	Plater	40
Kyong Shin Machine Shop	Lathe	13
Sam Sung Plant	Press	10
Shim Kun Steel Mill	Repairing Lathe	22
Sam Sung Radiator	Radiator	114
Iltong Plant	Plug	19
Kyongil Co.	Bicycle Handle	29
Yoo Kang Sa	Automobile Parts	19
Saeki Ind. Co.	Crank Shaft	25
Mijin Construction Co.	Automobile Repair	56
Shinki Sa	Automobile Repair	81
Il Sung Pump Co.	Pump	59
Myung Sung Machine Co.	Compressor	29
Kwang Shin Machine Co.	Paper Mfg. Machine	16
Tong Yang Special Machine Co.	Refiner	53
Choong Ang Ind. Co.	Lathe	10
Han Sung Scale Co.	Scale	70
Kwang Sung Stainless Co.	Stainless Tableware	35

Table 4-3 (cont'd)

Kun Kwang Machine Co.	Plating work	23
Dong Myong Machine Co.	Cutter	15
Masan Central Ship Building Co.	Ship building	18
Dae Ryuk Machine Co.	Dehydrator	10
Choong Won Machine Co.	Dehydrator	14
Choong Ang Steel Co.	Rear Car	10
Dae Hoong Machine Co.	Lathe	14
Hang Ku Steel Mill	Motor	14
Sung Hwa Shin Sung Co.	Steel wire	10
Hae Yang Electronic Equipment Mfg. Co.	Detector	14
Han Kook Shinchol Co.	Metal Reinforcement Bar	14
Tong Nam Steel Mill	Metal Reinforcement Bar	18
Won Chan Forging Co.	Engine Cranks	11
Dae Change Machine Co.	Lathe	10
Tae Won Machine Co.	Dyeing Machine	14
Dong Yang Ind. Co.	Auto Repair	53
Total		2519

Source: Masan Chamber of Commerce

and Iran. Products exported include sweaters, socks, wigs, and acrylic fibers. Table 4-4 lists the major firms in this industry. These firms employ approximately 12,800 workers.

4.3.3 Other Industries

There are a large number of other medium-sized industries in the Masan area. While none of these is a major employer, they nevertheless in combination provide nearly 3000 industrial jobs in the area. Table 4-5 lists these industries along with the types of products and employment estimates.

Table 4-4

MAJOR TEXTILE INDUSTRIES IN MASAN

(Firms employing 10 or more persons)

Name of Company	Type of Industry	Number of Employees
Hanil Synthetic Co.	Cashimiron	9,629
Masan Textile Co.	Synthetic Yarn	428
Daemyong Wool Textile Co.	Mixed Yarn	251
Koryo Wool Textile Co.	Wool Yarn	354
Daehan Knitting Co.	Sweaters	150
Hoong An Ind. Co.	"	110
Nam Yang Ind. Co.	"	100
Hanil Textile Co.	"	200
Kyong Nam Knitting Co.	"	270
Sae Chang Ind. Co.	"	132
Hoong An Knitting Co.	"	14
Dae Yang Knitting Co.	Knitted Goods	31
Nam Sung Enterprise Co.	Sweaters	160
Kwang En Knitting Co.	Knitted Goods	19
Nam Sung Wool Textile Co.	Wool Yarn	93
Sam Kang Textile Co.	Cotton Textiles	13
Han Il Textile Co.	"	13
Han Sung Textile Co.	"	12
Dae Jung Textile Co.	"	18
Dae Yang Textile Co.	"	96
Hae Yang Textile Co.	Wool Yarn	10
Kun sol Cotton Co.	Cotton	122
Dae Sung Textile Co.	Sweaters	21
Dong Myong Rope Co.	Fishing Net/Rope	175
Dae Il Ind. Co.	Sweaters	138
Kaesung Ind. Co.	Textiles	38
Hoong Il Ind. Co.	Sweaters	90
Ma Change Wool Co.	Yarn	90
Total Employees		12,777

Source: Masan Chamber of Commerce

Table 4-5

OTHER MAJOR INDUSTRIAL FIRMS IN MASAN
(Firms employing 10 or more persons)

<u>Name of Company</u>	<u>Type of Industry or Product</u>	<u>Number of Employees</u>
Bulro Food Co.	Canned Food	170
Uichange Marine Product Co.	" "	118
Koryo Ind. Co.	" "	106
Daehan	" "	133
Su Ryung Ind. Co.	Koorring	100
Masan Paper Mfg. Co.	Paper	41
Choong Ang Paper Co.	Toilet Paper	108
Sam Yang Co.	Paper	44
Dae Rim Ind. Co.	Various Paper	35
Nam Bang Paper Mfg. Co.	Paper	53
Il Sung Paper Mfg. Co.	"	14
Yang Duk Paper Co.	Packing Paper	31
Sam Hwa Paper Co.	Paper	58
Sam Shin Paper Co.	"	60
Jae Il Chemical Mfg. Co.	"	51
Sam Jung Chemical Co.	"	10
Soo Min Pharmacy	Capsules	84
Masan Rubber Co.	Rubber Shoe Base	23
Han Sung Rubber Co.	Rubber	29
Sam Won Ind. Co.	Edible Oil	19
Mongolian Sauce Factory	Bean Paste	17
Tong Yang Soft Drink Co.	Soft Drinks	16
Masan Ice Making Co.	Ice	15
Moo Hok Brewery	Distilled Spirits	111
Kang Nam Spirits Co.	" "	14
Hap Dong Unrefined Sool Co.	Unrefined Sool (unrefined spirits made of rice)	19
Shin Hoong Tire Reprod. Co.	Tire reproduction	11
Dae Won Ind. Co.	Aerated cider-like drink	27
An Kamg Special Glass Co.	Kang Haia Glass	12
Han Kuk Medicine Co.	Medicine	13
Tong Bang Chemical Co.		15
Dae Pyuk Fly Ash Co.	Fly Ash	10

Table 4-5 (cont'd)

Paik Kwang Brewery	Distilled Spirits	25
Tone Yang Ind. Co.	Wigs	289
Shin Hoogg Wig Center	Wigs	339
Paik Cho Musical Inst. Co.	Organs	142
Chong Yang Musical Inst. Co.	Accordions	35
Oasis Musical Inst. Co.	Guitars	29
Won Hoong Feather Co.	Feather Dust	
	Sweepers	30
Kum Sung Ind. Co.	Wooden ware	10
Tong Kwang Ind. Co.	Fishing tools	
Jae Il Mool San Co.	Biscuits	77
Han Kang Ind. Co.	Briquettes	12
Yoo Won Fuel Co.	"	14
Il Hoong Saw Mill	Planed Wood	18
Kyong Nam Packing Co.	Packing Boxes	26
Haop Dong Briquette Co.	Briquettes	42
Chong Woon Ind. Co.	Brick	20
Kuk Dong Brick Co.	Brick	33
Shin Hoong Plastic Co.	Bottle Top Covers	22
Shin Sung Ind. Co.		24
Hyon Dae Musical Inst. Co.	Melodions	52
Dong Jin Ind. Co.	Brick	10
Koryo Lacker Ware Co.	Lacquerware	18
Mikwang Musical Inst. Co.	Musical Instruments	20
		<hr/>
Total		2,854

Source: Masan Chamber of Commerce.

4.4. CANDIDATE INDUSTRIES

It is axiomatic in industrial development that the best method of increasing employment and economic activity is to expand and improve the performance of the industrial activities currently being performed in an area.

The main reasons for this approach are that the required skills are present in the labor force, the training facilities to increase these types of worker are usually available, and the financial and service industries necessary to support these industries are already in existence. Thus it is much simpler to expand existing activities or engage in complementary industries than it is to establish new industries along with the new support facilities that are required.

It is obvious from the list of machinery and metalworking industries that considerable capability already exists in Masan. Some of these industries are linked back to the availability of raw materials from the iron and steel mills. Probably many of these firms have been formed by individuals or groups who gained their initial experience in the large industries in this category.

The capabilities these important industries represent should continue to be expanded, both by greater integration and by introducing more sophisticated manufacturing techniques. These are important industries to the Korean economy, and they have significant export potential. MAFEZ can become a useful device in expanding them if the proper promotional activities are followed.

The existing labor force can provide the basic foundation for the continued expansion of these industries. The missing ingredients are technology, capital, and markets. These can all be provided by foreign firms induced to locate in MAFEZ. To accomplish this, it will be necessary to contact directly foreign firms in the metalworking field. As indicated in the discussion of International Markets, more and more firms are being forced to locate some of their more sophisticated operations overseas because of competition.

It is further recommended that, as these more sophisticated industries develop, it would be very desirable to allow them to sell a portion of their production on the domestic market. It will be many years before Korea develops a demand for some of these specialty products sufficient to warrant the installation of a domestic industry. However, by adding domestic demand to foreign markets, economies of scale can be achieved, with substantial benefits to domestic users. For this reason, the Korean government should allow some of the products from MAFEZ to be sold in the domestic markets.

The continued expansion of the metalworking and machinery industry will require additional raw materials, especially a broader variety of steel products. Electric furnaces currently being operated in Masan are capable of a higher use than the production of steel for plate. Steel making is essentially a batch process, and several types of steel could be produced. This is in contrast to the new integrated steel mill at Pohang scheduled for completion in 1973 where production will be concentrated in high-volume lines. This new steel mill should be able to produce high-volume items (such as plate and bar) at a lower cost than at the steel-making facilities in Masan. It is therefore logical that the Masan facilities should devote more of their capacity to the production of specialty steels.

There are several steel products, that, while not requiring high volume, nevertheless require a high labor input in the production process and require specialty steels. Some of these products, which are listed below, should be investigated as candidate industries for MAFEZ.

- Springs
- Fasteners
- Twist drills

- Taps and dies
- Hollow steel drills
- Dental drill bits
- Tool steels
- Lock making

This is only a suggestive list of possible products that could be manufactured by firms located in MAFEZ. Obviously many of them are not high-volume products and would require worldwide markets to warrant production. Further investigation will be needed to see whether the technology and necessary investment would warrant these activities based on the production volume that might be achieved. These detailed considerations are beyond the scope of this study.

The above-mentioned products are all linked back to the bar-mill facilities in Masan. It is currently not possible to roll plate sufficiently thin for use in many specialty products with existing equipment. For example, houseware items such as cooking equipment could not be produced by the present facilities. It is not anticipated that there will be enough volume to warrant the huge capital cost necessary to roll thinner plate or sheet products.

Some of the industries listed in Table 4-5 also offer skills, services, and products that would be an appropriate foundation for enterprises which could be located in MAFEZ. In this regard, a packaging firm is suggested to forward link with some of the paper companies listed in Table 4-5 and also to draw upon the same pool of specially trained labor. One or more food canning firms at MAFEZ represent another example of the type of enterprise which could be forward linked from the Korean economy and also share a common labor force with local industries.

As a general rule, local industries represent a basis for attracting investors to MAFEZ under the following guiding principles:

- Industries should be attracted to MAFEZ which can draw upon a common pool of skilled labor with local enterprises, especially where a labor surplus exists or could be readily developed through vocational training. Interchange of labor within this pool is an excellent means for technological transfer.
- Industries which can forward link from local industries or suppliers of raw material should be sought for MAFEZ.
- Local industries desiring to manufacture for export should seek foreign/investor partners to help establish associated firms at MAFEZ.

section 5

**Promotion of Masan
Free Export Zone**

Section 5

PROMOTION OF MASAN FREE EXPORT ZONE

5.1 INTERNATIONAL MARKETING PATTERNS AND TRENDS

The decade of the 1960's saw the evolution of the large multinational companies. These companies generally evolved from national companies with foreign branches into firms with truly international outlooks in production, distribution, and marketing. They adopted the systems approach in siting these functions. Many found they could manufacture components in one country, send them to another country for assembly, and then bring the assemblies back to the original country all at a lower total cost than would be obtained by assembly in the country of manufacture.

This discovery resulted in the dispersal of labor-intensive portions of the manufacturing process to countries that could provide cheap labor. These are the types of activity that were attracted to such places as Hong Kong and Taiwan.

The transfer of manufacturing to areas of low labor cost was a significant factor contributing to the rapid increase in world trade, which has grown from \$68 billion in 1953 to \$227 billion in 1969. This represents a growth rate of about 100 percent per decade in the postwar period.

Now that the trend has been firmly established by the large multinational companies, the following basic developments are expected to ensue:

- Small- and medium-sized companies will begin to transfer some of their activities overseas in order to remain competitive with the larger firms.
- There will be a tendency to locate activities which may be less extremely labor-intensive overseas, since the large companies have also found that they can obtain good workmanship and produce quality products there, and that the labor forces in developing countries can be trained to do higher skilled tasks.
- The original reluctance toward operating plants in foreign countries has been for the most part overcome by the accumulation of favorable experience.
- The growing markets in the developing countries themselves will spur the location of plants overseas. In the case of Asia, countries here represent some of the fastest growing economies in the world. (See Table 5-1).

Table 5-1

COMPARISON OF REGIONAL ANNUAL GROWTH RATES
(1960 to 1970)

	Percent Change in	
	Total GNP	Per Capita GNP
Less Developed Countries		
East Asia Including Indonesia	6.5	3.8
East Asia Excluding Indonesia	7.7	4.9
South Asia	4.3	1.8
Near East	6.8	4.3
Africa	4.1	1.6
Latin America	5.3	2.5
Total	5.5	3.0
Developed Countries	4.8	3.7

Source: Growth Rates and Trend Data by Region and Country, AID, May 15, 1971, Table 1a.

As more and more countries reach the developed state, they will begin to expatriate the labor-intensive portions of their manufacturing activities. Japan, for example, has begun in recent years to locate manufacturing plants throughout Asia, including Korea.

The trend in the 1950's and 1960's was toward liberalization of restrictions on world trade. This is one of the reasons for its rapid increase. It is expected that this trend will also continue into the future, and will contribute to the dispersal of manufacturing to countries that can provide **comparative advantages such as low-cost labor and raw materials.** Continued liberalization will exert both a short-term and long-term effect on the MAFEZ operation.

The short-term effect will be that in the immediate future more and more firms will locate manufacturing facilities abroad and import products into the developed countries with large markets. The long-term effect, as tariff reduction continues, will be the elimination of the need for artificial devices such as free ports to circumvent trade barriers. Thus, one of the fundamental recommendations of this study is to establish a pattern for transition of the industries back into the Korean economy.

5.2 PROMOTIONAL CONCEPTS

5.2.1 General

Promotional aspects of foreign investment in Korea should be coordinated and centralized. It is imperative that the prospective investor be exposed to the various options and alternatives of investment available in Korea. In the absence of a coordinated effort, the foreign entrepreneur, unaware of other suitable alternatives, might choose between only a single location in Korea and alternative locations in other countries. This could result in a decision to invest elsewhere, when in fact other locations or facilities within Korea might have been preferable.

5.2.2 Factors Influencing Site Selection

Among the variables considered by the foreign investor in making an investment decision, the most important are:

- Availability of a good supply of trained or trainable labor
- Convenient location with access to an economical means of transport, commercial services, and industrial and community infrastructure
- Other miscellaneous factors, such as availability of adequate housing for foreigners, hospital and medical service, and necessary supporting facilities

Each location differs in these various aspects, and each investor's needs differ also with respect to them. He therefore needs to be offered a choice of locations. The characteristics of each site should be well documented and well presented. And they should be presented with the credibility necessary to satisfy a wary investor, perhaps unfamiliar with the Korean scene (sometimes even with foreign investment in general), probably unable to communicate in Korean, and often without a peer group of other investors whom he can approach for verification of information received.

5.2.3 Alternate Approaches to the Promotion of MAFEZ

The most significant problems of promotion of industrial locations in Korea appear to lie in two areas. Firstly, Korea is still relatively unknown as a site for foreign investment, and within Korea there is little provision for selection among different industrial environments. Secondly, despite the general promotional activity regarding Korean sites, foreign investors are not yet confident in their evaluation of the many important factors involved.

Elsewhere in this report, Bechtel has recommended the combination of promotion of Korean industrial export and free trade zones to inform the foreign investor of the entire spectrum of available opportunities.

There are essentially three basic types of promotion.

1. General Information. General information is disseminated in trade publications, advertisements, and at business-oriented events, largely by consular, diplomatic, and trade promotional agencies of the Korean Government. Such promotion draws attention to Korea as a dynamic force in world trade and commerce, and as a desirable environment for foreign investment. It is usually associated with promotion of Korean export products, cultural attainments, and the general enhancement of Korea's international reputation.
2. Export Promotion and Industrial Site Promotion. More detailed information about specific export articles or specific industrial locations is distributed by KOTRA, consular officials, and individual functionaries of the export zones in trips abroad, conferences, trade exhibitions and fairs, and special events. Such promotion is addressed to special audiences who may have expressed some interest in the prospects of purchase or investment; but in general such activity must still be characterized as a quite broad or "shotgun" approach to promotion. It is normally so general that a site visit and study or a product testing and production facility review is required ultimately before the decision to buy or to invest. Thus the potential investor must do a good deal of research at considerable cost.

Recognizing the necessary exploratory effort and expense, the investor often decides not to proceed. Thus, the ease of obtaining information and the client's initial assessment of its credibility can be decisive.

3. Direct Solicitation of Interest. This approach, which may be termed the "rifle-shot" approach, is employed by a few countries or trade zones. It consists of direct contacts with potential investors by well qualified professional appraisers. Such appraisers would have developed extensive information about potential sites for investment, would have investigated them independently, and would have the credentials to make representations of fact, well supported by evidence, and in appropriate detail.

It is the third approach - in addition to some embellishments of the other two broader approaches - that Bechtel recommends as the effective way for Korea to seek out foreign investors for the export industrial zones.

5.2.4 Direct Investment Promotion

There are several ways to centralize the promotional function. One is to establish a network of authorized agents in selected countries. Such agents would be given complete information on investment possibilities in Korea and would be kept abreast of changes in policy and procedures. They would be private concerns familiar with the commercial and industrial entities in their own countries.

These agents would be retained by Korea to promote investment, particularly in the export trade zones, but also, as opportunity offers, in the general industrial community as well. There are many types of firms - consulting, engineering, investment, and conglomerate - which undertake location studies (for plant and headquarters facilities, for various service and production functions). These firms have professional staffs competent to evaluate potential sites in a manner sensitive to the needs of industrial undertakings. Such firms generally evaluate alternative locations for specific clients; but a number of them also work directly with developers

of specific industrial sites, parks, or even entire communities are attracting investors. When so engaged, they usually assemble considerable information regarding all important aspects of the investment site and provide comprehensive briefings to selected potential investors. They are chosen by the developers or industrial communities on the basis of their expertise and reputation. They are usually compensated by a retainer fee plus various incentive fees related to the magnitude of investment received, the value of land purchased, etc. In the case of foreign industrial export zones, the following types of arrangement should be considered:

Territories Covered

- U.S. — Three regions of country covered by separate firms: (1) Eastern, (2) Central and Midwest, and (3) West and Southwest
- Europe — (1) Common market countries, (2) EFTA countries
- Japan — One agency
- Other countries — A network of affiliated agencies covered through the six agencies represented above

Fee Arrangements

- Basic retainer to develop information on Korean economy, industrial communities and trade export zones — ranging from \$12,000 to \$25,000 per year with minimum effort contractually described, i.e., trips to Korea, studies, brochures, etc.
- Fee schedule: (Optional)
 - a. 3-5% of initial capital investment
 - b. 2-3% annual value added in exports (Korean) from Korea
 - c. Combination of the above
 - d. Fees related to lease of land (10% - 15%)
- Duration. One to three year contracts — extension based upon performance

Methods of Operation

- The agency would document the (free) export industrial zones thoroughly by visits and information gathering. It would present such data to potential clients, assist in evaluating their needs, and ascertain with certainty that the export industrial zone would meet them (e.g., labor, utilities, intermediate services or manufacture, raw material, etc.). The agency would then recommend proposals to potential tenants providing incentives to locate in Korea and would make arrangements for inspection visits to the zone.

Selecting the Agent-Promoters

- It is recommended that there be an international competition for contracts for specific areas. Not only would this assure a wide selection, but it would also advertise and disseminate knowledge of the industrial zones among the many firms who might perform these types of services.

5.2.5 Possible Extensions of the Agency Principle

The foregoing broad promotional concept could also encompass the sale of products already being produced in Korea, or which could be produced on specifications. (Some enterprises, not interested in direct investment, might be interested in employing the Korean industrial establishment.)

The agent, given his knowledge of the Korean economy, could contact various manufacturers regarding their interest in and capability for a given operation. This could be followed with detailed drawings and specifications which would result in a quotation to the purchaser. The final price could include a fee for the agent based on a percentage of the total transaction cost to the purchaser and could be paid by the Korean manufacturer. More importantly, from Korea's point of view, this could be the beginning of a relationship between foreign buyer and domestic seller which could evolve over time into additional operations with more value added to the Korean economy. Thus, a foreign firm which

might not be currently interested in investing in a plant in Korea, might still make a limited contact which would result in mutual benefit and lead to closer profitable association.

The Korea Trade Promotion Corporation (KOTRA), in addition to promoting Korean products, should join the overall industrial promotion and coordinate their activities with those of agents or brokers. If the latter are remunerated almost entirely for performance, Korea has nothing to lose and much to gain from diversifying her efforts to attract investment. KOTRA would continue to concentrate on the promotion of mass-produced, mainly non-durable consumer goods, but should be alert also to more specialized needs of foreign manufacturers and wholesalers, and to investor interests.

5.2.6 A Still Broader Approach

Another method of promoting investment would be to enlist the services of many more brokers or agents in many countries in a much less structured organization. The brokers' knowledge of the Korean situation would be limited, and their services would be restricted to preliminary discussions with potential investors. The basic effort and expense of developing an actual investment for an interested contact would be borne by the Korean government. The fee paid to the broker or agent would be lower than that paid to a designated agency as discussed earlier; but more brokers could be used in this broader approach, and many more potential investor contacts might result. The fee could be based on some formula taking into account the value added to the Korean economy. The government entity would have to maintain systematic contact to keep the investment brokers informed and also to follow up on interested investors.

5.2.7 Other Aspects of Promotion

Publications are important. Brokers, agents, consultants, and other offices engaged in promoting Korean products and investments need a steady flow of information. Attractive brochures containing factual descriptive information are needed. The message should be edited in the country where the brochure is to be used. Korean publications in English – often quite attractive – lack the careful editorial work needed to communicate fully and impressively. Unclear statements in advertising brochures are counterproductive, and often lead to confusion and lack of credibility.

Brochures designed to attract investment should obviously provide the basic information a firm would require to stimulate its interest:

- A full description of available locations
- A treatment of the skills and literacy of the work force and their adaptability to training
- A brief of the law as it relates to foreign business (with special emphasis on tax relief)
- Maps of the transportation system, including planned construction of roads, airports, and port facilities
- Details on infrastructure facilities and capacity (power, water, and sanitation).

Brochures should contain pictures of plants already located in Korea, with statements (credited or otherwise) by investors and plant managers. Publications should be in the language of the target country, and should identify a contact for further information. The office of the first contact should be within the country of distribution, in order to avoid the long delay of foreign correspondence.

Regular newsletters detailing changes in emphasis, new policies and procedures, and other pertinent facts would be useful. Publicity of successful efforts on the part of an agent, for example, can be helpful to those engaged in similar activities. The types of firms contacted, method of approach, and most fruitful sales features can be passed along to others who will often apply them to advantage. Special newsletters could also be used to highlight a particular aspect of the program or to announce a breakthrough in export achievement or a production record established by an enterprise already located in Korea.

5.2.8 Additional Benefits of Promotional Activities

A group of agents, brokers, or location search firms can efficiently sustain the promotional function and also provide important information to Korea. In constant contact with overseas investment enterprises, they will be sensitive to new developments which are important to Korea. Timely data on changed consumer patterns, new competition, or innovations in institutions or techniques could be most helpful to Korean policy makers designing advance programs.

Agents and industrial location consultants might also be helpful in some countries in reporting and countering trends to exclude certain imports. All countries are subject to pressures from labor and management groups to succumb to restrictive import legislation or non-tariff barriers to trade which would diminish the flow of goods exchanged in international markets. As balance-of-payment difficulties outrun the pace of change in international monetary mechanisms, the most affluent of nations tend to resort to traditional methods of correcting the imbalance. This means, among other things, attempts to buy less from abroad and restricting the outflow of investment funds. These forces are likely to intensify in the near future and will have greatest impact on those economies, like Korea,

who are attempting to use exports as a means of economic growth. Mutually satisfactory relationships with one or more well-established and well-staffed industrial investment consultants in the subject country could be quite valuable to Korea in such circumstances.

5.3 INCENTIVES

5.3.1 General Concept of Incentives

The Korean Government established MAFEZ to create an environment which would be attractive to entrepreneurs, especially foreign investors, whose activities there would provide a high rate of foreign exchange earnings for the Korean economy. The vehicle for creating this atmosphere of attractiveness and the key device for promoting MAFEZ is a series of both fiscal and physical incentives. Several incentives are already available to the potential investor at MAFEZ. These, and other possible inducements which should be considered during periodic reviews of the MAFEZ concept, are described in this section. Many of these possible incentives are also discussed in other parts of this report.

The incentives offered investors at MAFEZ should be sufficient to attract desired investment but should not exceed in value the anticipated foreign exchange and other value added to the Korean economy that would not otherwise accrue. The Korean Government, in offering these incentives, obviously intends to maximize the leverage of domestic investment potential and to attract foreign capital. The increase in foreign exchange and value added through offering incentives will, in all probability, more than offset the minor costs of establishing this precedent.

Expansion-minded industries are always alert to opportunities to become more competitive through establishing new enterprises where low-cost labor and other cost advantages are available. Cost saving incentives,

such as exemptions from import and export duties, can make a particular location such as MAFEZ more attractive for investors than other available sites. Thus, by offering such special incentives, the Korean Government can give special advocacy to MAFEZ over other industrial locations, either in Korea or neighboring countries.

Incentives, to be effective, must be offered on an equitable and fair basis to all investors. Inducements must be offered on a long-term basis. The most effective incentives are those that minimize both the risk to the investor and the cost of doing business.

If equal incentives are offered by the Korean Government to potential investors desiring to locate at MAFEZ or at other sites, an obvious competitive situation will be established. To a certain extent, this situation exists today. The Korean Government should be continually alert to the possible diffusion of effort and effectiveness that can follow from undesirable competition between different industrial promotion activities which offer equal or equivalent incentives. The expansion of the authority of the MAFEZ administration to have responsibility over all similar activities will help to maximize the benefits resultant from the incentives offered by the Korean Government and also minimize undesirable competition between similar centers for industrial attraction. In the long term, it will probably be to the advantage of the Korean Government to concentrate attention on MAFEZ and the proposed Yosu zones until these two activities are well established before offering equivalent incentives to attract investors to other areas.

5.3.2 Investment Guarantees

The Korean Government should offer all possible reasonable guarantees that will minimize risk exposure for investors at MAFEZ. These investment guarantees should be offered within a general framework of guiding

principles and negotiated on an individual basis with each investor because each type of enterprise differs with respect to the consequences of risk exposure. The investment guarantees which should be considered for attracting investment at MAFEZ include

- Capital and return (profit) repatriation guarantees
- Investment or business-risk insurance guarantees through an unbiased third party
- Arbitration of business disputes on an equitable basis
- Equitable rules for management/labor bargaining
- Management participation for foreign investors consistent with the level of investment
- First option to foreign investors on operations management
- Initial restrictions on Korean equity to guarantee majority control by the foreign entrepreneur
- After five years continuous operation, with restricted Korean ownership, long-term unrestricted division of ownership to leave foreign and domestic investors free to negotiate mutually agreeable arrangements
- A guaranteed long-term ceiling on the minimum value added requirements, although value added exceeding requirements should be encouraged

5.3.3 Simplified Procedures

The Korean Government has recognized that investors strongly desire to streamline the procedure for establishing and conducting their respective operations. The one-stop approach to authorizing investment is a distinct advantage enjoyed by MAFEZ. This and other similar procedural incentives which the Korean Government can use for selectively attracting industry to MAFEZ include:

- Centralized registry and zone administration
- Elimination of customs inspection

- Simplified income reporting
- Liberalized and simplified incorporation laws in recognition that many multinational firms typically establish a subsidiary to control activities in each country of operation

5.3.4 Financial Incentives

On balance, potential investors will select MAFEZ because that location offers a cost advantage relative to other sites. There are several financial incentives which could represent considerable inducement to investors and at the same time cost very little to the Korean Government. These financial incentives include:

- Exemption from duties for all goods moving in international commerce
- Tax exemptions
- Low-cost rent
- Low-cost utilities
- Low-cost (to investors) health insurance, pensions, and other employee benefits
- Preferential tariff rates for freight moving within Korea
- Low interest loans for
 - financing
 - long-term capital requirements of foreign and domestic investors
 - operating capital
 - domestic entrepreneurial capital

5.3.5 Comparison of Fiscal Incentives for Korean Investment

Analysis of the laws pertaining to attraction of foreign investment and those governing establishment of MAFEZ and the export industrial estates indicate

there is very little difference between MAFEZ and the export industrial estate. MAFEZ, however, offers several advantages over ordinary investment in the Korean economy. Priorities of the Korean Government will determine the relative advantages offered to the potential investor to locate at MAFEZ or one of the other sites for industrial attraction. These priorities and the advantages offered by a MAFEZ location should be reviewed periodically to assure consistency between priorities and incentives. The Government should consider widening the difference between MAFEZ and the export industrial estates through offering more liberal incentives at MAFEZ. Table 5-2 has been prepared to show the relative advantages of MAFEZ as an industrial site.

5.3.6 Physical Incentives

Physical facilities and infrastructure should also be provided as inducement to investors at MAFEZ, particularly foreign investors who require a modern infrastructure to support production activities and a high standard of living amenities to attract expatriate managers and supervisory personnel. The physical incentives which exist or should be considered by the Korean Government include:

- Land available for initial plant facilities
- Preconstructed standard factory buildings
- Customized factory buildings on request. Many multinational firms unaccustomed to dealing with the Korean construction industry would perhaps favor the MAFEZ administration acting effectively as an agent in procuring and managing the construction of specialized plant facilities.
- Common and special services, such as security, fire protection, banking, cafeterias, catering, etc.
- Adequate physical infrastructure - water, energy, transportation, and telecommunications

- Provision for expansion. The zone should be developed in a checkerboard fashion such that open areas remain adjacent to the initial facilities located there. Investors should be given first option on the lease of adjacent land areas or of vacant space in standard factory buildings.
- Central warehousing capability to accommodate the specialized needs of zone occupants for storage of raw materials or inventory
- Centralized computer service bureau to handle management systems and perhaps analytical requirements
- A training center, especially for crafts and skills common to many investors
- Western standard houses as well as apartments for expatriate managers and supervisory personnel
- A western standard hotel, exposition and recreation center
- A large foreigners' commissary, or shopping center, for expatriates
- Apartments and dormitories for employees. It is assumed that Koreans desiring or requiring houses at Masan will provide this type of accommodation on an individual basis.
- Western standard schools for dependents of expatriates
- Hospital for expatriates and dependents
- Preservation of environmental values within the zone and adjacent land areas

It is suggested that physical facilities be provided on a basis that represents no cost penalty to the basic industrial operation within the zone. Thus, low-cost rent and utilities are recommended as financial incentives to investors. On the other hand, facilities made available to those workers who are in abundance, such as housing, commercial services, schools, and health facilities, should be provided on a valid entrepreneurial basis by the MAFEZ administration.

Table 5-2

FISCAL INCENTIVES FOR ATTRACTING INVESTMENT

	Provided by Laws Establishing		
	MAFFZ	Export Industrial Estates	Foreign Investment Attraction
Guarantees (to foreign investor):			
Capital and return (profit) repatriation	•	•	•
Investment or business risk insurance			
Equitable rules for arbitration of business disputes			
Equitable rules for management/labor bargaining	•	•	•
Management participation consistent with investment	•	•	•
First option on operations management			
Initial restrictions on Korean equity	•		
Long-term unrestricted division of ownership			
Ceiling on minimum value added requirements	•		
Simplified procedures:			
Centralized registry and zone administration	•	•	
Customs	•	•	
Income reporting			
Incorporation laws			
Financial support:			
Exemption from duties	•	•	•
Tax exemptions	•	•	•
Low-cost rent	•	•	
Low-cost utilities	•	•	
Low-cost (to investors) health insurance, pensions, and other employee benefits			
Preferential shipping rates for freight moving in Korea			
Low-interest loans			
- Foreign long-term capital			
- Operating capital			
- Domestic entrepreneurial capital			
- Domestic long-term capital			

section 6

**Description and Engineering
Evaluation of MAFEZ
Development Plan**

Section 6

DESCRIPTION AND ENGINEERING EVALUATION OF MAFEZ DEVELOPMENT PLAN

6.1 PHYSICAL PLANS

6.1.1 Site Description

Masan city is located on the southern coast of Korea approximately 60 kilometers by road west of the port of Pusan. The Republic of Korea Hydrographic Office Chart No. 237, Figure 6-1, shows the MAFEZ site location at latitude $35^{\circ}-13'$ and longitude $128^{\circ}-36'$, on the tidal mud flats at the north end of the Masan Bay. Masan city proper and the old port are located across the bay about four kilometers in the southwesterly direction.

The MAFEZ site contains nearly 160 hectares or 483,000 pyongs (one hectare equals 3,025 pyongs). The site is divided into three sections. The first section, owned by MAFEZ, contains 60.4 hectares, and industrial sites are currently being developed there. Sections II and III, which are owned by the city of Masan and private individuals, are still being reclaimed and will be available for purchase when industry sites in Section I are fully occupied. Table 6-1 shows the size of the sections and the amount of land planned for specific uses. The complete zone layout is shown in Figure 6-2.

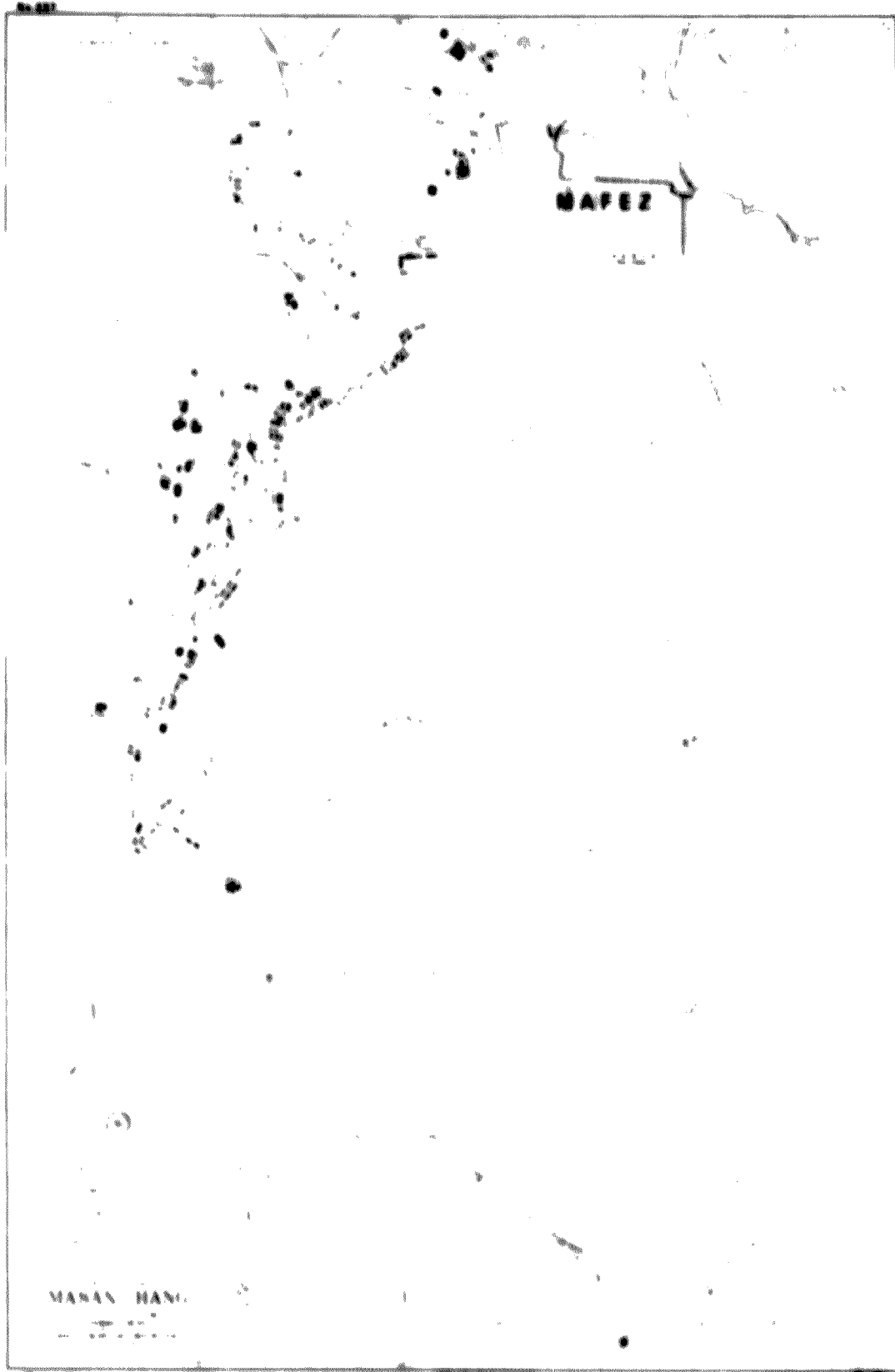
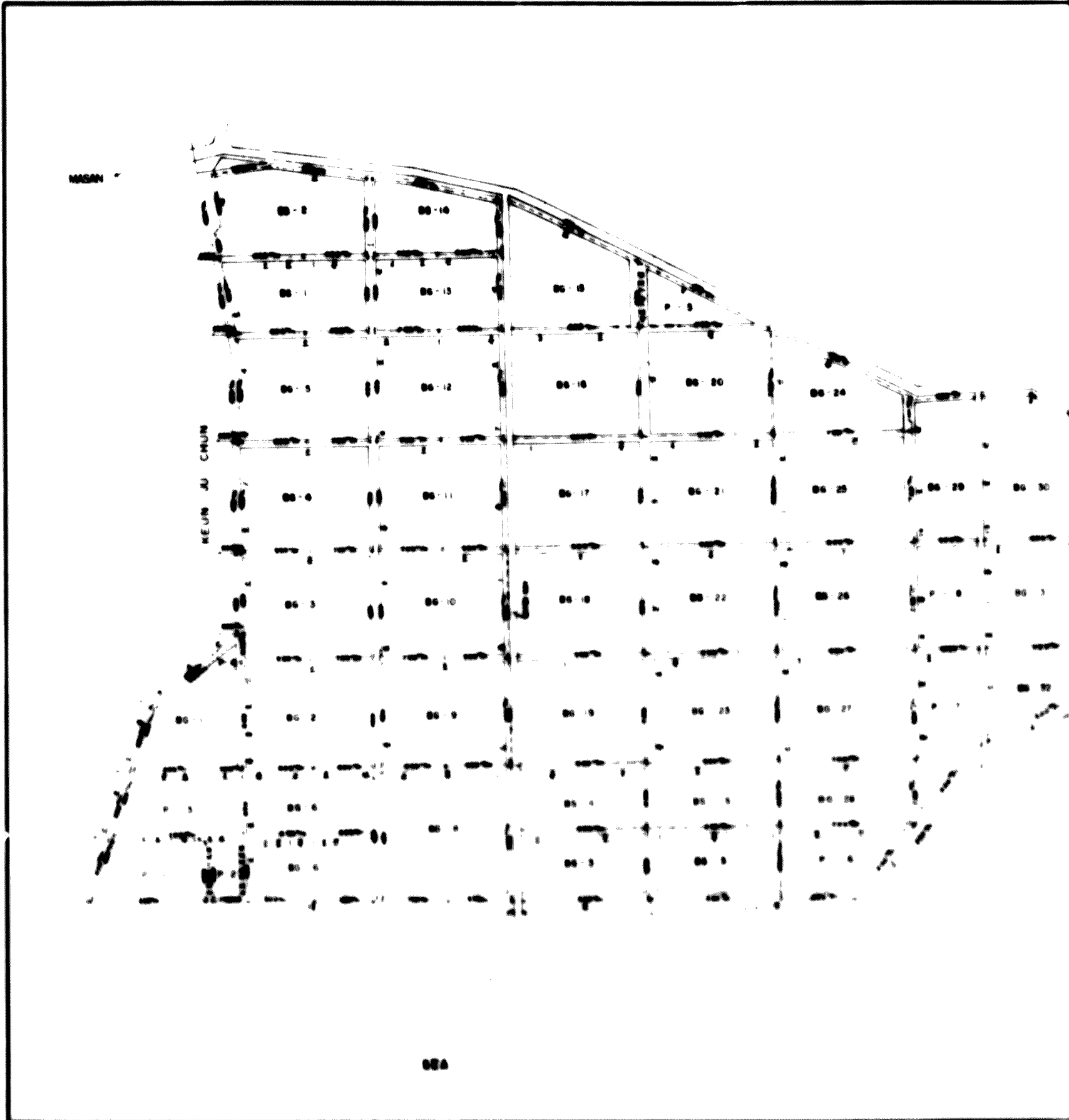


Figure C-1. Hydro Map of Masan Bay



SECTION 1

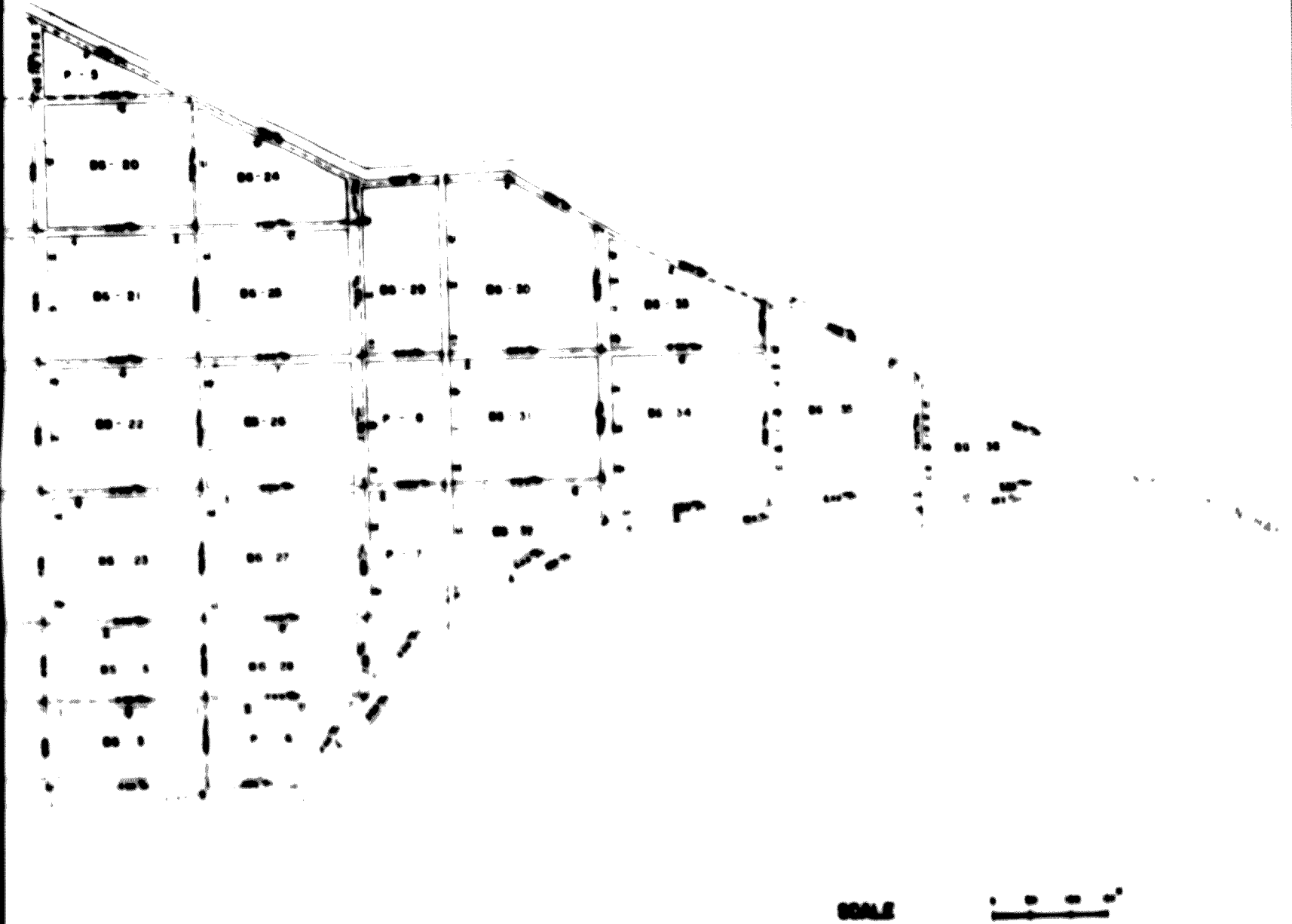


Figure 6-2. MAFEL/ Layout Plan

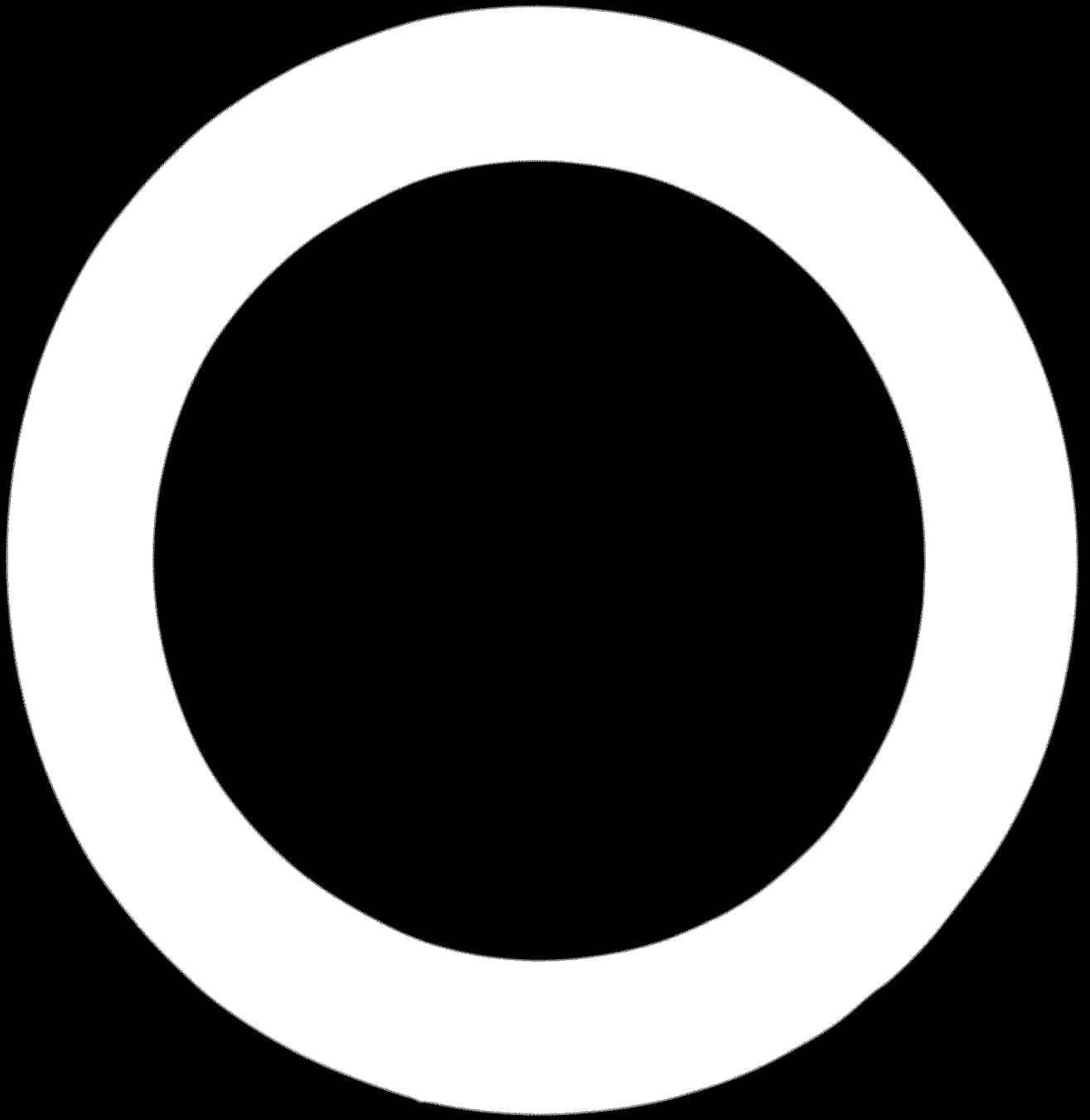


Table 6-1

MATEZ SITE AREA

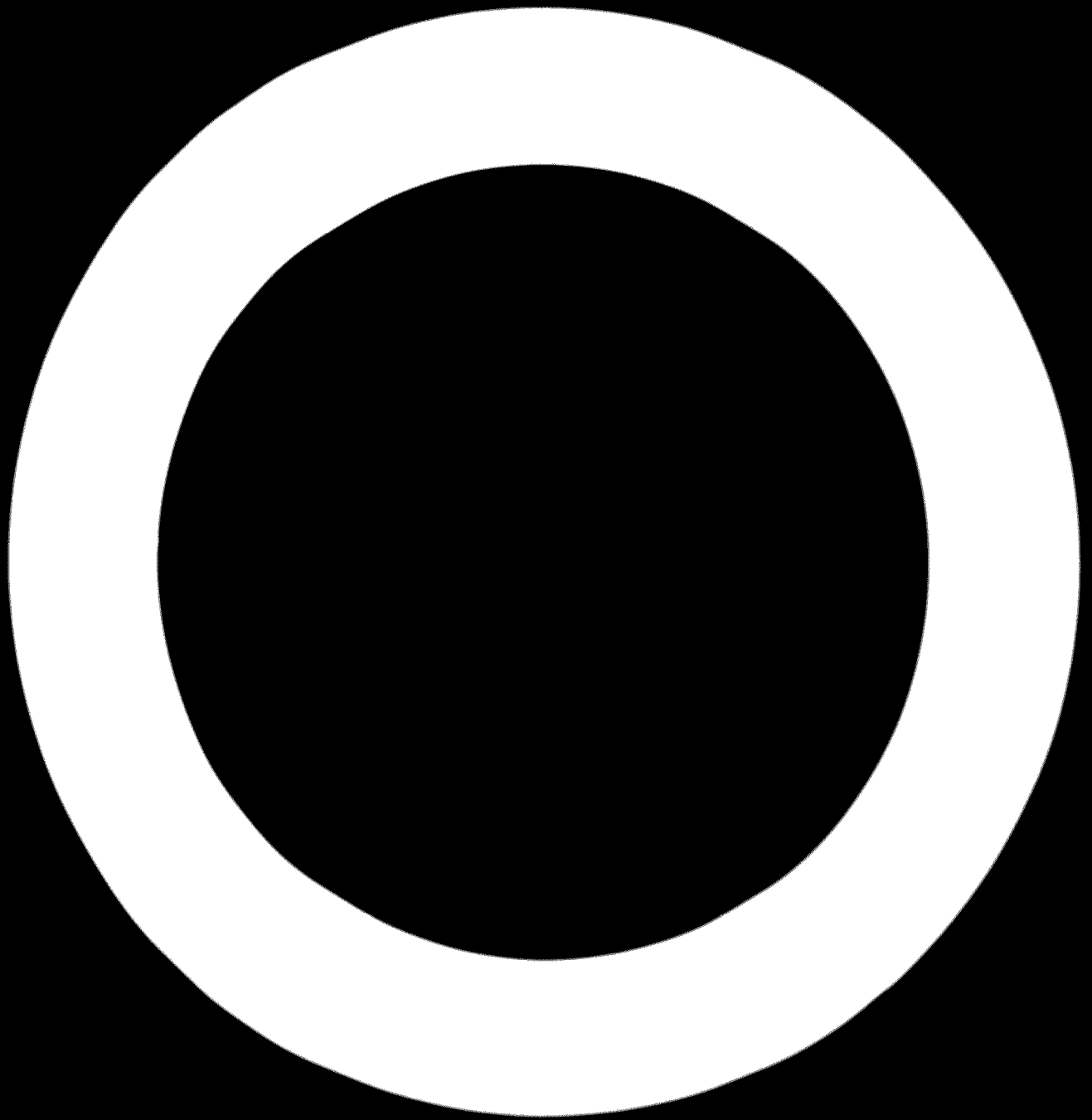
	Section 1 (one)		Section 2 (one)		Total	
	rectangles	pying	rectangles	pying	rectangles	pying
Public site	2,4	11,435	2,4	11,577	4,8	23,012
Standard industrial	2,4	11,435	2,4	11,577	4,8	23,012
Self-constructed factory	2,4	11,435	2,4	11,577	4,8	23,012
Road	4,2	17,670	4,2	17,670	8,4	35,340
Waterway	2,4	11,435	2,4	11,577	4,8	23,012
Total	6,4	27,975	6,4	27,754	12,8	55,729

6.0. One rectangle is pying.

6.1.2 Land Formation

As mentioned in paragraph 6.1.1, the MATEZ is located on the tidal mud flats of the Masan Bay. Section 1 (figure 6-3) of MATEZ has been purchased for 2450 won pyong from the city of Masan and filled to elevation 3.50 meters above mean sea level by a dredging operation and topped with a 50 cm. layer of sand and selected soil banking fill. A comprehensive soil borings program has established the existence of sound bedrock at a depth varying from 2 to 4 meters. All major structures will be founded on end bearing piles. Test piles have been loaded to 3 tons with maximum design bearing capacity limited to 50 tons.

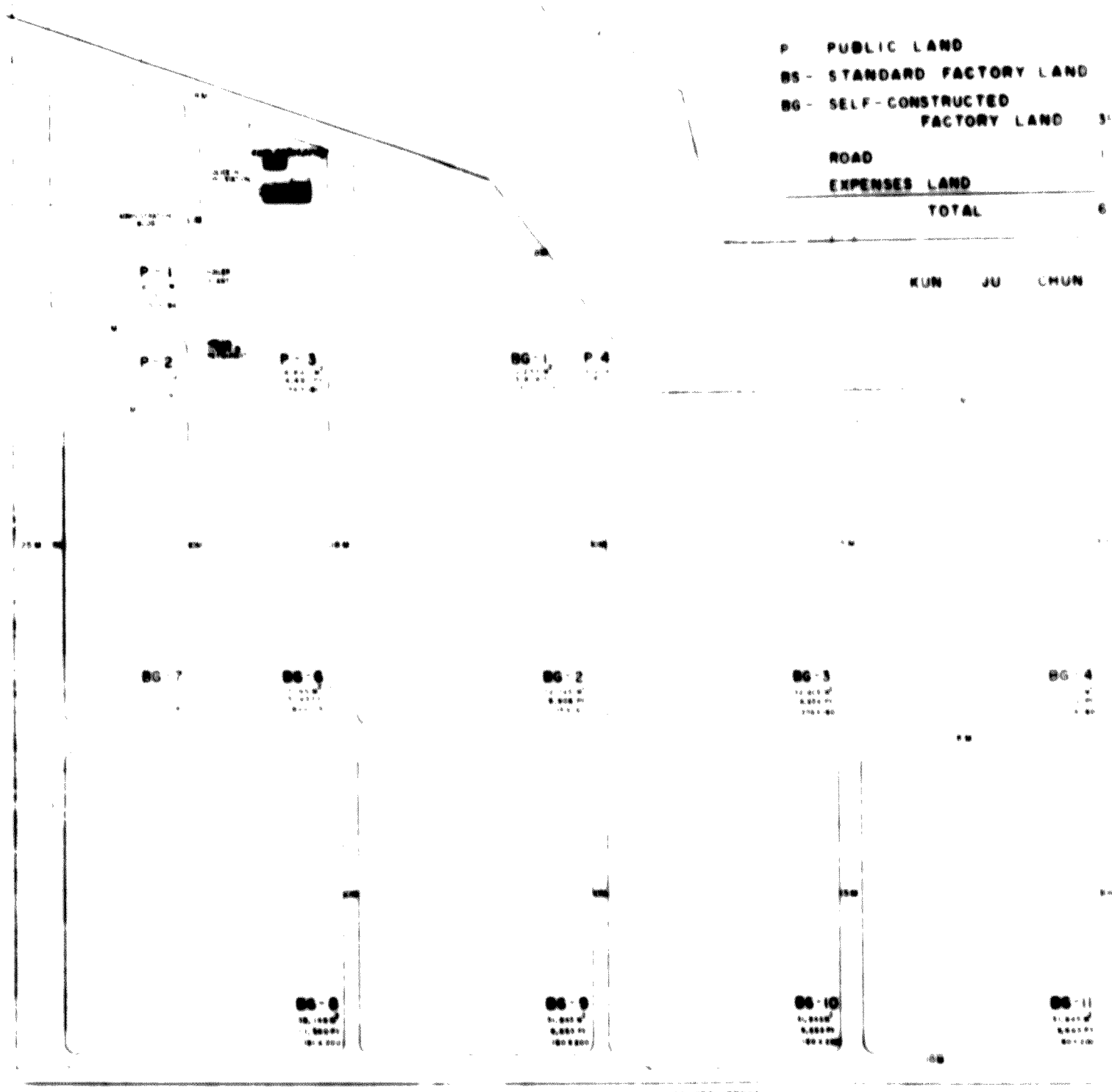
To accelerate the settlement of the weak dredged fill material, a vertical sand-pile drain method was utilized under the road system as illustrated in Figure 6-4. The drainage pipe system layout for the entire site is shown on Figure 6-2. The total settlement for the site is expected to approach 50 cm, with about 80 percent of the settlement occurring during the first five months. The drain pipes were flowing about 6 cm deep in May, 1971, with the settlement rate reduced to about 2 cm per month for the road bed.



P PUBLIC LAND
 BS - STANDARD FACTORY LAND
 BG - SELF-CONSTRUCTED
 FACTORY LAND 3
 ROAD
 EXPENSES LAND
 TOTAL 6

KUN JU CHUN

WARP



SECTION 1

P	PUBLIC LAND	34,410	10,000 PY
BS	STANDARD FACTORY LAND	34,020	10,000 PY
BS	SELF-CONSTRUCTED FACTORY LAND	302,020	10,770 PY
	ROAD	115,013	10,000 PY
	EXPENSES LAND	6,788	2,000 PY
	TOTAL	604,555	100,070 PY

KUN JU CHUN

BS-3
10,000 M²
10,000 PY
100 X 100

BS-4
10,000 M²
10,000 PY
100 X 100

BS-5
10,000 M²
10,000 PY
100 X 100

BS-1
10,000 M²
10,000 PY
100 X 100

BS-2
10,000 M²
10,000 PY
100 X 100

BS-10
10,000 M²
10,000 PY
100 X 100

BS-11
10,000 M²
10,000 PY
100 X 100

BS-12
10,000 M²
10,000 PY
100 X 100

BS-13
10,000 M²
10,000 PY
100 X 100

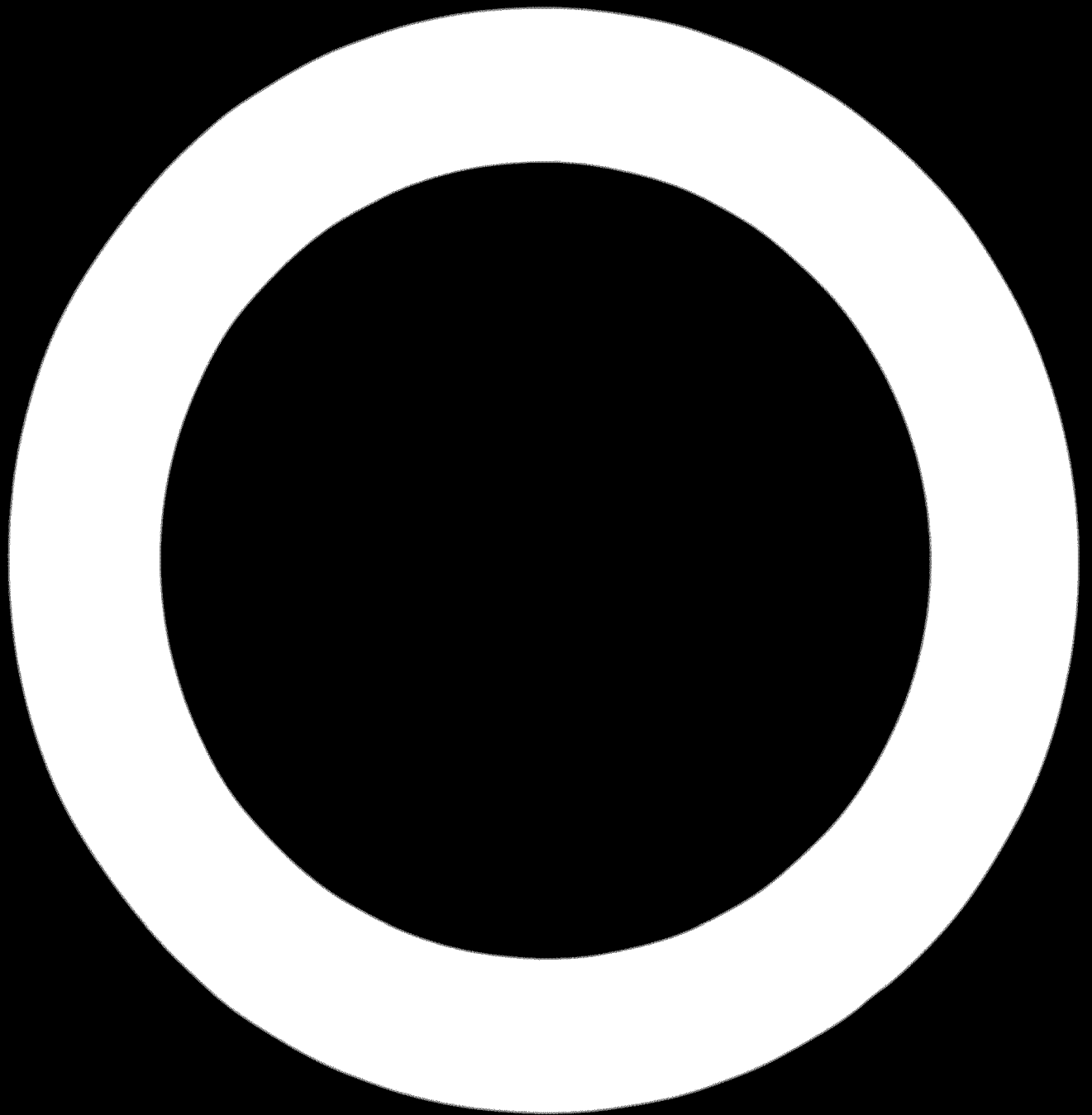
BS-14
10,000 M²
10,000 PY
100 X 100

FENCE

DAE HAN ASSOCIATES INC. LTD.
ARCHITECTS - ENGINEERS - PLANNERS

Figure 6-3. Section 1, MAFEZ

SECTION 2



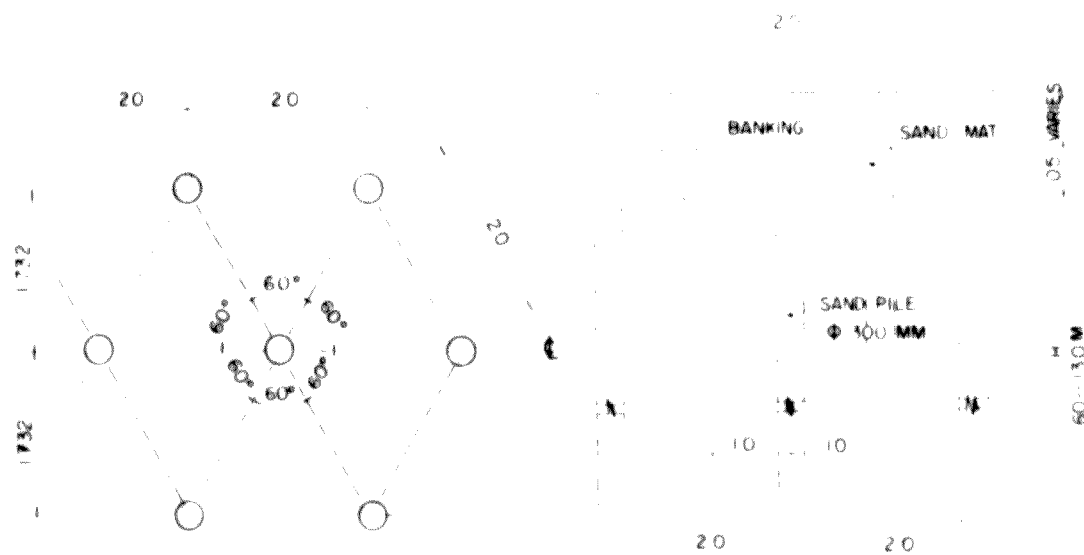


Figure 6-4. Arrangement of Sand Piles

Sections II and III designated for future expansion of MAFEZ are presently owned by the city of Masan and private individuals. Section II has been filled with dredged material to approximately sea level. Section III is being reclaimed by rock and earth fill obtained at an adjacent quarry. No settlement data are available for these two sections. The cost of these filled sites has not been established, although an estimated cost of 2533 won/pyong has been used in Table 10-1. If MAFEZ can negotiate a purchase price that is economically feasible for expansion of the zone, it is recommended that the sites be filled immediately and the rate of settlement monitored at selected control points. The longer settlement period should reduce the land formation cost by the elimination of the sand piles and extensive drainage system.

6.2 UTILITIES

Planning and cost estimates for the major utility systems were reviewed by the Bechtel team. These systems are already being installed in Section I. The cost estimates are based on expenditure records and budgets furnished by the Ministry of Construction and appropriate government officials in the Masan area.

6.2.1 Water System

The Ministry of Construction (MOC) report dated September, 1970 outlines in detail the water system being developed to serve the city of Masan and MAFEZ. The requirement for MAFEZ, Section I, is estimated by MOC to be 10,000 tons per day to be supplied from the existing Main industrial water main and the new treatment plant being constructed for MAFEZ. The distribution lines to the zone are coated steel pipe with welded joints instead of the cast-iron pipe specified in the MOC report. This will provide greater flexibility in the line to accommodate the anticipated settlements of fill. Although each site building will have an individual water storage tank located on the roof for fire protection, it is recommended that MAFEZ provide storage capacity for a two- or three-day water supply for the entire zone to protect against a major power failure or line rupture.

The MOC report also notes that an additional water system will be required for MAFEZ expansion into Sections II and III. This expansion should be made in connection with the need to provide additional water supplies for the city of Masan. There will be a large expansion of urban facilities north of MAFEZ and a major extension of water and other utilities will be required.

In the future, consideration should be given to the installation of a waste-water renovation facility to provide a portion of the industrial water for MAFEZ. The cost of such water may prove to be less than that for construction and operation of a new supply line. In view of the demands for water for other urban uses, this could someday constitute an important source of water.

6.2.2 Electrical Power System

As noted in the MOC report, and shown in Figure 6-5, Masan currently has substantial surplus power capacity. As the national grid system (Figure 6-6) is developed, the reserve capacity at Masan will be increased even further. The total power requirement for MAFEZ is estimated at 25,000 KW compared with a surplus capacity of 175,000 KW for the Masan Power Supply System. The power supply in Masan has been very reliable. A survey of the major industries located there failed to produce even one instance of power failure during the past four years.

The estimated cost figures for power presented in Section 10 reflect the installation cost to the individual factory site boundaries. Only the costs of individual hookups and power wiring and lighting in the standard factories are borne by the tenants.

6.2.3 Storm Drainage and Sewerage

Surface water runoff is collected by a curb and gutter system sloped to catch basins at street intersections. These catch basins are drained by a pipe system discharging into the waterway that surrounds MAFEZ, Section 1, as shown on Figure 6-2. This same pipe system was utilized for the vertical sand pile drains described above.

The factories and administration buildings are served by individual septic tanks to remove solid wastes. The effluent is connected to the storm drainage system for direct discharge to the waterway. In the future,

when pollution-control legislation prohibits the discharge of raw sewage into the bay, a separate sewage drain system will be required to collect and pump raw sewage to a treatment plant. The rate of settlement of the land fill should be minimal at that time, which will eliminate many problems that would be experienced if the separate system were installed now. Also, the treatment plant can be planned and sized to accommodate the adjacent sanitary district of the City of Masan.

In this regard, it is essential that a suitable system be set up for handling sanitary wastes from the urban areas that will develop in the valley north of Masan. There will be substantial storm runoffs from these valleys, and it is essential that the storm drainage and sanitary system be kept separate. As this new area develops, substantial amounts of new effluent will be discharged into Masan Bay in the area of the zone. Precautions must be taken to prevent the water areas around the zone from becoming polluted and creating an undesirable environment for both industries and workers.

The MAFEZ administration will operate a solid-waste collection service for the septic tanks in connection with the trash disposal incineration system that is included in the estimate of zone development costs.

6.2.4 Communications

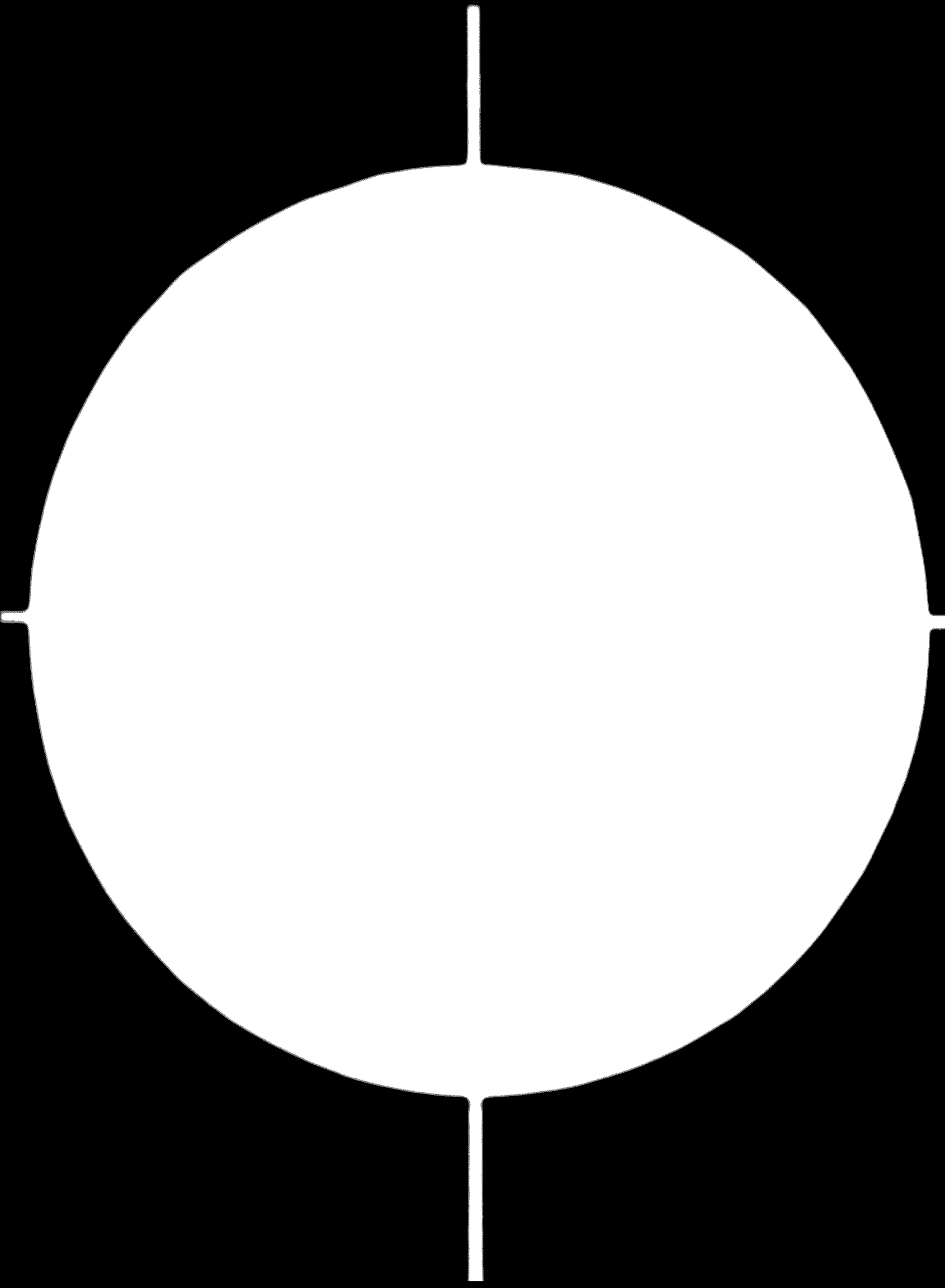
The MOC report lists the following communication facilities serving the city of Masan:

Radio broadcasting stations	2
Microwave stations	1
Telephone and telegraph office	1
Telephones	4600

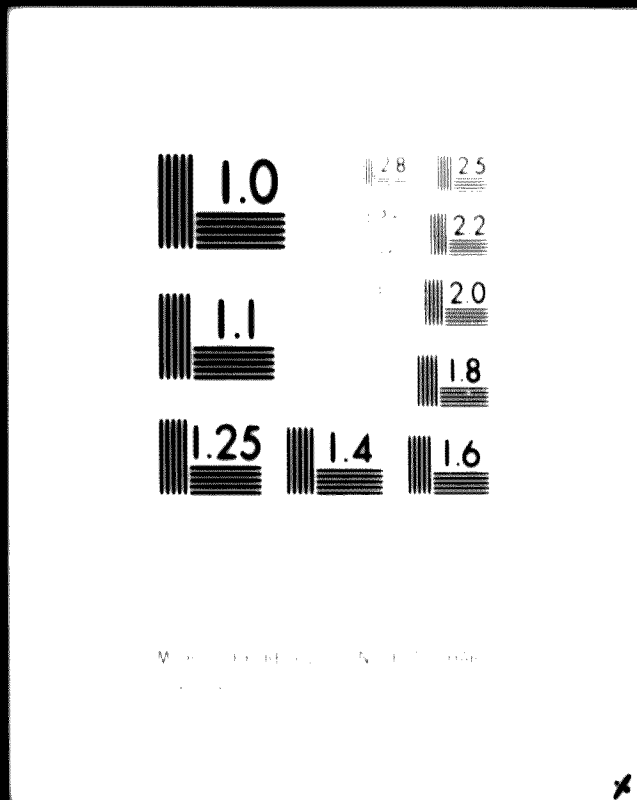
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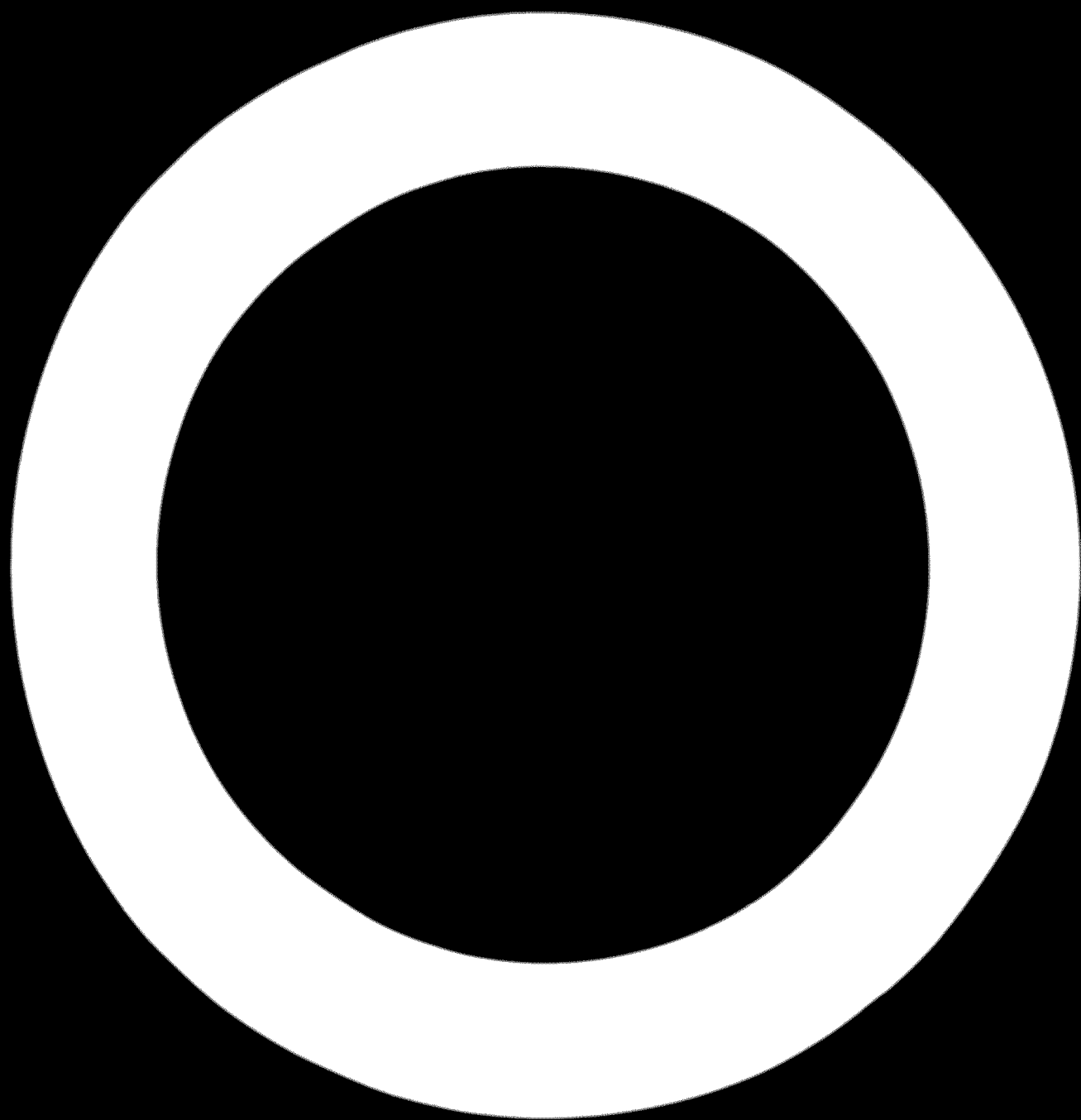
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	Dec. 1970		Dec. 1971		Dec. 1972		Dec.
	Plant	MW	Plant	MW	Plant	MW	Plant
Hydro			Namhang (Jun.)	12.60	Paldang (Dec.)	80.00	
	Total :	327.28		339.89		419.88	
Diesel							
	Total :	245.08		245.03		245.08	
Thermal			Power Barge (Feb.)	(30.00)	Kyungin #2 (Jan.)	158.00	Inchon #2 (Oct)
			Tonghae #2 (Mar.)	220.00	Yongnam #1 (Mar.)	200.00	
			Seoul #4 (Apr.)	137.50	Honan #1 (Mar.)	300.00	
			Tonghae #1 (Apr.)	220.00	Honan #2 (Jun.)	300.00	
			Yongnam #2 (Jun.)	200.00	Tonghae #3 (Jun.)	220.00	
			Kyungin #1 (Nov.)	158.00	Yongdong (Oct.)	125.00	
	Total :	1,209.50		2,205.00		3,708.00	
Total Installed Generation Capacity (MW) (Assuming Shutdown of Thermal Less Than 50 MW and Diesel Units Starting in 1971)		1,871.86		2,292.33		3,875.38	
% Increase in Generation Capacity over Previous Year		+ 15.4 %		+ 70.5 %		+ 69.1 %	+ 6.5 %
Total Generating Capability (MW) (Approximately 95 % of Total Installed Generation Capacity)		1,778.00		2,178.00		3,682.00	
Estimated System Peak Demand by KECO-USAID (MW) (Nov. 1970)		<u>1,555.00</u>		<u>2,120.00</u>		<u>2,585.00</u>	
% Annual Increase in Peak Demand		+ 21.5 %		+ 36.3 %		+ 21.9 %	+ 19.1 %
Generating Capacity Reserves (MW)		223.00		58.00		1,097.00	
% Capacity Margin (Without Small Units)				2.7 %		42.4 %	
% Capacity Margin (With Small Units)		14.3 %		25.0 %		60.7 %	

Data confirmed with USAID staff on April 30, 1971

1972	Dec. 1973		Dec. 1974		Dec. 1975		Dec. 1976	
MW	Plant	MW	Plant	MW	Plant	MW	Plant	MW
80.00					Soyanghang (Jun.)	200.00	Andong	80.00
419.88		419.88		419.88		619.88		679.88
245.00		245.00		245.00		245.00		245.00
158.00	Inchon #2 (Oct.)	290.00			Yosu #2 (Jan.)	300.00	Inchon #3 (Apr.)	313.00
200.00							Nuclear (Oct.)	600.00
300.00								
300.00								
220.00								
125.00								
200.00								
3,708.00		3,958.00		3,958.00		4,258.00		5,171.00
3,875.38		4,125.38		4,125.38		4,625.38		5,618.38
	+ 6.5 %		-		+ 12.1 %		+ 21.5 %	
3,682.00		3,919.00		3,919.00		4,394.00		5,338.00
<u>2,585.00</u>		<u>3,080.00</u>		<u>3,620.00</u>		<u>4,185.00</u>		<u>4,785.00</u>
	+ 19.1 %		+ 17.5 %		+ 15.6 %		+ 14.3 %	
1,097.00		839.00		299.00		209.00		553.00
42.4 %		27.2 %		8.3 %		4.8 %		11.6 %
60.7 %		42.6 %		21.3 %		16.3 %		21.4 %

Figure 6-5. Electric Power Generation Table



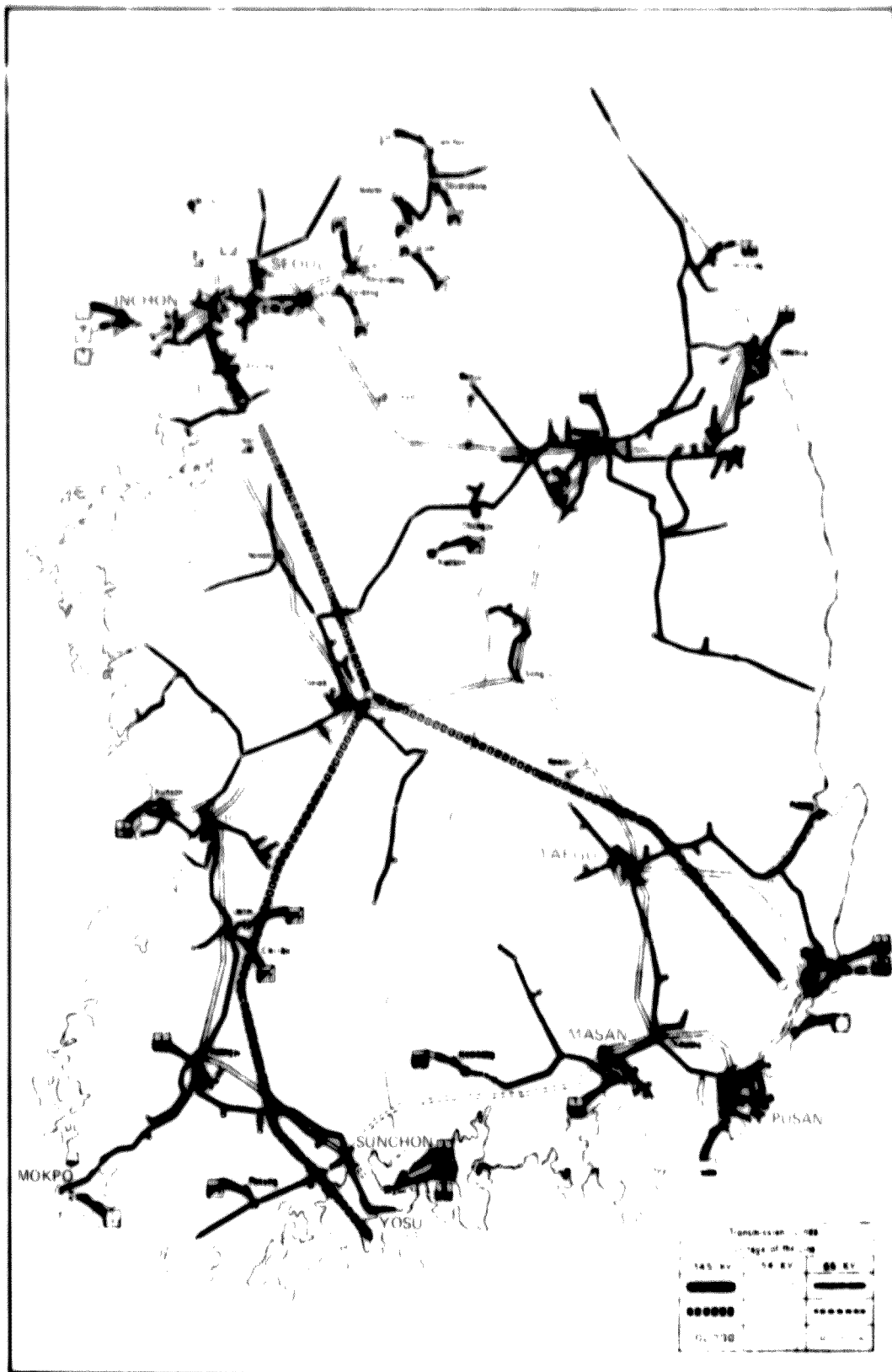
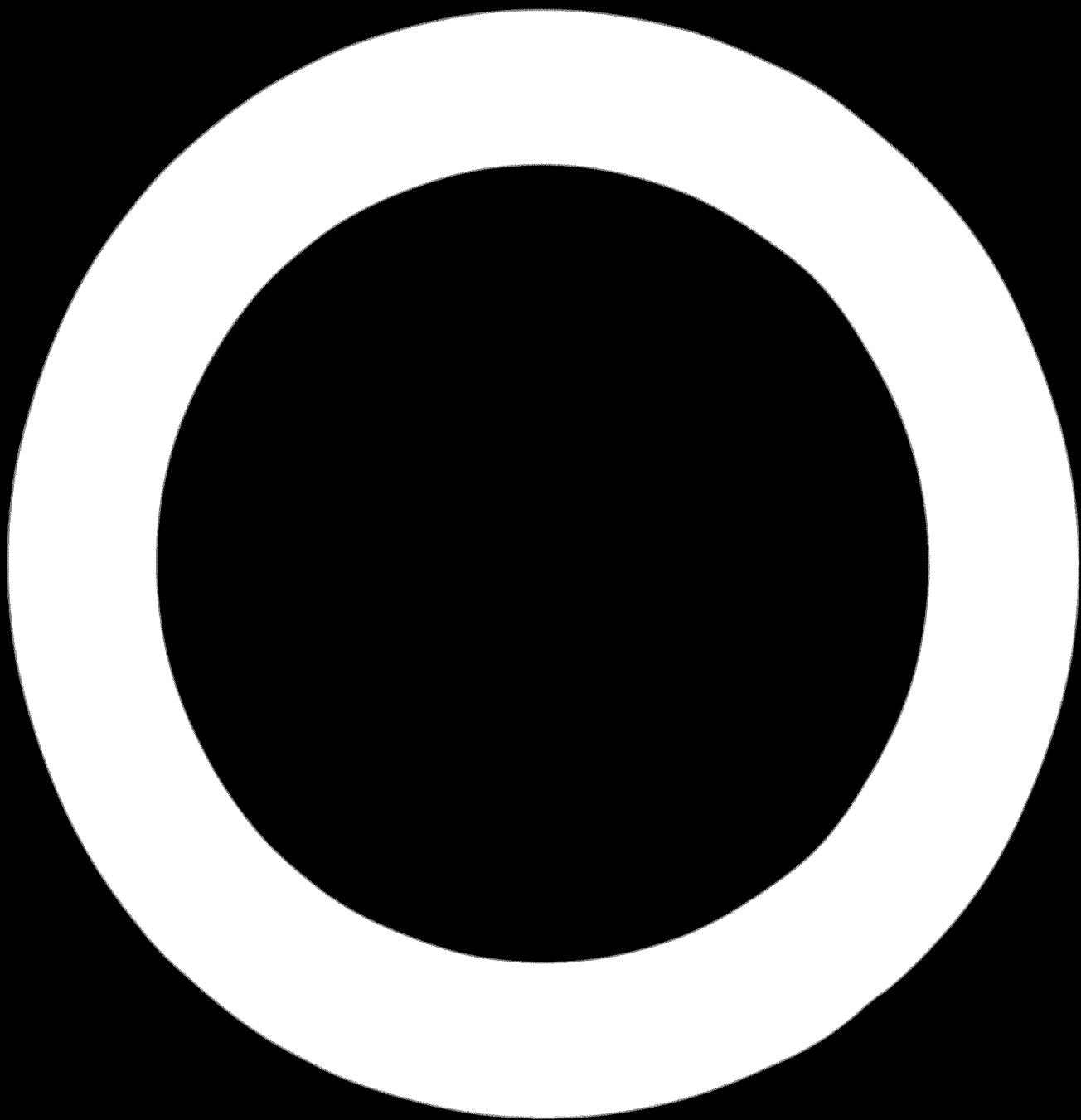


Figure 6-6. National Power Grid



International telephone service is provided through the Korean International Telegraph Office. Masan is connected to the Seoul-Busan network for telex and photoradiograms. The MAFEZ administration should follow the pattern of other existing industrial estates in Korea and establish a central telex service center for the convenience of the tenants.

6.3 BUILDINGS

6.3.1 Administration Building

The administration building shown on Figure 6-7 is presently under construction. This building will house the administration activities for all three sections of MAFEZ. It is planned to locate the customs activities for the zone in this building to expedite clearance papers for all tenants. A new bridge is being constructed at the administration site to connect MAFEZ with Masan proper and the proposed freeway system. This will permit the administration to monitor all activities entering and leaving the site until future expansion necessitates activating the future planned access gates.

6.3.2 Standard Factory Buildings

The standard factory buildings shown on Figure 6-8 and 6-9 are representative of the construction details utilized in the first buildings now being built. The buildings are founded on end-bearing piles and are designed for floor loadings of one ton/sq m on Type A factories and 0.8 ton/sq m on Type B factories. Each floor is serviced with a two-ton chain hoist. If material handling volume warrants them, exterior freight elevators may be incorporated at a later date.

A perimeter utility tunnel is constructed under the first floor to provide individual tenants easy access connections. The buildings will be heated from the common boiler plant serving two buildings.

6.3.5 Boiler Plant and Employees Restaurant

One boiler plant and factory employees' restaurant is provided for each two standard factories. These are the only factory employer facilities provided by the MAFEZ administration within the zone. The owners of self-constructed factories will have to provide restaurant facilities for their employees, which might be catered by the MAFEZ administration.

6.4 PLANNING CONSIDERATIONS WITHIN THE ZONE

6.4.1 Streets

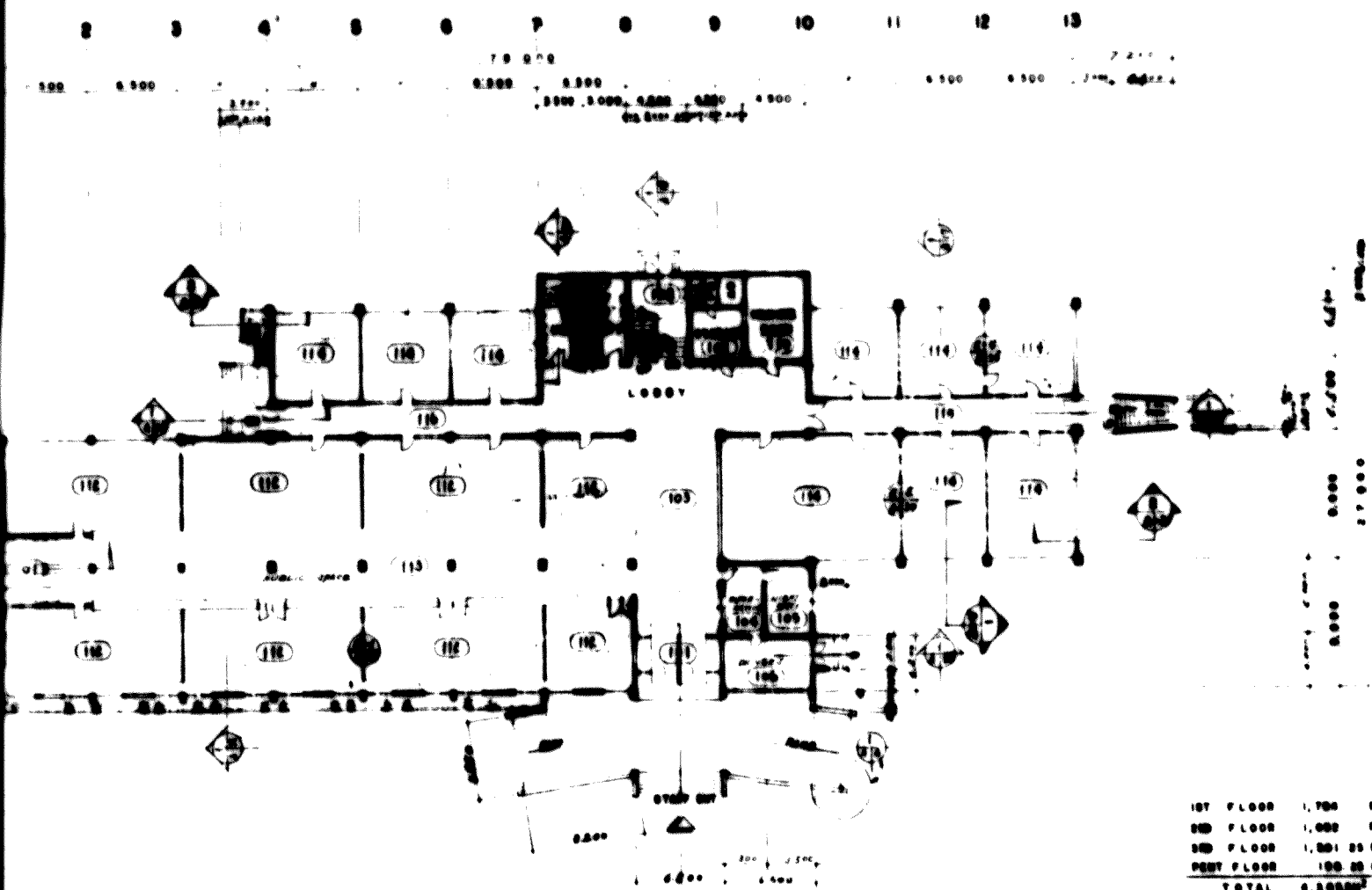
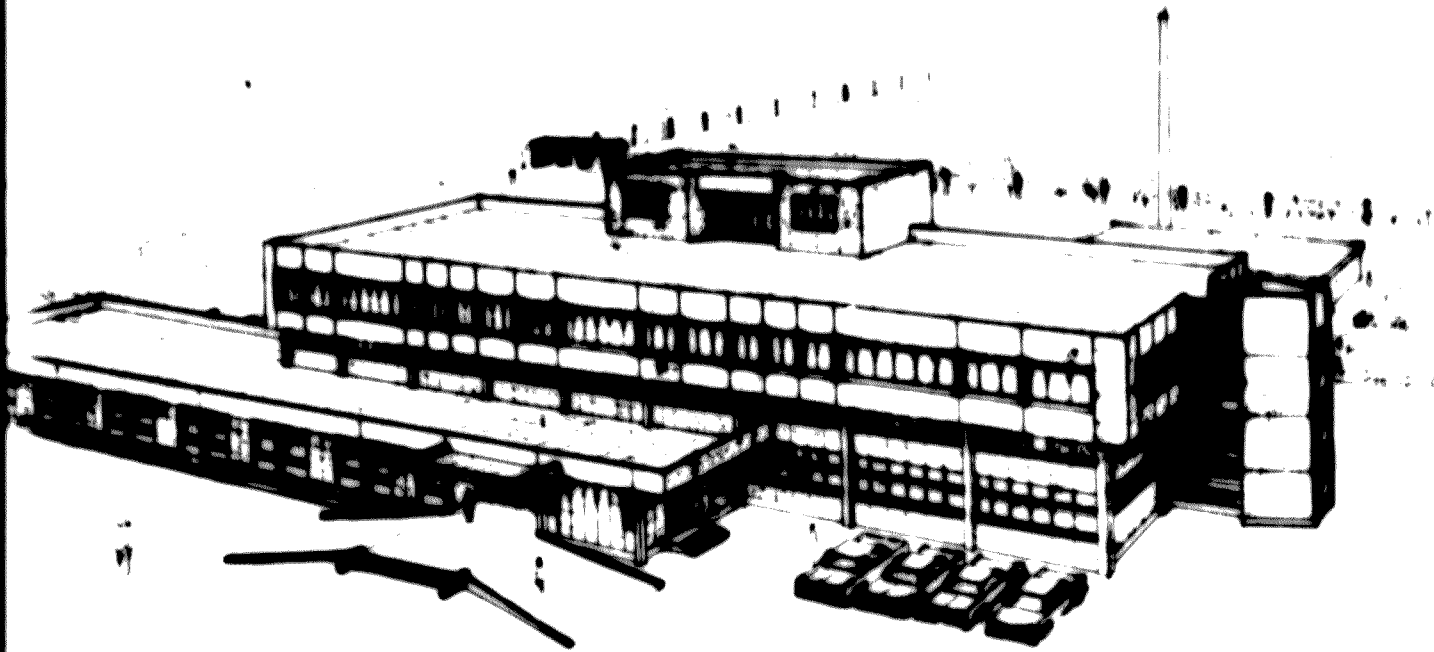
The streets within the zone are generally adequate for traffic movement. However, they are not wide enough to allow on street parking. Street parking will have to be prohibited. Some of the secondary streets are only 10 meters in width. Consideration should be given to widening these to at least 12 meters to allow more maneuvering room for large trucks.

6.4.2 Parking

Each plant must provide for its own parking requirements, both for trucks and passenger cars. No street parking will be allowed. The increasing ownership of private automobiles in Korea should be considered in making provisions for parking. The administration should carefully review each site plan to insure that adequate space for parking will be available.

6.4.3 Landscaping

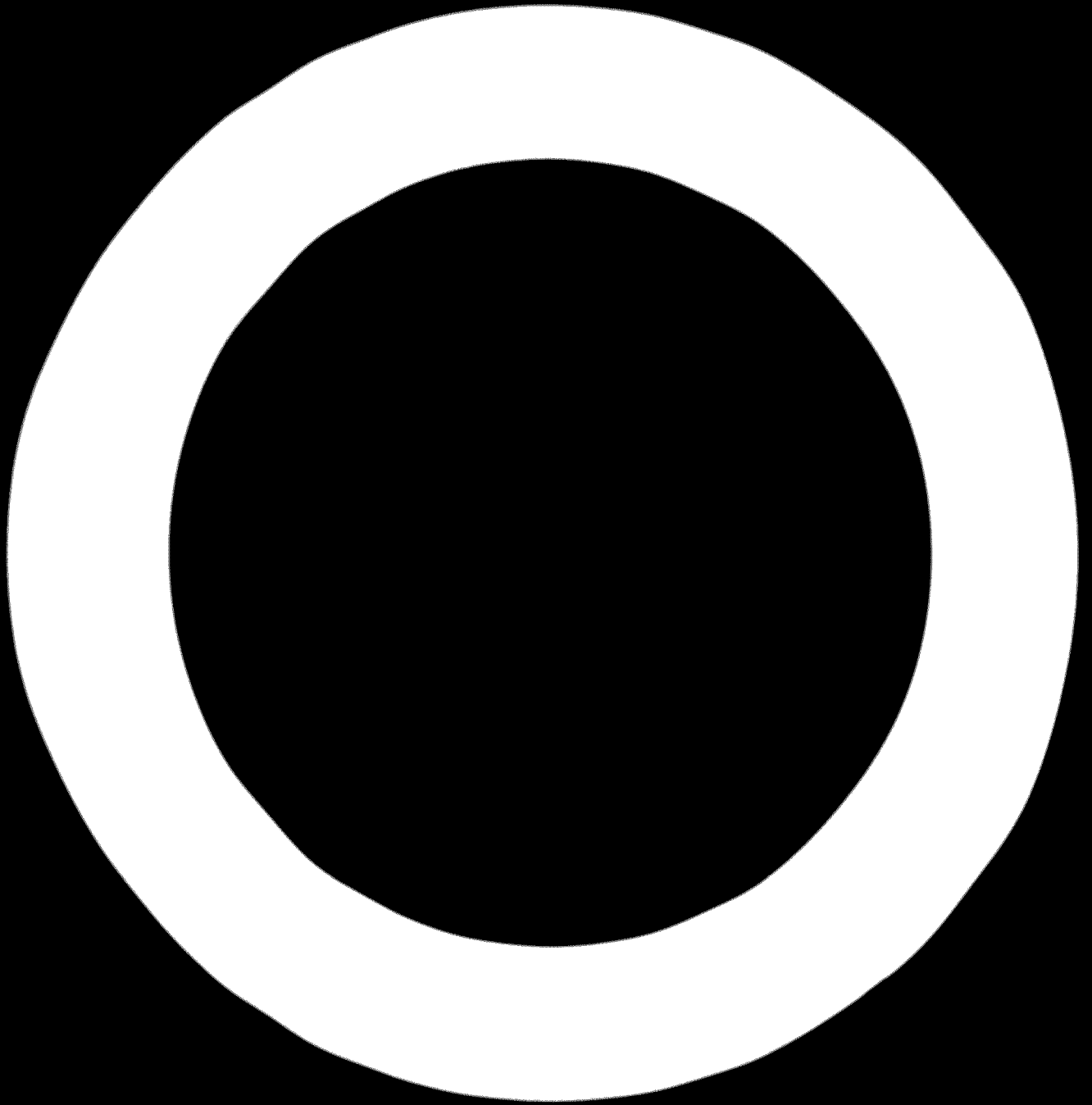
The maintenance of a pleasant environment within the zone is essential for several reasons:

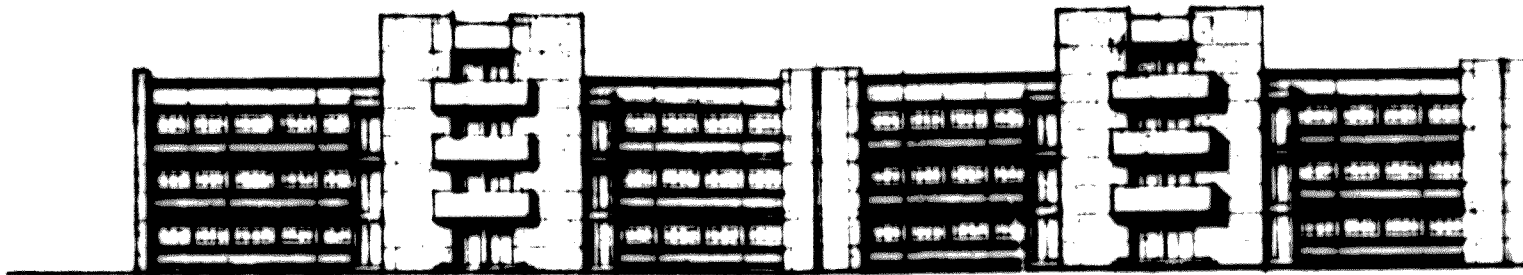


1ST FLOOR	1,700	m ²
2ND FLOOR	1,000	m ²
3RD FLOOR	1,001.25	m ²
POST FLOOR	100.25	m ²
TOTAL	4,802.50	m²
	(1,280,671)	

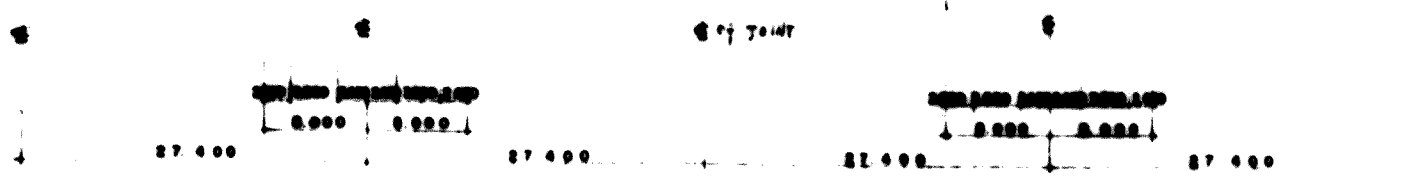
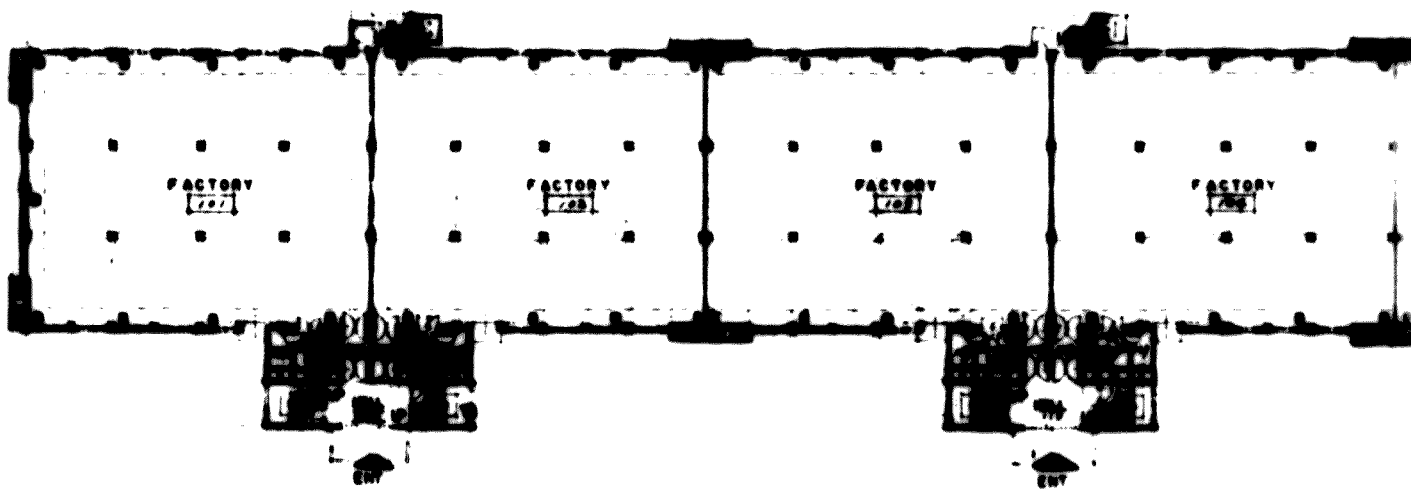
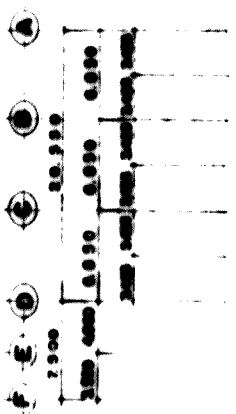
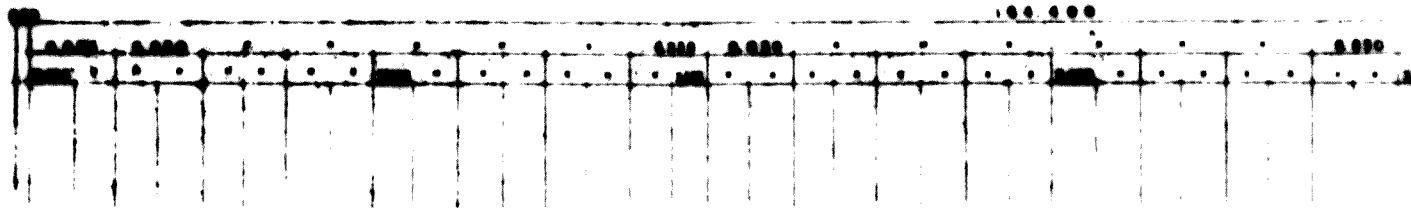
1ST FLOOR PLAN
SCALE 1/2000
AREA - 1700M²

Figure 6-7. MAFEZ Administration Building





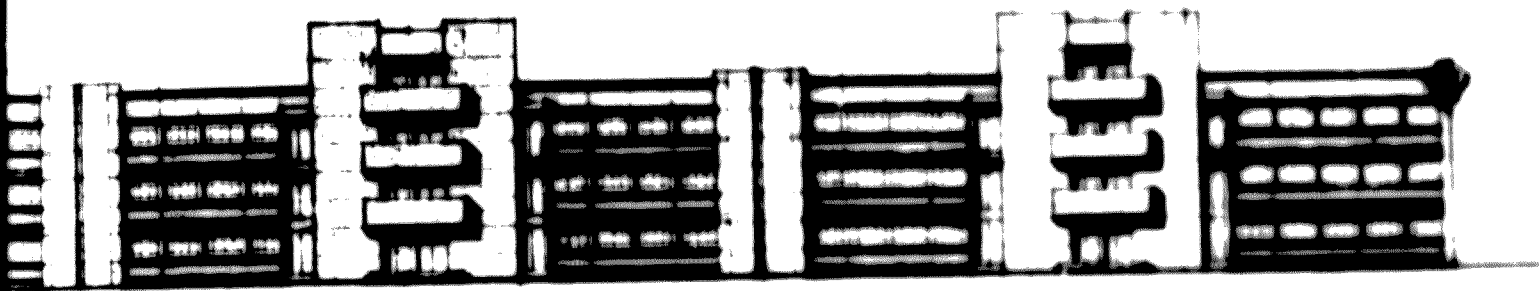
FRONT ELEVATION SCALE



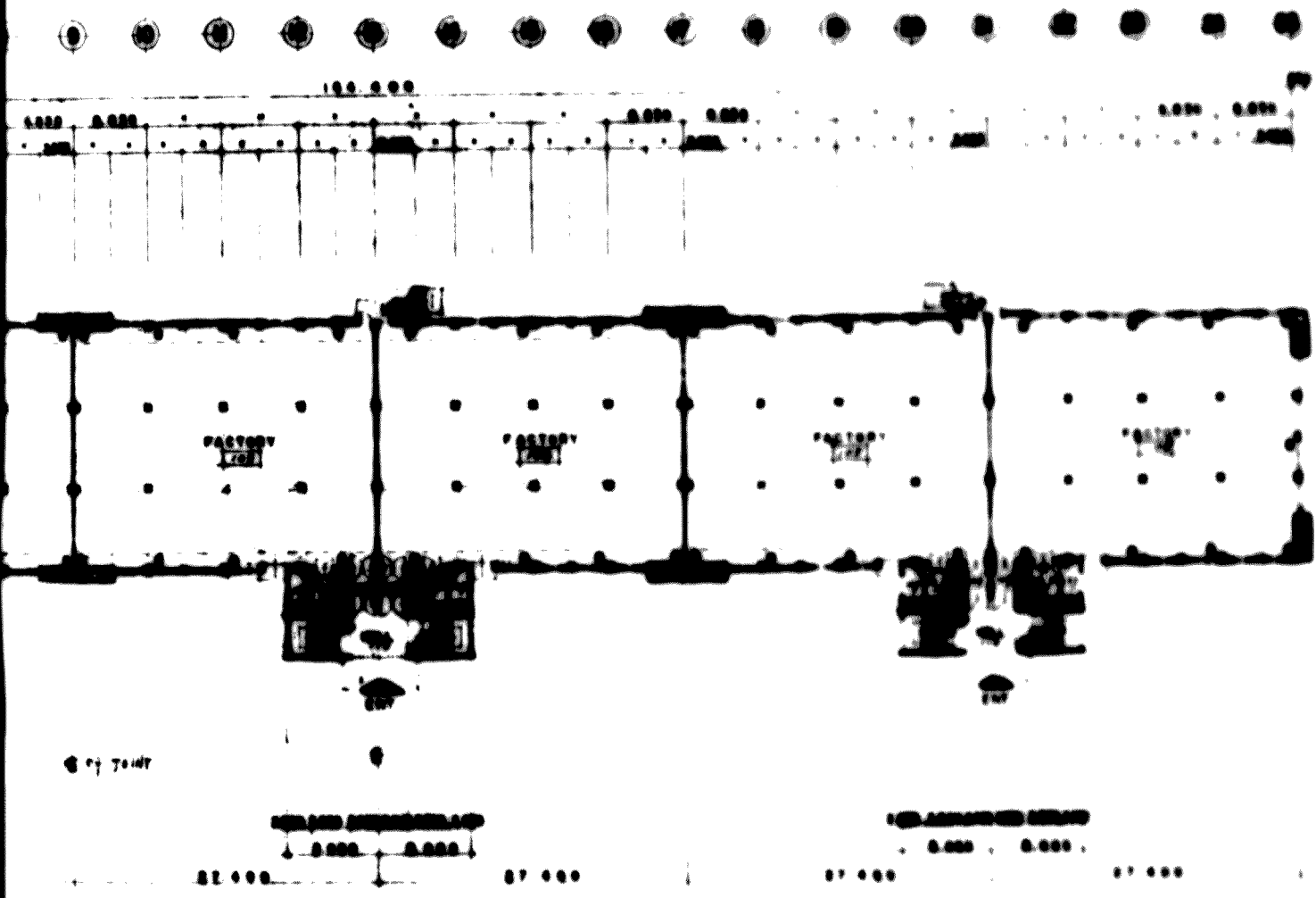
1ST FLOOR PLAN SCALE 1/500 (M)

A = 2,700.00 (1,130)
 TOTAL BAY AREA = 11,970.00
 (2,991.50)

SECTION 1



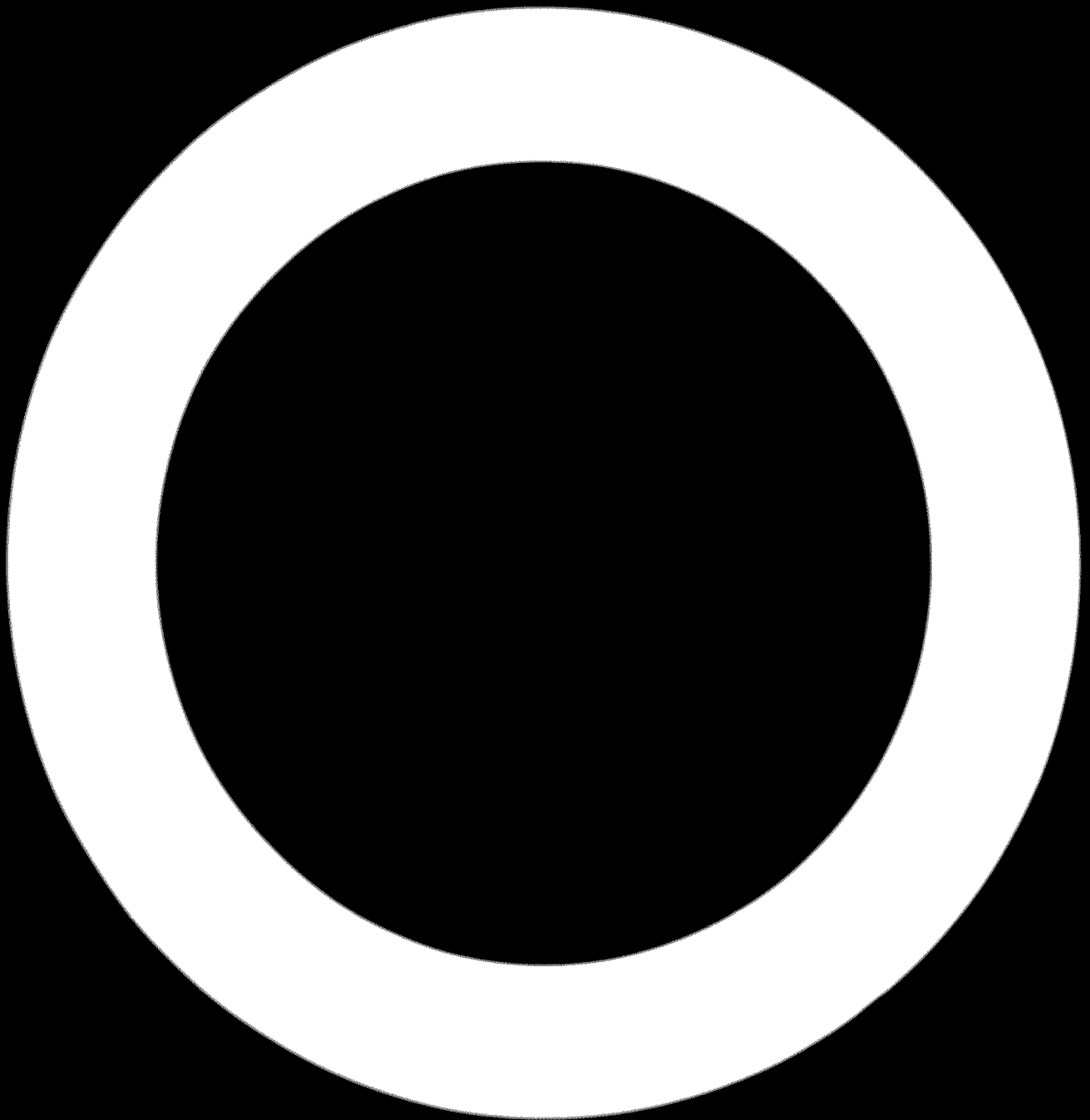
FRONT ELEVATION SCALE 1/300

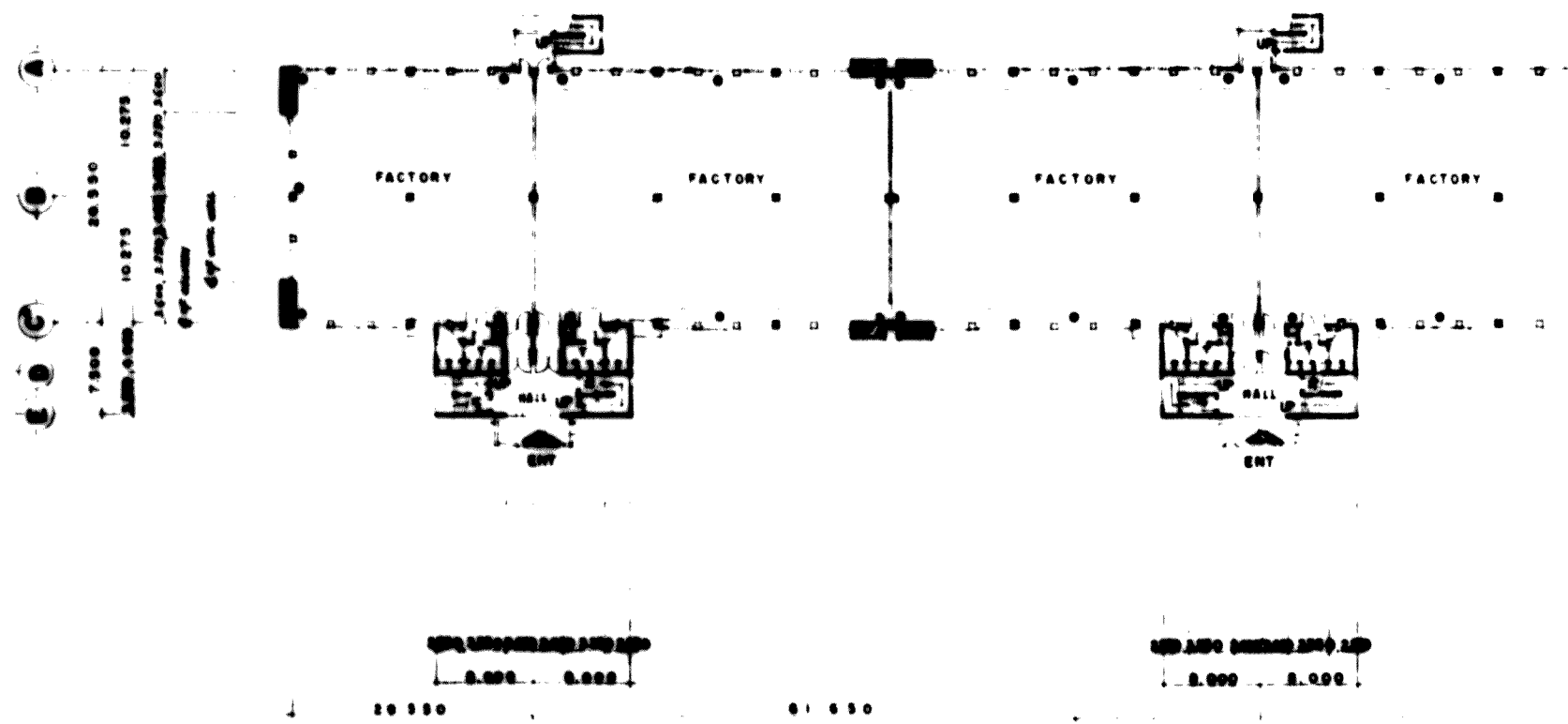
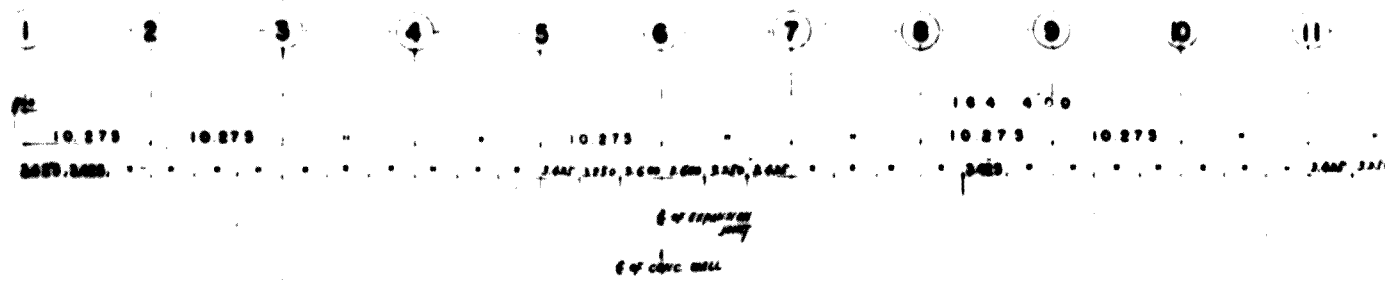


1ST FLOOR PLAN SCALE 1/300
 A - 2,700 @ 11,100 @ 90
 TOTAL AREA - 11,070 SQ
 (5,535 SQ)

Figure 6-8. Standard Factory Building A

SECTION 2



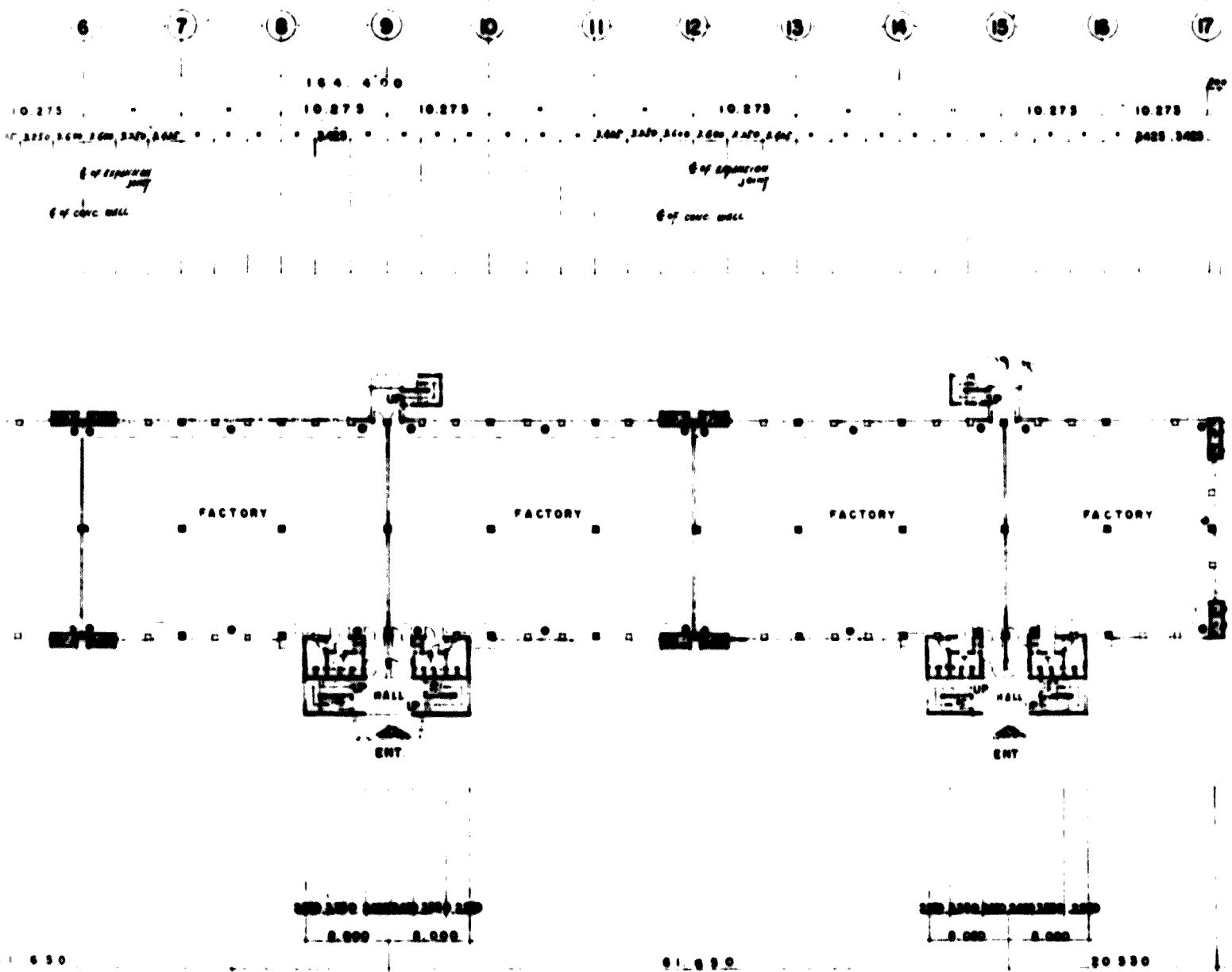


1ST FLOOR PLAN SCALE 1/300

A = 3,738.42 SF
(1,130.87 PY)

TOTAL BLDG AREA = 11,575
(3,500)

SECTION 1



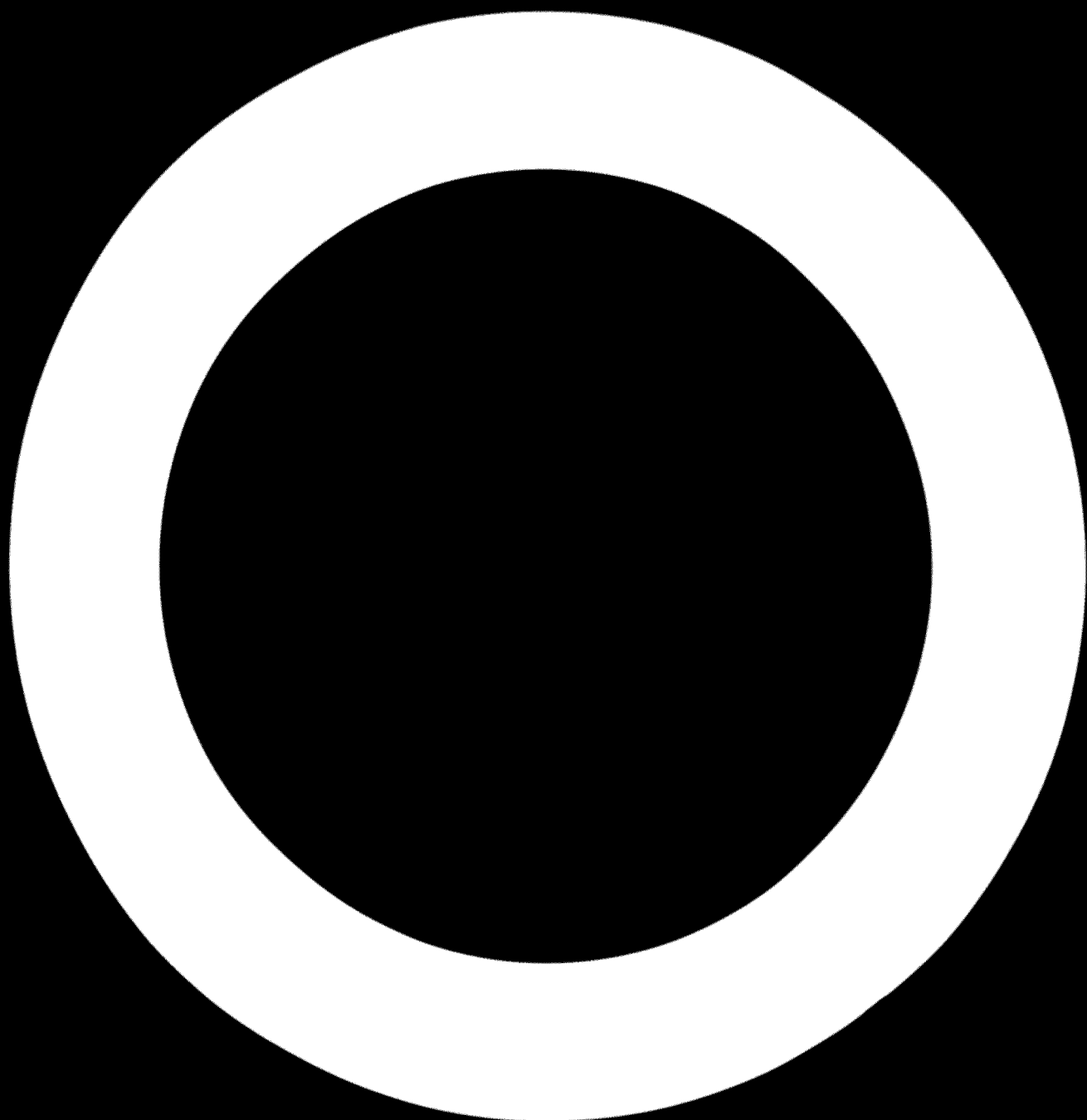
1ST FLOOR PLAN SCALE 1/300 (M)

A = 3,780.42 m²
 (1,130.87 PY)

TOTAL BLDG AREA = 11,973.26 m²
 (3,301.3 PY)

Figure 6-9. Standard Factory Building B

SECTION 2



- The impression on potential tenants can influence their decisions regarding location in the zone.
- The land values of the zone will be preserved and will pay for the landscaping investment many times over.
- The impression of a quality zone will carry over to customers and help create an impression of quality products.
- Studies have indicated that workers are more productive in pleasant surroundings and that worker turnover is reduced.

Therefore, each firm should be required to devote some portion of the site to landscaping, and its proper maintenance should be insured. The zone administration should provide a landscaping service for tenants who would prefer not to maintain their own.

Proper setbacks should be insured, and for the most part these should be landscaped. Each tenant should be required to maintain any land reserved for expansion in a manner that will enhance the aesthetics of the zone. Storage areas and unsightly activities should be properly fenced. Tenants should be encouraged to restrict these activities to the rear of the factory sites.

6.5 SERVICE CENTER

The site plan includes an administration building, service building, fire station, motor pool building, dining area, and medical clinic. In addition, this service center will also contain a gasoline service station, guard houses, and entrance gates, and a major transshipment warehouse located near the south end of the site. It is proposed to erect a pre-fabricated steel frame warehouse building that is easily expandable to meet future requirements.

Construction is underway on all the major elements of the service center. Bus and taxi stations will be established and expanded as the requirements develop.

6.6 ENGINEERING EVALUATION

The geographic location selected for the free export zone is the result of a concerted study effort by the Korean government. All the elements needed for a successful operation are present; climate, transportation, labor supply, established community infrastructure, and land area for expansion. In view of these considerations, the site selected appears to be favorable.

The original land purchase price of 2450 won/pyong for MAFEZ Section I places the zone in a favorable competitive position. As pointed out earlier, MAFEZ must exercise care in establishing a purchase price for the land areas of Sections II and III. The fact that government-owned land is also available for development at Yosu (see Appendix A) places MAFEZ in a strong bargaining position when the purchase price for Sections II and III is to be negotiated.

The technique employed for the land formation on Section I has proven to be satisfactory. The MAFEZ construction personnel are aware that fill settlement will pose some problems, but the current designs employed will keep maintenance costs to a minimum. Complete foundation data are available for tenants utilizing self-constructed factories.

The MOC reports and MAFEZ studies of the overall utility requirements for the zone are based on historical records for existing export zones of a similar nature. The source of water is adequate for all future expansions and planning and scheduling has been carried out for future water-line and pumping station construction.

The existing power supply is adequate, with excess generating capacity available. Sewage will become a problem, as has been previously stated, but delaying major line construction now will result in less future settlement and maintenance of lines.

A survey of established enterprises in other industrial export zones failed to disclose any communication problems when the zone was served by a telex system. This report has recommended that MAFEZ install a central telex station at the administration service center.

All buildings erected or approved by MAFEZ will be constructed in accordance with the MOC specifications and building code requirements. The construction in progress was inspected by the Bechtel team and found to be satisfactory in all respects. It should be noted here that construction generally proceeds at a rapid rate and on schedule. Building designs are adequate for the rigorous climate and service conditions. Design loads are ample for the types of industrial occupancy to be expected. Space is available for future modifications or expansion, which is an important feature for a zone complex of this type.

The layout of the zone is oriented about the major east-west axis connecting all three sections. Plans for future bridges and streets are shown on the Masan City master development plan. As the occupancy and traffic count increase, the plans for future gates and bridges with connecting roads will be implemented. An allowance has been included in the capital investment requirements for off-site road improvements to connect with the Pusan express highway system.

As noted in Section 8, the requirement for the proposed wharf should be thoroughly studied before construction is implemented. Soundings

in the harbors have been completed on a 50-meter grid which indicate that a channel depth of 11 meters below low water can be attained. However, rock will be encountered a short distance below this depth. This precludes utilizing the newer container ships now being placed in service.

In conclusion, the Bechtel team evaluation indicates that the MAFEZ has been studied, planned, designed, and constructed on a sound professional level.

section 7

Human Resources

Section 7

HUMAN RESOURCES

The economic impact of the Masan Free Export Zone on the surrounding community will be substantial. New employment opportunities created by the Free Export Zone, combined with the anticipated expansion of existing manufacturing, commercial, and service enterprises, will require a substantial expansion of the labor force. The purpose of this section is to review the situation with respect to national and regional human resources and to place them in perspective with the human resources that will be required in the Masan area.

7.1 POPULATION GROWTH

Preliminary estimates from the 1970 census indicate a present population of 31.5 million persons for the Republic of Korea. The average annual growth rate since the last census (taken in 1966) was 1.9 percent annually. This constitutes a substantial reduction in the historical growth rate and in the growth rate expected during the past Five-Year Plan period. The decline is attributed to both the national family-planning program and the improvement of the standard of living in the Republic of Korea.

Population growth rates are expected to continue to decline. In the Third Five-Year Plan, a population growth target has been established at 1.5 percent annually.

The age structure of the Korean population is strongly weighted toward the younger age groups, reflecting past high birth rates. In 1966, approximately 44 percent of the population was under 15 years of age, while only 53 percent was in the key productive age categories of 15 to 65 years. This proportion of productive population to total population is substantially lower than in countries with higher levels of industrial development. However, it compares favorably with other developing countries. Table 7-1 provides a comparison of population in the productive age categories for selected countries.

Table 7-1

AGE DISTRIBUTION - SELECTED COUNTRIES

Country	PERCENT OF TOTAL POPULATION		
	Under 15	15 to 64	65 and Over
Korea	43.5	53.2	3.3
Algeria	47.2	48.3	4.5
Turkey	41.9	54.1	4.0
Portugal	29.0	62.5	8.5
Greece	25.4	65.4	9.2
Japan	24.9	68.7	6.4
Germany	22.6	65.5	11.9
France	25.3	62.5	12.2
Sweden	20.9	66.2	12.9
United States	30.5	60.1	9.4

Sources: 1966 Korean Census of Population and O. E. C. D., "Labor Force Statistics, 1956-1966," Paris, 1968, p. 14.

Substantial improvement is expected in this age structure because of the rapidly falling birth rates. Already, according to the 1966 census, the number of persons under 5 years old is lower than the number 5 to 9 years old. With the expected continuation of this trend, the productive age group will increase much faster in the future than the non-productive age group.

7.1.1 National Population and Manpower Projections

The Ministry of Science and Technology (MOST), in order to analyze the future requirements for scientific and technical personnel, had a long-term population and manpower projection prepared by the Institute of Population Problems. The results of these projections are shown in Table 7-2.

Table 7-2

PROJECTIONS OF TOTAL AND ECONOMICALLY ACTIVE POPULATION 1971 to 1986

	(Millions of Persons)				Percentage Growth 1971 to 1986
	1971	1976	1981	1986	
Total Population	32.4	34.3	37.7	40.2	24
Population over 14 years of age	19.9	23.2	26.5	29.5	48
Economically Active Population	10.7	12.3	14.3	16.2	51
Ratio of Economically Active to Total Population	33%	36%	38%	40%	

Source: "Manpower Development and Non-formal Education in Republic of Korea," published by the Ministry of Science and Technology, May, 1971, Table 1.

These projections indicate that the population over 14 years of age will grow twice as fast as the total population during the next 15 years. One of the results of this shift in age structure will be a substantial gain in the percentage of persons expected to be economically active. This category will increase from 33 percent of the total population to approximately 40 percent in 1986.

7.1.2 National Jobs Needed

If reasonable long-range employment levels are to be achieved, substantial new jobs must be created in the national economy. The absolute number of jobs in agriculture, forestry, and fisheries will decline in the future as underemployment is reduced and mechanization is more widely adopted. Employment in these categories is projected to decline by approximately 1.5 million workers by 1968. Thus new jobs must not only be created in other sectors of the economy to meet the needs of the growing population, but also to absorb workers released from the agricultural sector.

Table 7-3 contains projections by industrial category of future employment that will be required to achieve a low unemployment rate in the economy. According to these projections, some 2.7 million new jobs will be needed in mining and manufacturing, as well as approximately 4.3 million new jobs in Social Overhead Capital and Services. (This category includes construction, utilities, transportation and communication, commerce, and private and government services.)

7.1.3 Gyeongsangnam Province

Most of the human resources needed to staff the new industries in the Masan area, including those locating in the Free Export Zone, will come from Gyeongsangnam Province. Some workers might be attracted from Gyeongsangbug Province and from Seoul and Pusan; these latter two cities,

Table 7-3

FUTURE EMPLOYMENT REQUIREMENTS BY
INDUSTRY CATEGORY 1971 to 1980

	(Millions of Persons)				Absolute Change 1971 to 1980
	1971	1976	1981	1986	
Agriculture, Forestry and Fisheries	4.7	4.4	4.1	3.2	1.5
Mining and Manufacturing	1.7	2.4	3.3	4.4	2.7
Social Overhead Capital and Services	3.8	4.9	6.4	8.1	4.3
Total	10.2	11.7	13.8	15.7	5.5
	(Percent Distribution)				
Agriculture, Forestry and Fisheries	46.0	37.6	29.7	20.4	
Mining and Manufacturing	16.7	20.5	23.9	28.0	
Social Overhead Capital and Services	37.3	41.9	46.4	51.6	
Total	100.0	100.0	100.0	100.0	

Source: "Manpower Development and Non-formal Education in Republic of Korea," published by the Ministry of Science and Technology, May 1971, Table 3.

however, are major poles of attraction and competitors for the existing labor force. It is unlikely that many workers will be attracted from the Jeolla provinces because (1) plans are currently being prepared to create free export zones at Yosu and Mokpo which will form poles of attraction for the available labor force in these provinces, (2) these provinces are important agricultural producers (and one of the major goals of the Third Five-Year Plan is to increase agricultural output and farm incomes), and (3) historically, migration between the Jeolla and Gyeongsang provinces has been limited.

Gyeongsangnam Province has actually been losing population in recent years. According to recently released preliminary results from the 1970 Census, there were some 28,000 fewer persons living in this province than in 1960. Several other provinces, including Jeolla, also lost population during this period, while the cities of Seoul and Pusan and Gyeonggi Province surrounding Seoul recorded substantial gains in population. Table 7-4 shows the absolute and percentage changes in population for the provinces and the cities of Seoul and Pusan for the critical period from 1960 to 1970.

In contrast to the decline in population for Gyeongsangnam Province, the number of households actually increased slightly between 1960 and 1970. In fact, all provinces except Chungcheongbuk recorded an increase in households. For the Republic of Korea as a whole, the number of households increased by 14.1 percent compared to a gain of 12 percent in total population.

This indicates that a substantial "undoubling" of families occurred, especially amongst families migrating from rural areas to urban areas. ("Undoubling" means the forming of two households from one, such as when a son and his family who are living with parents move out to form their own household.) It also indicates that there is, and will continue to be, substantial pressure on the housing resources of the country.

Table 7-4

CHANGES IN POPULATION - 1966-1970

Provinces and Cities Recording Increases		
	Amount of Increase	Percentage Increase
Seoul	1,716,713	+45.3%
Pusan	452,766	+31.8
Gyeonggi	259,405	+8.4
Gangweon	42,723	+2.3
Gyeongsangbug	91,677	+2.1
Jeju	28,255	+8.4
Provinces Recording Decreases		
	Amount of Decrease	Percentage Increase
Chungcheongbug	65,668	-4.2
Chungcheongnam	39,255	-1.3
Jeonlabug	87,388	-5.4
Jeonlanam	39,533	-0.9
Gyeongsangnam	58,341	-1.8

Source: Bureau of Statistics, Economic Planning Board,
 "Preliminary 1970 Population and Housing Units," Table 3

especially in rapidly developing urban areas. Table 7-5 contains data on the percentage change between population and households for the period from 1966 to 1970.

Reflecting this "undoubling," the average number of persons per household for the Republic of Korea declined from 5.68 in 1966 to 5.37 in 1970. A similar reduction occurred in Gyeongsangnam Province as the average household size declined from 5.63 persons in 1966 to 5.43 persons in 1970.

Age Distribution. The age distribution shown in the 1966 census indicates that the number of persons 15 to 64 years old amounted to 52 percent of the population compared to 53 percent on a national basis. The City of Masan had 56 percent of its population in this key age category in 1966. Table 7-6 shows the population age distribution for Gyeongsangnam Province and the City of Masan. The age distribution for Gyeongsangnam Province is also shown graphically in Figure 7-1.

To obtain an estimate of the labor force, a population projection was prepared utilizing a computer program that projects the population annually by age and sex, reports the median age, and reflects changes in natural increase and migration patterns.

In preparing the projection for Gyeongsangnam Province, 1966 was used as a base year. The projections reflect the preliminary estimate of the 1970 population which, as indicated previously, declined slightly during this period. (Unfortunately, detailed population data for geographical regions such as cities and data on age distributions for 1970 will not be available until late 1971.) For the projections, it was assumed that there would be no substantial out-migration in the future, but there would be some growth in population due to natural increase. This assumption

Table 7-5

CHANGES IN POPULATION AND HOUSEHOLDS
1966-1970

Province or City	Percent	
	Population	Households
Seoul	+45.3	+50.5
Pusan	+31.8	+36.3
Gyeonggi	+ 8.4	+15.7
Gangweon	+ 2.3	+10.8
Chungcheongbug	- 4.2	- 0.3
Chungcheongnam	- 1.3	+ 3.2
Jeonlabug	- 5.4	+ 1.3
Jeonlanam	- 0.9	+ 4.8
Gyeongsangbug	+ 2.1	+ 8.4
Gyeongsangnam	- 1.8	+ 1.8
Jeju	+ 8.4	+12.4
Total Country	+ 7.5	+14.1

Source: Bureau of Statistics, Economic Planning Board,
"1970 Preliminary Population and Households"

Table 7-6

POPULATION AGE DISTRIBUTION - 1966

Gyeongsangnam Province and Masan

Age Category	Gyeongsangnam Province		Masan	
	Number (000's)	Percentage Distribution	Number (000's)	Percentage Distribution
0-4	486	15.1	18.9	12.2
5-9	507	16.0	22.9	14.8
10-14	404	12.8	21.5	13.9
15-19	288	9.1	17.2	11.1
20-24	235	7.4	13.1	8.5
25-29	225	7.1	12.2	7.9
30-34	202	6.3	10.8	6.9
35-39	168	5.3	9.3	6.0
40-44	148	4.7	8.1	5.2
45-49	119	3.8	5.9	3.8
50-54	105	3.3	4.6	2.9
55-59	91	2.9	3.6	2.3
60-64	69	2.2	2.4	1.7
65 and over	127	4.0	4.2	2.7
Total	3,175	100%	154.6	100%
15 to 64 Age Category	1,650	52.1%	87.1	56.3%

Note: Totals may not add due to rounding

Source: 1966 Census of Population

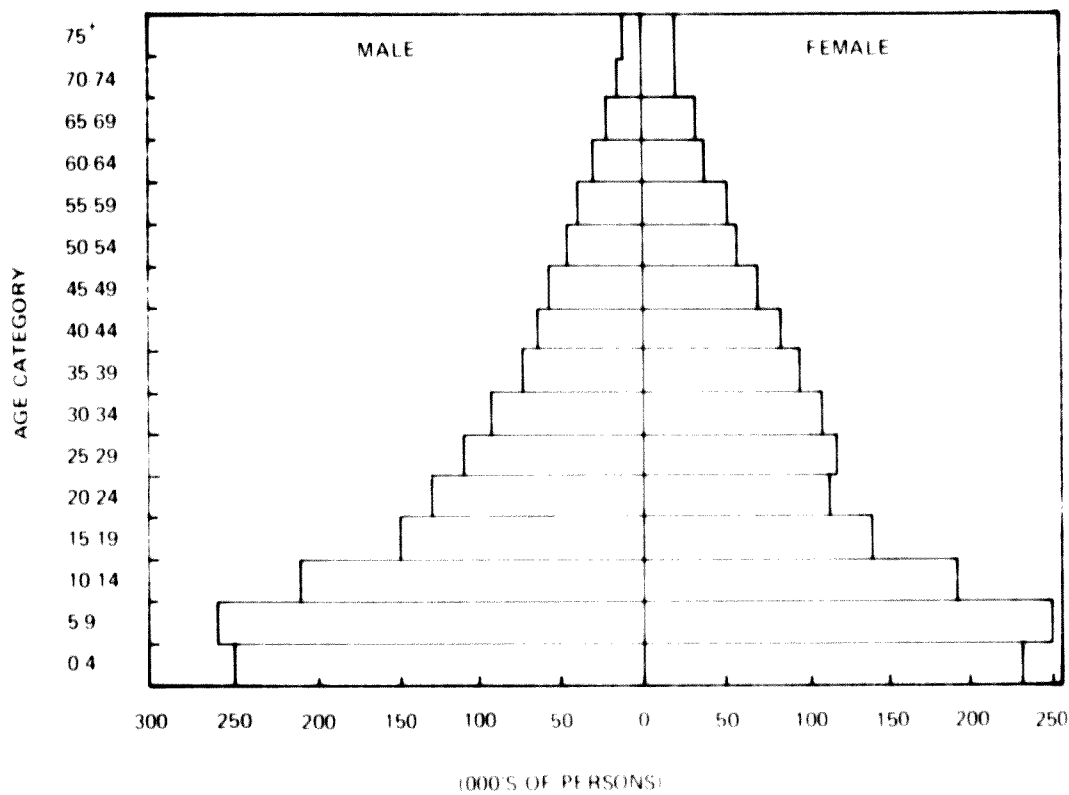


Figure 7-1. Gyeongsangnam Population Distribution

is based on the national desire to create regional growth centers such as Masan and to discourage migration to Seoul and Pusan. The future growth rate of the province from natural increase was assumed to be about 1.5 percent, as projected in the Third Five-Year Economic Development Plan. This projection, including the age and sex breakdown, is shown in Table 7-7.

7.1.4 Masan City

The latest estimate available for Masan indicates a population of 177,400 persons* in 1969. This represents a growth rate of about 4.7 percent annually during the three-year period from 1966 to 1969. By comparison,

*Masan Chamber of Commerce Data Book, page 298.

the national growth rate was 1.9 percent annually. This high growth rate indicates there has been an in-migration of population into Masan during this period.

The future growth of Masan will obviously be influenced strongly by the Free Export Zone. Traditional population-projection techniques utilizing historical trends and demographic characteristics are inadequate for projecting the population growth of the City of Masan. The development of MAFEZ will result in a substantial increase in population unrelated to previous trends. The impact of MAFEZ is difficult to forecast accurately, and any projection will represent an order-of-magnitude estimate only.

The magnitude will be determined by (1) the number of years required to develop the zone, (2) the types of industries that will be attracted to the zone, and (3) the employment pattern of these firms.

Many of the new workers at MAFEZ will come from Masan, and thus represent no new additions to population. However, the labor force in Masan is not sufficient to provide all the employees needed, and a large number of workers therefore must be imported. Available employment data indicate only a small number of unemployed or potential workers in Masan. However, there are also many persons underemployed and, with a greater availability of employment opportunities, many persons not now listed as active will join the labor force.

Nevertheless, there will be a substantial shortfall of employees available from Masan itself. Therefore, the growth in population and its economic infrastructure will be significant.

Because of the many variables and uncertainties, a reasonable approach to planning for the growth of Masan is to assume certain levels of population and let the time period become the variable. The new master plan

Table 7-7

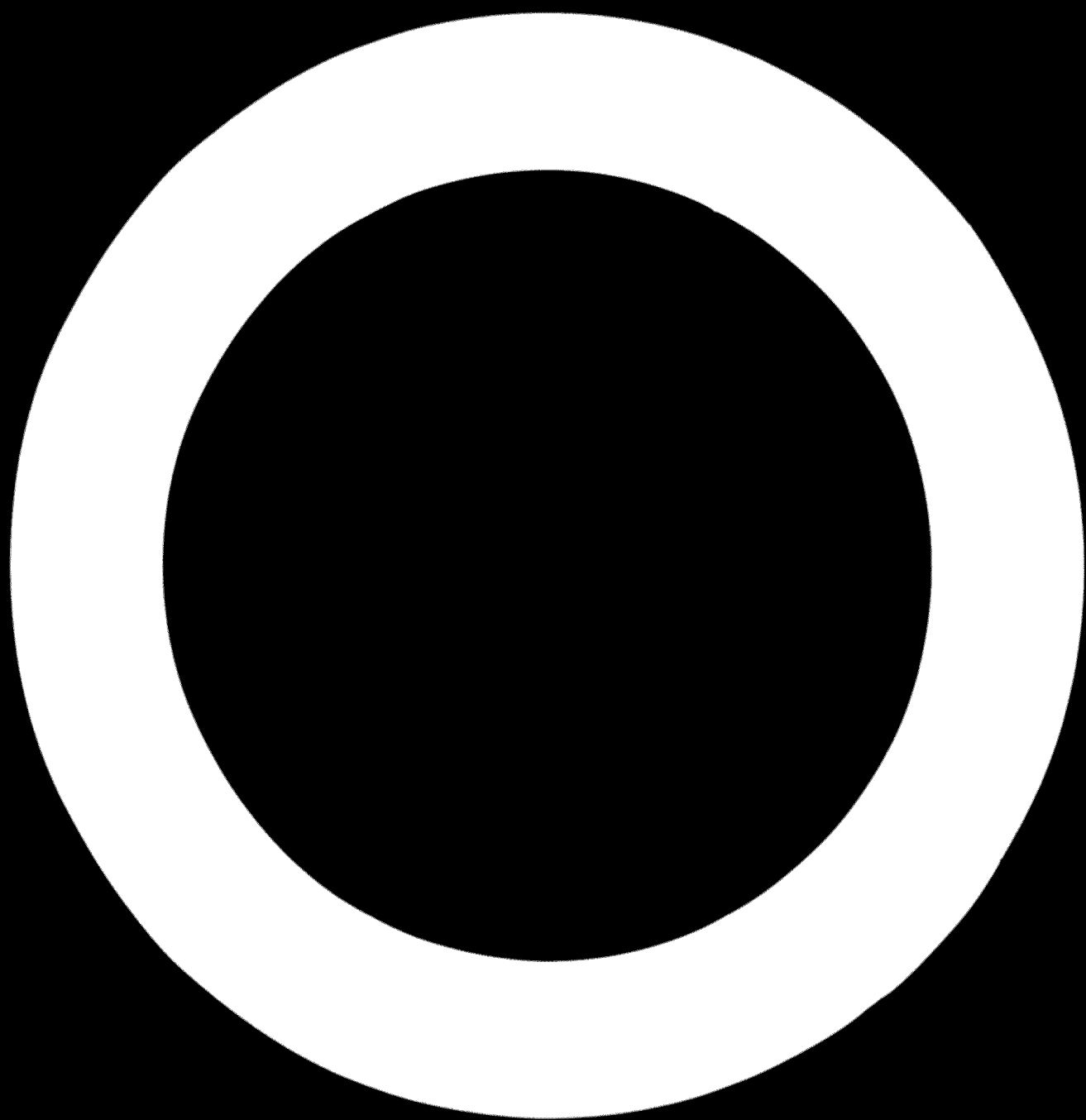
POPULATION PROJECTIONS BY AGE AND SEX, GYEONGSANGNAM PROVINCE
(1000's)

	1966			1971			1976			1981	
	Males	Females	Total	Males	Females	Total	Males	Females	Total	Males	Females
0 - 4	251	235	486	224	217	441	188	183	371	194	184
5 - 9	263	244	507	219	203	423	218	211	429	184	179
10 - 14	210	194	404	225	207	432	215	200	415	214	199
15 - 19	149	138	288	186	171	357	222	205	427	213	198
20 - 24	127	108	235	136	124	261	183	168	351	219	194
25 - 29	113	112	225	113	98	211	134	122	256	180	165
30 - 34	99	103	202	99	97	196	111	96	207	132	126
35 - 39	78	90	169	86	90	176	97	95	192	108	106
40 - 44	72	77	148	69	79	148	83	87	171	94	92
45 - 49	58	62	119	60	68	128	66	77	143	81	79
50 - 54	51	55	105	49	54	103	56	65	122	63	61
54 - 59	43	48	91	39	46	85	43	51	94	50	48
60 - 64	32	38	69	30	39	68	31	41	73	36	34
65 and over	50	77	127	53	91	144	62	108	170	73	71
Total	1594	1581	3175	1588	1583	3171	1710	1710	3420	1841	1841

Table 7-7

POPULATION PROJECTIONS BY AGE AND SEX, GYEONGSANGNAM PROVINCE
(1000's)

1971		1976			1981			1986		
Females	Total	Males	Females	Total	Males	Females	Total	Males	Females	Total
217	441	188	183	371	194	189	383	203	197	400
203	423	218	211	429	184	178	362	190	185	375
207	432	215	200	415	214	208	422	181	176	357
171	357	222	205	427	213	198	410	212	206	418
124	261	183	168	351	219	202	421	210	195	406
98	211	134	122	256	180	165	346	216	199	416
97	196	111	96	207	132	120	251	178	163	341
90	176	97	95	192	108	94	203	129	118	247
79	148	83	87	171	94	93	187	106	93	199
68	128	66	77	143	81	85	166	91	91	183
54	103	56	65	122	63	75	138	77	83	160
46	85	43	51	94	50	62	112	57	72	129
39	68	31	41	73	36	47	82	43	58	101
91	144	62	108	170	73	128	200	87	153	240
1583	3171	1710	1710	3420	1841	1844	3685	1981	1988	3969



for the City of Masan was prepared on the basis of a population of 500,000 persons.^{*} This population level is expected around 1980. If achieved then, this would represent an annual growth rate of approximately 10 percent.

However, because of the physical difficulties in expanding the City of Masan, the large investments that will be required for housing and infrastructure, and the recommendation of this report that MAFEZ develop at a lower employee density and the development period be extended over a longer period of time, it is not likely that this population level will be achieved by 1980. A lesser increase to 400,000 persons by that time, or essentially a doubling of population, would represent an easier target in view of the housing and infrastructure requirements. (Even this lesser target will require a substantial commitment of national resources.) This would represent a growth rate of about 7.6 percent annually. While this is still a sizeable annual increase, it is below the growth rate of 9.8 percent per annum experienced by Seoul from 1966 to 1970, and is only slightly higher than the 7.2 percent growth rate of Pusan during this period.

7.2 LABOR FORCE

Like most developing countries, Korea has a shortage of skilled and managerial type personnel. However, the general populace is well educated and adaptable. Interviews with numerous firms indicate that Koreans respond readily to training, both in highly skilled endeavors as well as in lower skilled, assembly-type techniques.

Statistics on the labor force in Korea indicate a low level of unemployment in the country (estimated at between four to five percent in 1970). However, a special study made by the Ministry of Labor revealed that

* "Masan City" p. 3.

an estimated 18 percent of the labor force was underemployed in 1970. This underemployment and the continued rural-urban shift in population will provide a continuing labor supply in Masan.

A projection of the economically active population in Gyeongsangnam Province indicates that this group will increase at twice the rate of the population as a whole. Due to the decreasing birth rate and subsequent shift in age structure, the economically active population will increase from 30 percent of the population to 37 percent by 1986 (compared to a projected 40 percent for the country as a whole). Table 7-8 contains projections of the economically active population in Gyeongsangnam Province along with employment targets necessary to achieve a four-percent unemployment rate, a goal set in the third Five-Year Plan.

Table 7-8

PROJECTIONS OF ECONOMICALLY ACTIVE POPULATION
OF GYEONGSANGNAM PROVINCE

	1966	1971	1976	1981	Percentage Growth	
					1986	1971-1986
Total Population (1000's)	3,175	3,171	3,420	3,685	3,969	25
Economically Active (1000's)	937	983	1,154	1,313	1,474	50
Employment Targets (1000's)	881	937	1,108	1,261	1,415	51
Unemployed (%)	5.9	4.6	4.0	4.0	4.0	
Ratio of Economically Active to Total Population (%)	29.5	31.0	33.8	35.6	37.1	

To meet the employment targets in Table 7-8, employment opportunities must be expanded by 171,000 new jobs between 1971 and 1976. The employment opportunities (up to 65,000 jobs) to be generated by MAFEZ are well within this target. However, an analysis of specific categories indicates that it will be difficult to meet some requirements without either attracting workers from outside Gyeongsangnam Province, or encouraging a greater participation from some categories in the labor force.

An analysis was made of the potential employment patterns in MAFEZ based on (1) the experience of the existing export industrial estates at Seoul and Inchon, (2) the first eleven firms to be located in MAFEZ, and (3) the early experience of KEPZ in Taiwan.

This analysis clearly indicates that most of the industries attracted to MAFEZ will employ large numbers of young females in their late teens and early 20's. This has been a typical pattern in the export industrial estates at Inchon and Seoul. In KEPZ in Taiwan, during its first four years of operation, the employment level reached 22,200 workers, of which 83 percent were female. Of workers involved directly in production, some 88 percent were female. Furthermore, some 85 percent of the total females were in the 14 to 24 age group. Table 7-9 contains a breakdown by age and sex of workers in KEPZ as of May 1969, four years after this zone was established.

Table 7-10 lists the first eleven firms that have signed contracts to locate in MAFEZ, and their planned employment by sex. The employment plans of these firms indicate that 78 percent of the total will be female.

If the present pattern should continue, and in view of the KEPZ experience, this is quite possible, then upwards of 50,000 out of a targeted 65,000 employees in the zone would be female. Furthermore, from 40,000 to 45,000 of these would probably be in the 15 to 24 year age group.

Table 7-9

KEPZ EMPLOYMENT BY AGE AND SEX
(as of May 1969)

	Male Total	Female Total	Employment Total	Percentage Female Total
14-19	947	12,379	13,326	93%
20-24	1,123	4,364	5,487	80
25-29	622	679	1,301	52
30-39	500	513	1,013	51
40 and over	676	396	1,072	37
Total	3,868	18,331	22,199	83%

*Four years after acceptance of applications began (at which time some 95 firms were listed as in operation and employing 22,199 persons).

Source: KEPZ Essential Statistics, May 1969, Tables on Workers and Administrators

In the City of Masan, it is estimated that there are only 20,000 females in the 15 to 24 year category. When this is reduced by the number who are married, attending school, or not economically active for other reasons, it is obvious that the supply is far short of the potential demand. Therefore it will be necessary to attract the required female workers from a broader geographical area.

On a province basis, it is projected that there will be 373,000 females in this category in 1976. The 1966 census shows that 29 percent of the girls in this category listed themselves as economically active, and 53 percent were fully employed. Assuming the same percentages in 1976, there would be 108,000 girls economically active of which 58,000 would

Table 7-19

PLANNED EMPLOYMENT OF FIRMS LOCATING IN MALE
June 1977

Company Name	Major Product	No. of Employees			Percentage Female
		Male	Female	Total	
Shin Hwa Electric Co.	Electronics	111	0	207	40
Korea Minami Ind. Co.	Dec. Electric Bulbs	40	222	262	85
Dream-Cut Co.	Work Clothes	52	356	408	87
Korea Toki Co.	Coil	15	485	500	97
Grow Molding Co. Ltd.	Mold	122	0	122	0
Masan Industries Co.	Toys	7	224	231	97
Korea Metho Co.	Electric Wire and Steel Furniture	153	149	302	49
Union Asbestos Co. Ltd.	Asbestos Yarn	14	0	14	85
Tokyo Hiken Co.	Food Samples Handicraft	44	38	82	40
Iell Garment Co.	Synthetic Leather Gloves	10	250	260	96
Korea Fong Co.	Mens Suits	34	259	293	88
Total Employment		602	2,157	2,759	78
Average number of employees per firm				250	

be fully employed. This would leave 50,000 listed as economically active but not fully employed. Obviously it will be necessary to attract a substantial number of these workers to MAFEZ from this category as well as workers who are not currently listed as economically active, and workers not currently living within the province. It is assumed that the tradition of females to leave their jobs upon marriage would continue. However, any change in this tradition could create an additional source of labor. Table 7-11 contains a projection of the population for Gyeongsangnam Province along with estimates of those economically active, in school, married, etc.

Table 7-11

POPULATION PROJECTIONS FOR FEMALES AGE 15 TO 24,
 GYEONGSANGNAM PROVINCE
 (1000's)

	1966	1971	1976	1981	1986
Girls, age 15 to 24	246	295	373	400	401
Active economically (29%)	71	86	108	116	116
In school, married	89	118	168	180	180
Other	86	91	97	104	105

In general, this analysis indicates the following:

- There will be some difficulty during the later part of the development period in finding young unskilled female workers. This supports the thesis that industries requiring fewer of this type of worker should be located in MAFEZ even though such action might extend the development period.
- Korea cannot assume that an unlimited labor force will be available for an indefinite period. Therefore, future planning for industrial development

should take into consideration the need to make a transition from labor-intensive industries to more capital-intensive industries requiring employees with higher skill levels.

In order to attract industries that require higher skilled employees, the vocational training capacity of the Masan area should be expanded to increase the skill levels of local workers. Rather than making a judgment of the specific supply and demand for skilled workers, it is the recommendation of this study that the educational agencies, both national and local, develop cooperatively with MAFEZ a program of providing training. This training should be responsive to the industries that ought to be attracted to Korea because of their contributions to the economy. Such a program is described later in this section.

7.3 EDUCATION AND TRAINING

The evolutionary nature of the Masan Free Export Zone from one composed of businesses employing mainly unskilled and semi-skilled labor to a mix of firms and industries with much higher skill requirements can become a reality only to the extent that a planned effort for the education and training of the labor force parallels the program for recruitment of enterprises with these manpower needs. Properly designed manpower programs will be possible only through careful cooperation among the various interested institutions. These include the Central Ministry of Education; the educational authorities of Gyeongsangnam Province and Masan City; MAFEZ, representing the occupant firms; the Chamber of Commerce, representing the commercial and industrial community as a whole; and trade unions or other organizations, representing employees.

Generally, publicly supported educational institutions should be responsible for basic education and for vocational and technical training at the secondary level and beyond. Such training should be broadly applicable.

More advanced technical training (mechanical, electronic, etc.) can then be provided by one or more of the several available approaches. Where a common need exists for large numbers of people with the same skills, training might be provided by a publicly supported vocational training institution, or sponsored jointly by the firms who eventually employ the trainees. Facilities might be provided by the public institution as well as the employing enterprises. Similarly, instructors might be supplied by both the hiring firms and the training school.

Any specialized training involving relatively few people should, as a general rule, be undertaken by the employing enterprise. Much of this type of training would be done on the job in the form of apprenticeship. Due to the specialized nature of much of the training, it might be necessary to send individuals out of the community - perhaps some to foreign institutions. Others might be sent elsewhere to schools supported by the employer. MAFEZ especially should be prepared to submit innovative programs and policies and assist in their implementation in this vital area.

To be more specific in terms of human resources for MAFEZ, Table 7-12 shows the number of vocational-school graduates for the year 1970 in the broad geographic area around Masan. Since none of these was employed in the Masan Free Export Zone, it is assumed that an ongoing demand for this number of graduates, plus a seven-percent yearly increase, will develop from growth in the industrial areas outside MAFEZ.

It is then necessary to add to this demand that which stems from firms occupying the zone. If we assume that the skill demands will be distributed in the same proportion as present over the six types of training, we can predict the total demand for trained workers depending upon the category of skill projection. In Table 10-4, the skill requirements are given for different employment level and different kinds of enterprises implying changed skill demands by firms in MAFEZ.

Table 7-12

VOCATIONAL TRAINING GRADUATES IN 1970

	Gyeong-sangnam Province	Jeonlanam Province	Pusan City	Total
Machine and Metal Trades	630	140	1,466	2,236
Woodworking	705	640	60	1,405
Textiles and Shoemaking	980	1,258	329	2,567
Construction Trades	160	42	435	637
Printing	50	60	25	135
Ceramic and Glassmaking	360	-	-	360
Total	<u>2,885</u>	<u>2,140</u>	<u>2,315</u>	<u>7,340</u>

7.3.1 Estimated Training Requirements

The data contained in Table 10-4 do not include an allowance for the period required to achieve a given mix of skills. Assuming that the mixes requiring higher levels of skill will take the greatest length of time to achieve, some more or less arbitrary dates can be set for achievement. Table 7-13 shows an approximate phasing of the categories of skill requirement and employment levels. It assumes a more gradual escalation in total employment with substantial concentration on the higher skills rather than on employment itself regardless of the skill levels affected. In Section 4, it was demonstrated that greater benefits accrue to the Korean economy in general by selecting the alternative which stresses employment of higher skills.

Thus Table 7-13 assumes a more gradual build-up in employment and, consequently, a shift as early as 1976 from category IA to category IIA in Table 10-4. With continued efforts to attract enterprises employing proportionately more skilled and semi-skilled workers, it is assumed

Table 7-13

MASAN AREA TRAINING REQUIREMENTS BY YEAR

	1972	1973	1974	1975	1976	1977	1978
Total MAFEZ Employment	5,000	10,000	15,000	20,000	25,000	30,000	35,000
Total MAFEZ Skilled and Semi-Skilled Employment	1,000	2,000	3,000	4,000	6,000	7,500	9,000
Incremental Skilled and Semi-Skilled Employment at MAFEZ ¹	1,000	1,200	1,500	1,800	2,600	2,500	3,800
Incremental Secondary Skilled and Semi-Skilled Employment ²	1,500	1,700	1,800	2,000	2,800	3,200	5,000
Other Demand for Skilled and Semi-Skilled Workers	8,000	8,500	9,000	9,500	10,000	11,000	12,000
Total Demand for Skilled and Semi-Skilled Workers	10,500	11,400	12,300	13,300	15,400	16,700	20,800

furthermore that the employment pattern can shift to category IIB by 1978. The demands for trained workers can then be predicted according to these assumptions for patterns of employment in MAFEZ and the additional projected demand for skilled employees outside the zone. The results show that training facilities must be prepared to increase the number of graduates nearly threefold between 1970 and 1978.

7.3.2 Description of Activities

To meet the challenge of this substantially greater demand for training, it is recommended that a publicly supported training center be established in Masan. It would be charged with the responsibility of assuring that the supply of trained personnel be sufficient to satisfy the pressures of

demand at a price (wage rate) which would be competitive with alternative industrial locations and would also fulfill the legitimate need for higher real incomes based on improved labor productivity.

In more specific terms, the center would perform a research function to determine the training needs of the community as far in advance as necessary to provide the training required. This would mean working with the individual enterprises both within MAFEZ and in the local community. A program would have to be started to anticipate the training needs which could not be projected in any exact way. These efforts should be of a general training nature which could be used as a basis for specialization in many different narrow vocational areas.

The public training center should work very closely with the MAFEZ administration to keep abreast of the changing patterns of occupancy of the zone. In the course of its recruiting activity, MAFEZ would become conversant with the needs of potential occupant enterprises and their requirements for skilled and semi-skilled workers. Close coordination with the training center would assure that their efforts continue to be focused on the changing demands for manpower. But the coordinated efforts of MAFEZ and the training center should not be limited to responses to occupants or potential residents of the zone. It is recommended that they pursue a more active and aggressive manpower training policy by advanced recruitment of instructors from the firms to be located in MAFEZ, or by arranging to send instructors from the training center to headquarter plants for specialized training.

7.3.3 Need for Immediate Action

The Ministry of Education will, of course, be obligated to include funds in the budget for a Masan Training Center. It is therefore important that they be immediately consulted jointly by MAFEZ and the local and

regional educational administrators. In view of the scheduled need for expanded training (as shown in the following tables), it is important that the problem be given almost emergency priority. Plans should be developed for facilities, and budgetary provisions made during the coming year. Construction could then proceed during 1973, with short-course graduates beginning to emerge in 1974. By 1975, graduates from two-year courses should be available for employment. Since it would be almost impossible to accelerate this schedule, the present public and private training schools will be forced to expand in the interim to cope with the increased demand.

There are risks involved in concentrating on the recruitment of a large proportion of firms with a demand for relatively large numbers of skilled and semi-skilled employees. The contention here is that the risks are more than offset by the additional benefits to the Korean economy. The calculation in Section 10 shows clearly that the benefits — in terms of foreign exchange alone — render the slower buildup of employment in conjunction with higher skill levels the preferable course of action. The long-run advantages of technology transfer, admittedly difficult to measure, should also be considered in this evaluation. The proper coordination of these activities could result in the projection of an image of Masan as a source of well-trained, highly skilled manpower. Such an image would attract the most desirable kinds of enterprise more effectively than almost any other device. Hence the urgency and importance of starting a program of training properly coordinated with selective recruitment of appropriate enterprise.

The national demand for personnel was recently estimated by the Government Labor Office. Table 7-14 shows the growth in demand for technicians, skilled workers, and semi-skilled labor for the nation as a whole as taken from the paper. The incremental growth is then compared with that projected for the Masan region.

Table 7-14

DEMAND FOR LABOR BY SKILLS

	1972	1973	1974	1975	1976
Total Korea	603,020	674,780	748,350	828,450	915,540
Technician	29,520	32,130	34,920	37,890	41,070
Skilled	68,930	75,160	81,670	88,670	96,240
Semi-Skilled	504,570	567,490	631,760	701,890	778,230
Total Korea Incremental Demand	-	71,760	73,570	80,100	87,090
Masan Region Incremental Demand	10,500	11,400	12,300	13,300	15,400

©Taken from Labor Status, Government Labor Office.

Since demand is expected to grow substantially throughout the nation as a whole, little reliance can be placed on training facilities elsewhere in Korea. Even if training schools outside the region are able to keep pace with this growth in demand for skilled and semiskilled workers, it is unlikely that they will graduate a surplus of any substantial number who could be available to fill a shortfall which might develop in the output of vocational schools within the region.

Since there are economies of scale in the training of some skills, it is recommended that the MAFEZ effort become a part of a national plan for vocational training. As the Masan region develops a demand for specific skills, the training center can specialize in the courses to meet them. Fixed costs in the form of expensive training equipment and instructional materials as well as expert instructors' salaries can often be spread over a large number of students by training more people than might be needed locally.

MAFEZ should also participate in more long-run programs of improvement in the supply of skilled labor such as projects to reduce the relatively high turnover rates among skilled and semi-skilled workers. Firmly established cultural and traditional patterns discourage work outside the home for married women and are a significant factor behind these high rates of replacement. Although some enterprises are beginning to alter this practice by inducing some married women to return in emergency or peak output periods, few go back to the job on a permanent basis. Perhaps special incentives might be initiated to retain larger numbers of these trained employees. Shorter work days with transportation provided at irregular hours might be a partial solution. Providing a nursery for young children in conjunction with occupant firms might be beneficial. Some very demanding activities calling for a relatively high degree of skill and exactness might benefit from the efforts of two women each working half time, as compared to one working full time. However, again it is emphasized that Korean customs presently do not favor women continuing to work after marriage, and providing incentives to do so may result in only limited success.

Another long-run manpower function which could be provided by MAFEZ is the training of persons presently working, to prepare them for more advanced positions. These courses are usually offered in the evening, and are designed to convey information of a practical nature in accounting, management procedures, inventory control, and other technical areas which equip students for positions of greater responsibility and increased income. Instructors can usually be recruited from local industry, colleges, and vocational training schools in the area.

The continued ability to provide levels of skilled manpower appropriate to the changing demands of dynamic firms selling in international markets will be one of the most sensitive and demanding undertakings for

MAFEZ and the entire community. Thus the following is a summary and reemphasis of the recommended programs to be undertaken at the earliest possible date.

- Establish a publicly supported vocational training center in Masan designed to exceed the needs of the region, capturing any advantages accruing from economies of scale.
- Institute a continuing research and advisory service aimed at providing information on current changes in technology affecting training. The group should work either under the direct supervision of the MAFEZ Administrator or as a part of the training center, but would keep in consultation with these institutions as well as the industrial firms and other interested agencies.
- Utilize facilities and personnel of private firms for training purposes whenever feasible with proper compensation as a supplement to the basic training effort.
- Instigate programs designed to improve the supply of skilled labor by reducing turnover rates. Scarce training resources can be conserved to the extent those already trained can be induced to remain active.
- Establish in conjunction with private and public institutions a management training course designed to prepare those willing to exert the effort for higher positions of authority and responsibility.

section 8

Transport Requirements

Section 8

TRANSPORT REQUIREMENTS

8.1 GENERAL

A free export zone is dependent, in the first place, on good reliable access to world markets and sources of raw materials. Good access to national centers is essential, not so much to support the direct processing and distribution function of the freeport, as to supply the requirements necessary to attract the required population to the zone.

The Masan area has good transport access, by land, sea, and air, to major population centers in Korea and by sea to the rest of the world. It is connected to the first-class national highway network and important railway routes, and it has a small port in addition to being close to the national port and airport of Pusan.

Masan city is served by railroad connections to Pusan and Taegu on the main line to Seoul. In the near future, the four-lane express highway system now connecting Seoul and Pusan will be extended to Masan and a direct link constructed to Taegu. This new expressway system will also provide direct access to the new international airport presently under construction at Kimhae, about midway between Pusan and Masan. Planned expansion of the express highway system west of Masan will connect the the cities of Suncheon, Yosu, Kwangyu, and Chonju and link up with the existing Seoul-Pusan expressway at Taejon. The highway system map, Figure 8-1, illustrates the excellent relationship of the site location and transportation system for MAFEZ.

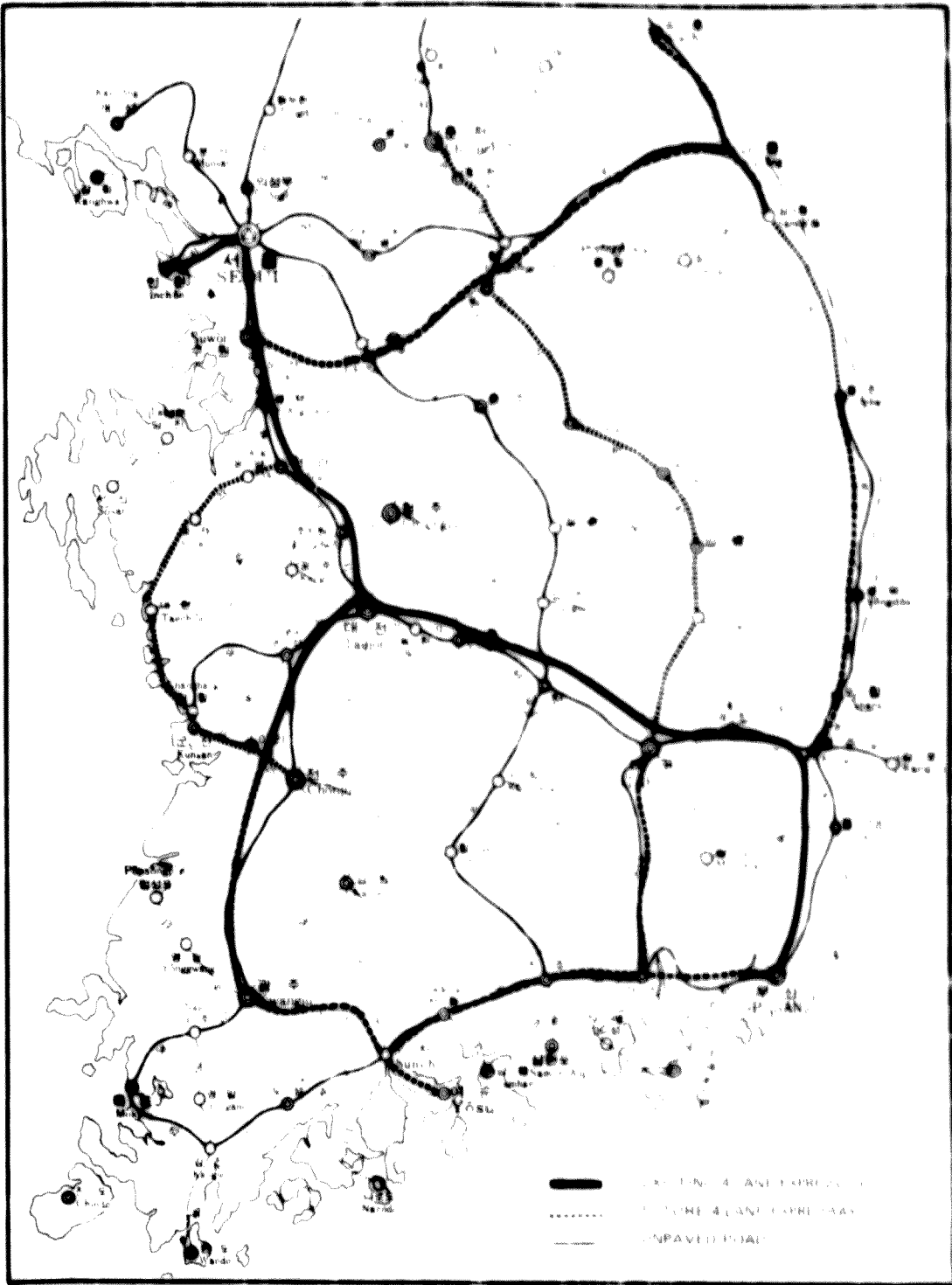


Figure 8-1. Korean Highway system

Analysis of MAFEZ transport requirements is based on a thorough review of the well-documented publication of the Korean Ministry of Construction entitled "Report on Port Development Plan for the Support of Masan Free Export Zone," 1970.

8.2 CONTAINERIZATION

Examination of the prospective industries to be located in MAFEZ (Table 8-1) indicates that a substantial percentage of both raw or input material, as well as of finished products, is containerizable. Most of the finished products of the zone are furthermore suitable for air cargo shipment. Since the main function of the zone will be processing for an export market rather than manufacturing, the zone will be less dependent on such bulk items as fuel, raw minerals, grains, and the like. It is expected that bulk materials needed for the zone will be in relatively small volume, and can be obtained either from national sources or through import via one of the established ports in the region (i. e., Pusan and Masan).

It is believed that the estimated future freight volume (750,000 tons/yr at full development) is reasonable, particularly in the light of available information on type and extent of industries to be located in the zone.

This volume will be handled by a variety of sea, land, and air transport modes to and from a multitude of both national and international points. Available information on type, extent, and characteristics of prospective industries to be located in MAFEZ does not permit a thorough analysis of the modal split characteristics of such cargo. It is estimated, however, that approximately 20% (or 150,000 tons) of total cargo volume generated at MAFEZ will be moving between the industrial zone and national points of origin and destination. This tonnage will be carried on trucks, rail, and coastal shipping.

Table 8-1

ADAPTABILITY OF CONTAINER TECHNOLOGY TO MAFEZ
TENTATIVE LIST OF INDUSTRIES

Industry	% Share	Adaptability to Containerization		Suitability of Finished Product for Air Cargo
		Input Material	Finished Prod.	
Precision Mach. & Equipment	0.9	High	High	Most suitable
Optical Instruments	1.1	High	High	Most suitable
Med. and Scient. Eqpt. and Tools	0.5	High	High	Most suitable
Mach. & Machine Parts	1.0	Medium	High	Suitable
Electronic Eqpt.	25.0	High	High	Most suitable
Traveling & Sports Gear	1.0	Medium	High	Suitable
Musical Instruments	1.0	High	High	Most suitable
Metals & Metal Prod.	5.0	Low	Medium	Least suitable
Elect. Mach. & Eqpt.	4.0	Medium	High	Suitable
Packing Material Products	1.2	Low	Medium	Not suitable
Toys	1.6	Medium	High	Suitable
Furniture & Furnishings	0.3	Low	High	Least suitable
Industrial art prod.	3.8	Medium	High	Suitable
Synthetic Resin Prod.	5.6	Low	Medium	Least suitable
Rubber Products	0.7	Low	Medium	Least suitable
Hides and Leather Prod.	1.5	Low	High	Suitable
Weaving & Dyeing	0.5	Low	High	Suitable
Fiber & Knitted Prod.	12.4	Medium	High	Suitable
Clothing	17.1	Medium	High	Suitable
Printing (synthetic)	0.9	Low	High	Suitable
Wigs	3.9	High	High	Most suitable
Others	1.6			

Source: Report on Port Development Plan for the Support of Masen Free Export Zone, 1970 Ministry of Construction, pp. 85-86.

The balance of cargo (600,000 tons) will be carried between MAFEZ and international points of origin and destination. It is expected that about 70% of this international cargo will be carried in containers shipped on ocean-going container ships (90%), as well as on large cargo jet aircraft (10%). The balance of the international cargo will be in the bulk and non-containerizable general cargo categories.

Improvement of port facilities at Masan discussed in the Ministry of Construction report is needed to stimulate the economic development of the Masan region and to meet critical trade needs of other heavy industries in the area. Exception to the recommended improvement plan is taken for two items where further analysis is warranted before final commitment of resources is made. The two recommendations will be discussed here as pertaining to the transport requirements of the free zone only - other national or regional considerations may have warranted the adoption of these recommendations and as such are outside the scope of this particular study.

8.2.1 Establishment of Container Terminal at Masan Port Beyond 1980

Of the estimated 800,000 tons of containerized cargo to be handled at the proposed Masan container terminal, it is expected that 400,000 tons will originate from and be destined to the free export zone. Considering the rapidity by which container traffic grows all over the world, it is anticipated that dependence on container port facilities will start with the construction of the first industrial enterprise and grow gradually as other industries are established in the zone until the 1976-78 period when full development of the zone is planned. This would indicate that by 1980-82, when the Masan container terminal is expected to be built and become operational, MAFEZ will have established a pattern, together with the

necessary supporting infrastructure and organization, to handle its containerized cargo through Pusan. Thus, the timing of establishing a container terminal at Masan is not considered a selling point to prospective industries who would be considering locating at MAFEZ.

Worldwide developments in handling container cargo tend to favor the establishment of regional container ports where new large container ships (1,000 - 1,650 containers) are loaded and unloaded at one time, thus realizing important savings in both time and expense. Land transportation modes would collect and distribute containers from an influence area within a 500-mile radius. Two pertinent examples of this trend are available in the U.S. Sea-Land Corporation trucks its containers from Seattle, Washington to Portland, Oregon, a distance of 180 miles, because their container facilities are concentrated in Seattle. Seatrains Lines has likewise pioneered a high-speed unit train to serve its southern California markets through the port of Oakland, some 400 miles away. The Masan port experience, where proportions of cargo handled at Masan to the rest of the country have been decreasing gradually but consistently (from 5.6 percent in 1958 to only 1.7 percent during 1969), even though the absolute volume of cargo has been increasing, emphasizes the trend toward concentrating shipping activities at a few major ports.

Draft limitations at Masan port pose another difficulty for developing an efficient container terminal. Container ships over 20,000 DWT cannot be handled at the port. It is interesting to note that, of 199 container vessels under construction and on order all over the world (as of April 1, 1969), a full 24 percent were of DWT over 20,000 (carrying up to 1650 containers). These ships would be excluded from calling at Masan port. This trend toward faster and bigger ships is expected to accelerate as the economy of scale figures more prominently in shipping activities.

The cost of developing a complete and efficient container terminal is estimated now at upward of \$30 million. It is believed that the estimated 800,000 tons to be handled by this mode can not justify such expenditure, particularly if bigger container facilities are needed and are planned for the national ports of Pusan and Inchon.

Masan's proximity to Pusan is considered a locational advantage for Masan. It is estimated that an average of forty 20-ton truck round trips daily between Masan and Pusan can handle all the expected container tonnage of the free zone at ultimate development.

8.2.2 Construction of Export Wharf at Free Export Zone and 200-Meter Wide Shipping Channel

The investment of \$10 million to clear a 200-meter wide channel that accommodates 20,000 DWT ships to a special export wharf is believed to require additional studies before final commitment to the project is made. This recommendation is based on the analysis of existing information and data regarding the characteristics and function of the Free Export Zone. It is understood that the function of these facilities is to handle directly bulk and non-containerizable general cargo of the coastal as well as ocean-going type originating from or destined to the Free Export Zone.

For the ultimate development of the zone, estimated cargo volume in this category is believed to be about 200,000 tons/year. It is estimated furthermore that about 50 percent of this volume can be handled by 5,000 DWT coasters or barges that can be accommodated at the Free Export Zone with a minimum level of investment. The remaining 100,000 tons/year of oceanborne cargo will consist of small quantities of a large variety of materials, originating from, or destined to, a multitude of points all over the world. Input materials required for MAFEZ industries could

be needed for other industries in Korea and could be imported, in economic quantities, to a central port such as Pusan or the existing Masan port. It is feared that, in order to attract shipping lines to load and unload cargo at MAFEZ export wharf, facilities will be provided on the wharf with sufficient capacity to handle cargo originating from or destined to other than MAFEZ industries in the Masan region. If so, such activities could require a substantial fraction of the total land area designated for the Free Export Zone, complicate traffic patterns within the zone, and generally reduce the attractiveness of a special shipping export wharf.

The construction of a wharf to accommodate coasters, barges, and lighters in the 5,000 DWT category at MAFEZ may be a worthwhile consideration in lieu of the proposed shipping channel and export wharf. Such a small wharf plus the modest requirements of loading/unloading equipment might cost on the order of \$1.0 million.

8.3 LOCAL CIRCULATION

It is essential that the MAFEZ zone be connected directly with the national road system as soon as possible to allow easy access to the port at Pusan.

At the present time, the main entrance to the zone is from a single street to the north. This street forms a four-way intersection with the major highways to Masan, Pusan, and Chin Hae (see Figure 8-2). Needless to say, as the traffic from the zone grows, both from workers entering and exiting from the zone and from the normal shipping requirements, this intersection will become a major bottleneck to the efficient movement of both zone-created traffic as well as other local traffic.

Since the heaviest flow of traffic is in the direction of downtown Masan, it is essential that the proposed extension of this highway to the north be completed as soon as possible. It is also essential that rights-of-way

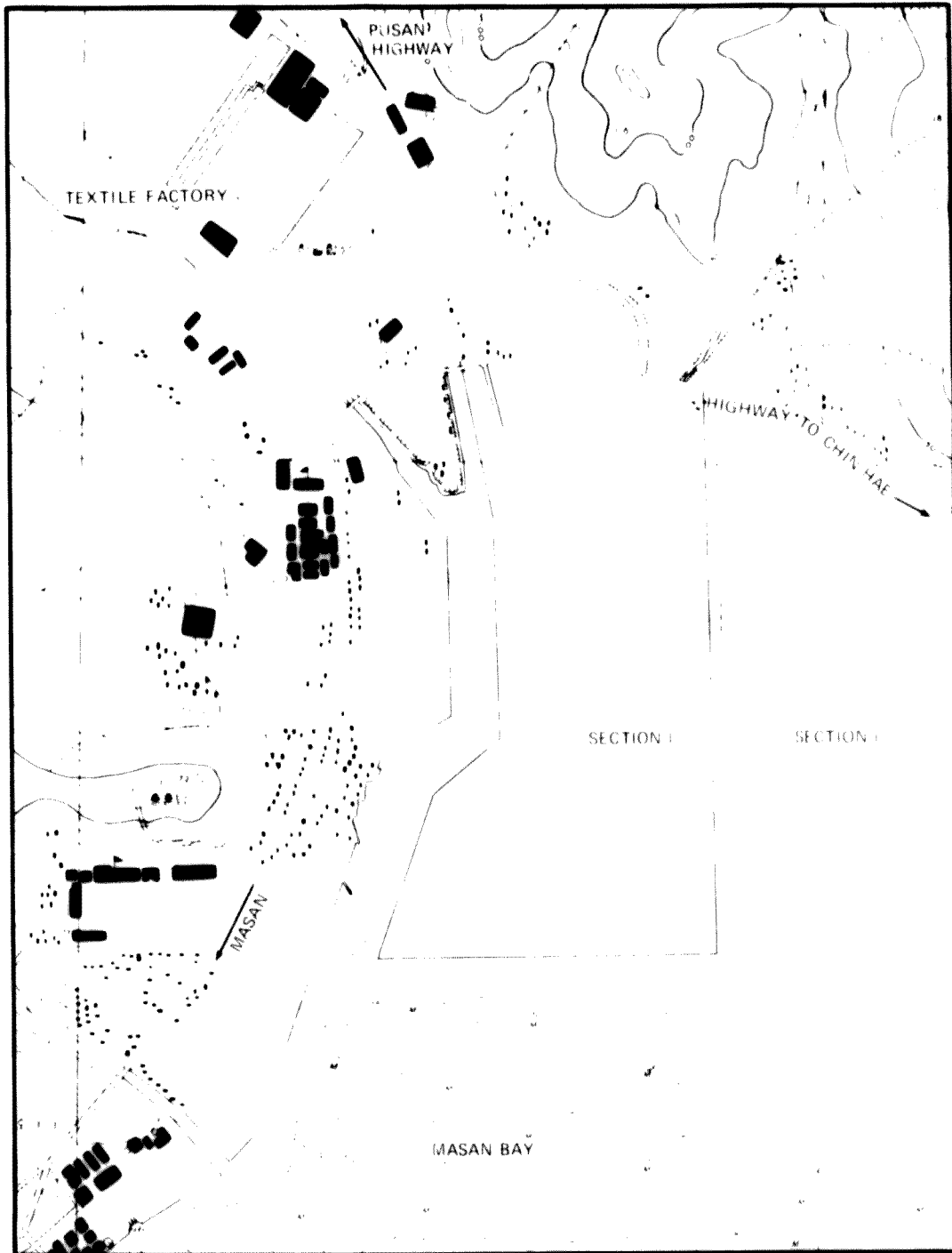


Figure 8-2. Existing Highways

for the other major highways in this area be established and encroachments from undesirable land uses be prevented.

Initially at least the majority of goods shipped from MAFEZ will be trucked to Pusan, where greater frequencies of scheduled shipping and services are available. It is essential that no bottlenecks be allowed to develop along the major transportation corridors to the north of the site.

These proposed major highways should be directly connected with the proposed Masan-to Pusan expressway. This expressway also has high priority because of the large amount of traffic that will be generated from industries locating in MAFEZ. Most textile products from Masan bound for export markets are currently trucked to Pusan for shipment. This vital transport link will be needed as soon as possible to assure prospective tenants that no transportation bottlenecks will interfere with factory production.

8.4 RAILROAD ACCESS

It is essential that a right-of-way be reserved for a railroad connection to the national system. The Masan general plan shows a spur connection to MAFEZ from the east. The need for a rail line should be determined by a careful study of the entire transportation system, including the port questions, and by the actual experience of the initial firms locating in MAFEZ. The essential thing at this early stage of development is that this option be kept open by reserving the right-of-way.

8.5 ZONE BUS SYSTEM

A survey of existing industries located both in the Korean industrial export zones and on individual industrial sites revealed the basic need for

chartered bus service between the residential areas and the plant sites. Absenteeism was reduced considerably when private bus service was inaugurated in lieu of the public transportation system. In view of these results, two schemes can be proposed for the MAFEZ. The first would entail the purchase and operation of a bus fleet by the MAFEZ administration on a service-charge basis to the zone tenants. The second scheme would operate essentially identical to the first except that the bus service would be obtained by subcontract to the MAFEZ administration. If reliable operators can be obtained by subcontract, the second scheme is probably more economical and preferable to the first, since the vehicles can be used elsewhere during off-hours.

It naturally follows that a good reliable bus system will substantially reduce the number of private vehicles in the zone and on the streets surrounding the zone. This is mutually advantageous to both the zone and the city of Masan.

section 9

Community Impact

Section 9

COMMUNITY IMPACT

The need to attract substantial numbers of workers from outside Masan has several important implications on the development pattern of MAFEZ and the impact on the community. If the development of the zone is compressed into a short period of time, it will be necessary to provide housing for the new workers at an accelerated pace. This in turn will affect the whole community infrastructure of the City of Masan. Masan is already one of the most densely populated cities in Korea (see Table 9-1), so it will be difficult to absorb additional population within the present confines of the city. Because of its tight geographical configuration, the city cannot expand peripherally. The only area available for expansion is the large valley to the north and east of the existing city,

Table 9-1

DENSITY OF SELECTED CITIES - 1966

	Persons per square kilometer
Masan	4,995
Seoul	6,204
Pusan	3,834
Ulsan	650
Pohang	1,786
Taegu	4,762

Source: 1970 Korea Statistical Yearbook, Table 29

which is currently in agricultural use. Such essentially linear expansion will be very costly in terms of the investment that will be required in economic infrastructure. Much of the economic infrastructure will require installation of completely new systems rather than simple extension of existing utility lines, streets, etc., in a peripheral pattern. Thus, the capital costs of developing new urban areas to the north of Masan will be high, especially if they must be developed over a short time period.

9.1 PLANS FOR MAFEZ DEVELOPMENT

Layout plans have been prepared for the development of all three sections of the MAFEZ site. Land use plans for the area immediately surrounding the site are contained in the Masan Plan for Urban Development. These plans were reviewed by the Bechtel team during their visit in Korea and generally found to be suitable.

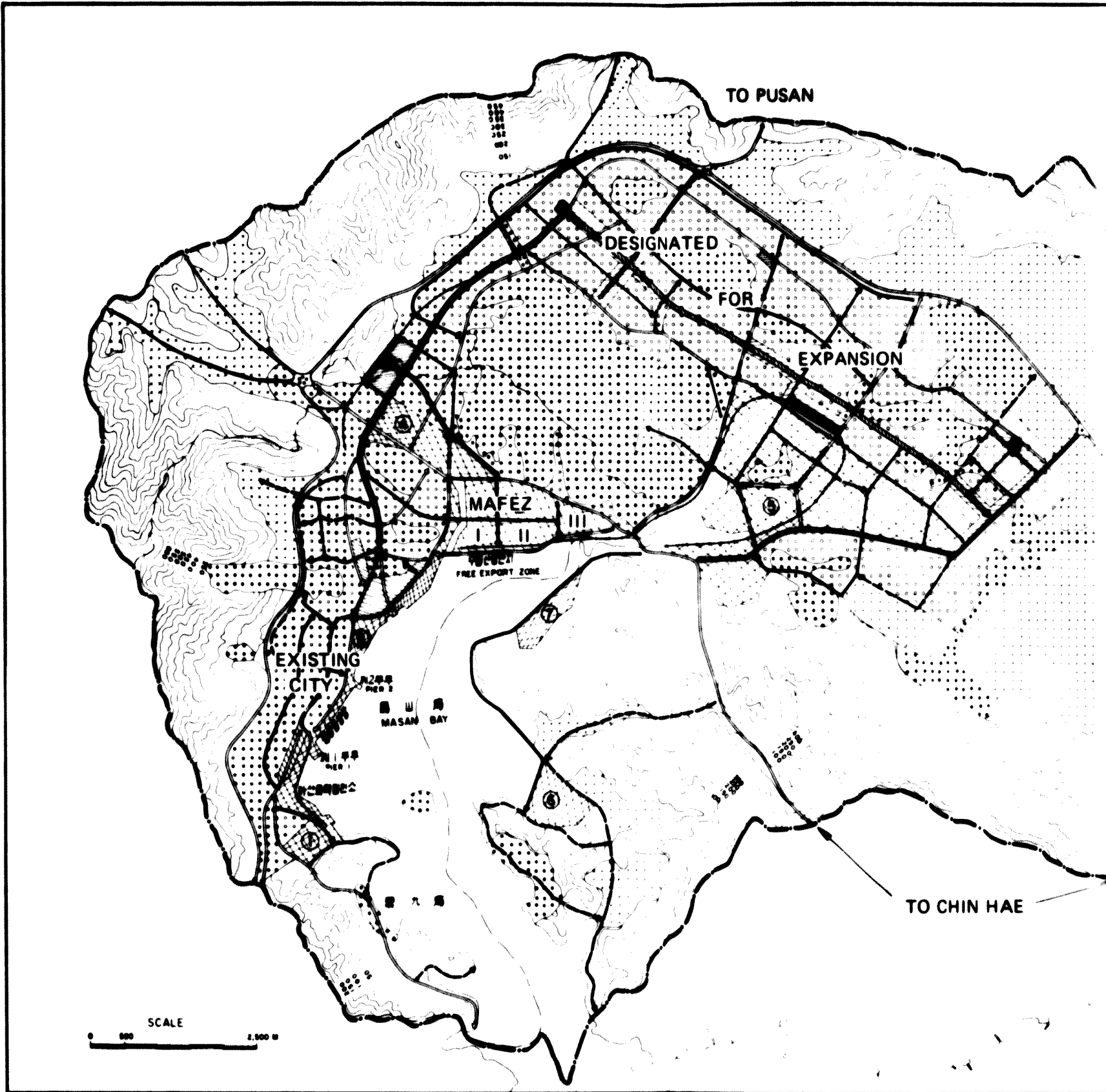
9.1.1 Masan City Master Plan

A general land use plan has been prepared for the extension of the urban development of the city of Masan. A copy of this plan is contained in Figure 9-1.

This plan has been prepared in anticipation of the impact that will be created by the new industries locating in MAFEZ. It provides for a population level of 500,000 persons.

9.1.2 Land Use in Vicinity of Site (See Figure 9-2)

The MAFEZ site is located in pleasant surroundings at the head of Masan Bay and bounded on the north and east by scenic mountains. These physical features essentially dictate the surrounding land use. The mountains, because of their rugged nature, are unsuitable for development and have



SECTION 1

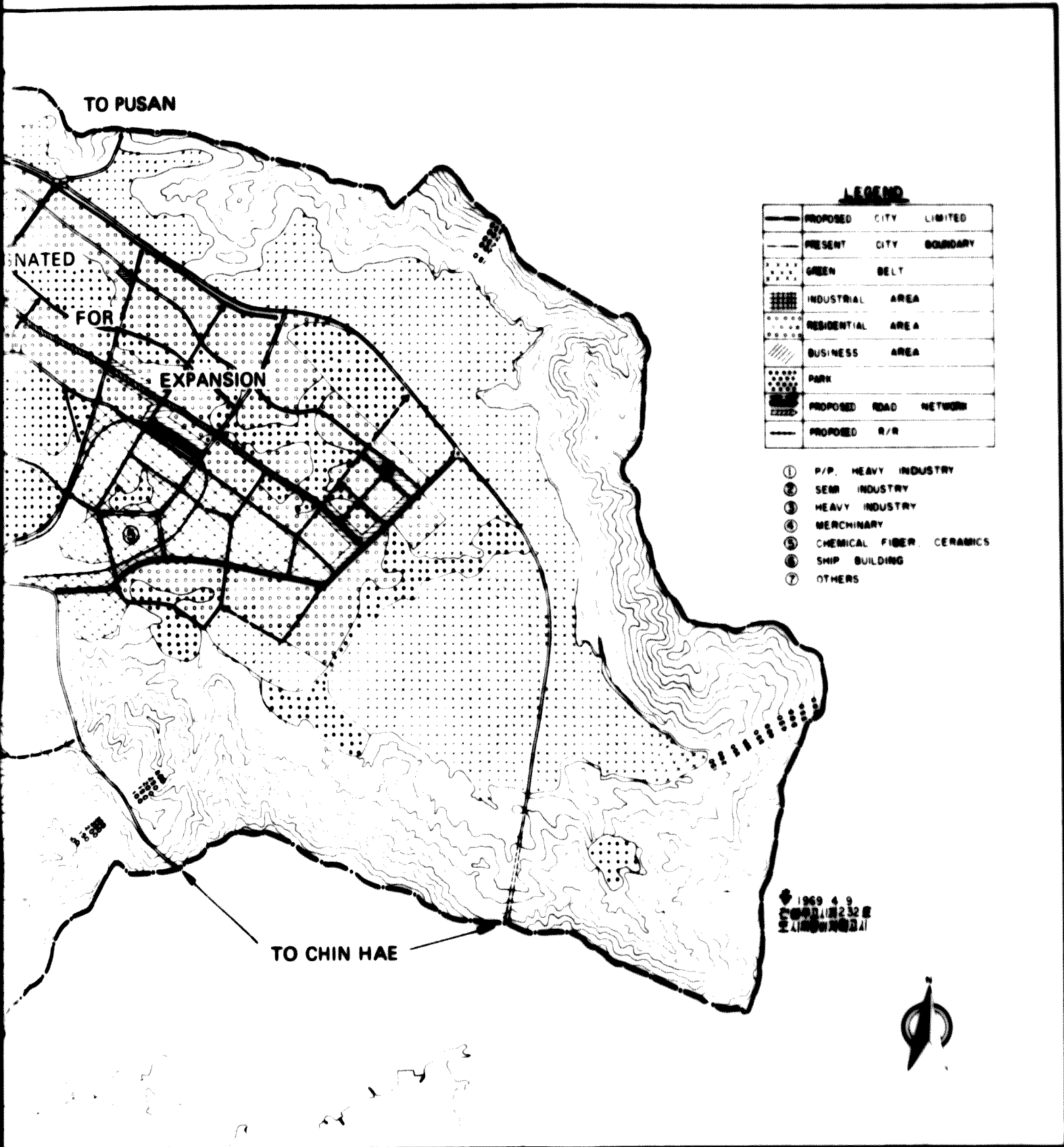
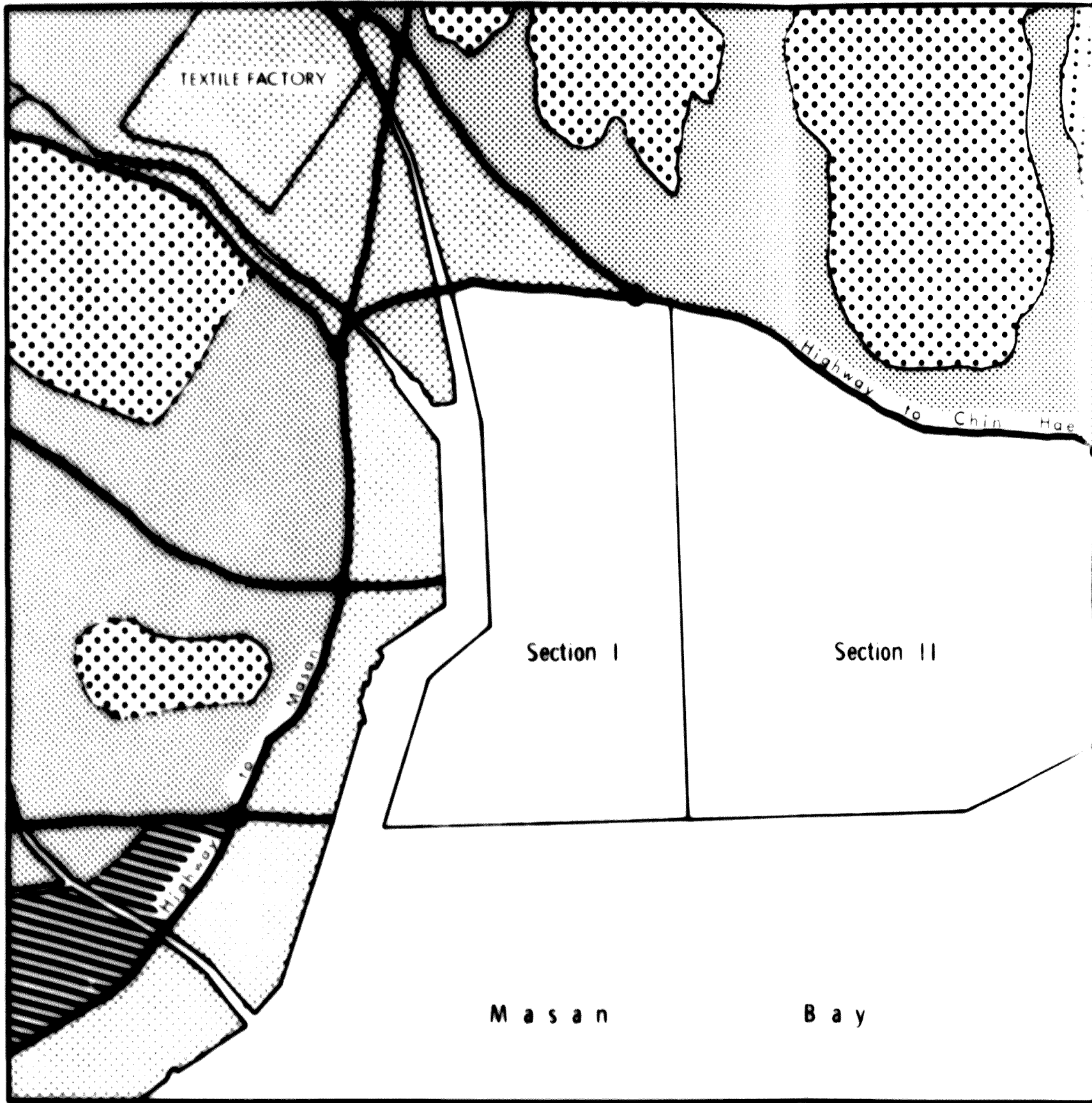


Figure 9-1. Plan for Urban Development

SECTION 2



SECTION 1

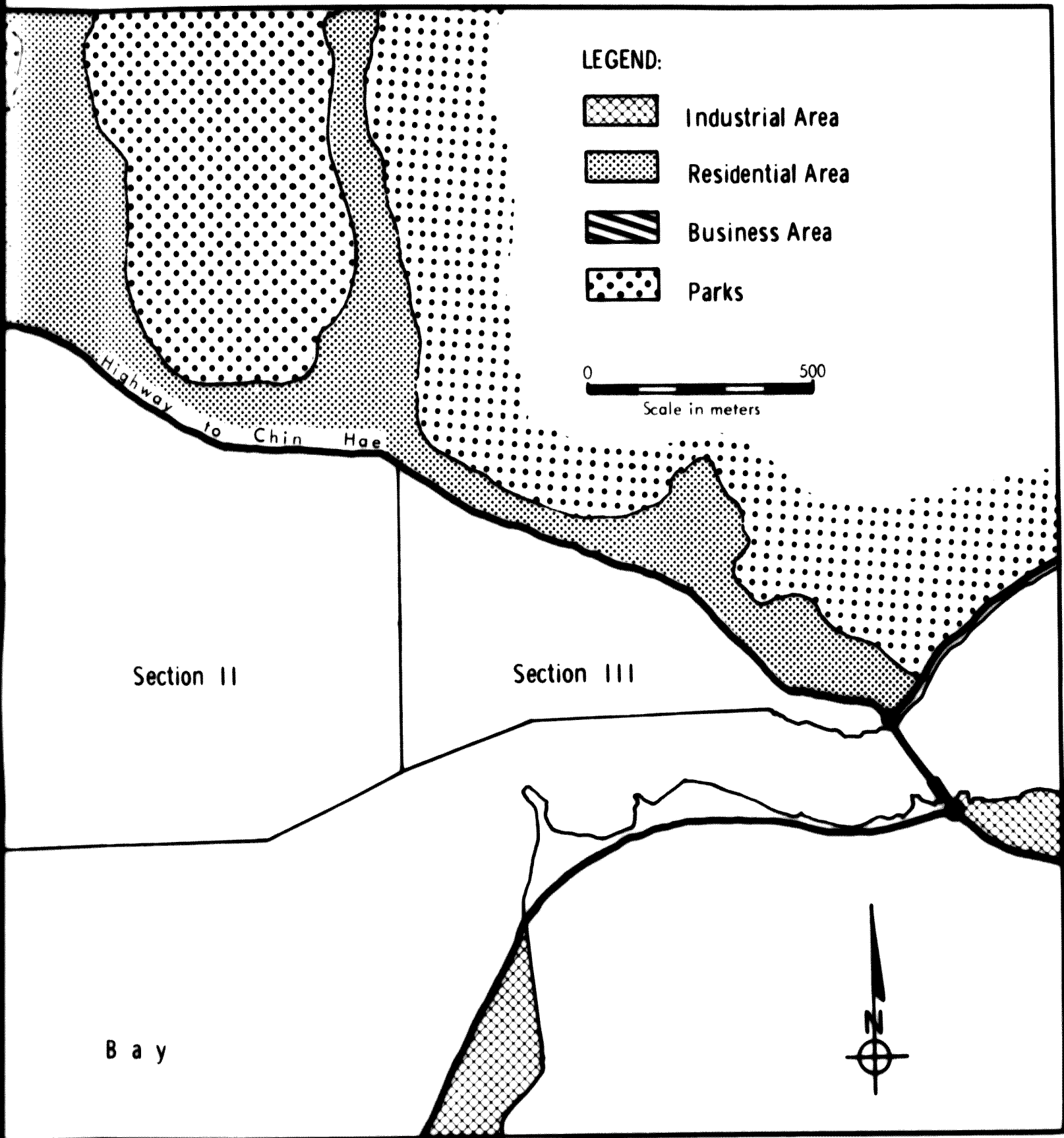


Figure 9-2. Surrounding Land Use

been designated for park use in the general plan. This will insure the maintenance of pleasant surroundings encircling the MAFEZ.

Between these mountains and the highway to Chin Hae (which forms the northern border of the zone) is a strip of varying widths designated as residential. This strip consists of land which for the most part has slopes suitable for the development of housing. There are two small canyons extending into the mountains which could be developed into very pleasant housing complexes.

It is essential that land use along this strip be controlled very carefully. Since it is adjacent to the zone, there will be great pressures to develop this land rapidly and without thought to aesthetics. Use of this land for commerce, light industry, repair facilities, or storage should be avoided.

Most visitors to the zone will approach from the north, and the first visual impressions will be important. The highway bordering the zone on the north should be broad and well landscaped to give the proper visual impression. Housing developments along the aforementioned strip should meet high standards of design. Already there is a large borrow area from which fill material is being extracted for use in Section III. This will create a permanent scar on an otherwise attractive mountainous setting. Future activities of this type should be avoided.

The area immediately west of the zone across the small tidal basin has been designated on the land-use maps as industrial. It is obviously valuable land because of its strategic location and close proximity to the zone. It has been reported elsewhere, however, as destined for open space or greenbelt. Again, this land is a key factor with respect to visitors' impressions of the zone.

If this land is allowed to be developed industrially there is a danger that it will end up as open storage area, truck service repairing, and other similar types of activity. It is very difficult to maintain an aesthetic setting with these types of operation. Therefore, it will be necessary to control carefully the uses to which these parcels are put.

Since substantial amounts of land will be required for dormitory facilities, this area should be considered seriously for such use. Dormitories could be constructed there with ample landscaped open space, thus creating an open, park-like setting. Such a development could leave a very pleasant impression with visitors to the zone. It would also provide pleasant and convenient surroundings for workers, and would be within easy walking distance thus reducing vehicular traffic in the vicinity of the zone.

The land to the northwest of the zone is extremely important, since the main transportation corridors serving the zone and other parts of the community run through this area. These transportation corridors must be carefully protected. A large textile factory is located in this area, and therefore this land should continue to be developed in industry. Care should be exercised, however, that industries not be allowed that might encroach upon or interfere with the important transportation corridors.

9.1.3 Land Use Within the Zone

As mentioned above, substantial pressures will be created for several important types of land use. Specific locations for these important land uses should be designated, including the following two possibilities.

The first is that specific suitable areas be designated and controls established for these types of use in the surrounding community. This would require a more specific definition of sites for these activities than is

shown on the general plan. The second is that some of these uses be allowed within the areas now designated as the zone. The possibility of allowing either temporary or permanent housing in some parts of the zone is discussed later in this section.

Some consideration should also be given to allowing service industries there. A packaging plant, for example, will be an important service industry that could benefit from being located in the zone. The substantial increase in truck transportation will require land for truck servicing and parking. It is estimated that there will be at least 80 truck trips generated per day between MAFEZ and Pusan alone. If suitable facilities are provided in the zone, or at least at a convenient location nearby, truck servicing could be encouraged in Masan rather than in Pusan. This would increase the economic benefits to the surrounding community from the zone.

A plan has been prepared for the zone that designates certain blocks for specific types of industries. The team reviewed this plan and, while it seemed reasonable, felt it entailed unnecessary rigidity. The administrators should maintain maximum flexibility in the development of the zone, and be receptive to deviations from the plan which show promise for significant improvements.

In general, the following principles should be practiced in locating firms within the zone.

- Each industry must take the necessary measures whereby it will not be offensive to neighboring industries. This includes air pollution, noise, unsightly buildings or storage areas, parking, etc. By using reasonable standards, **incompatibilities among different types of industries** should be eliminated, and no need should arise to segregate the zone rigidly into different industry categories.

- Provisions for future expansion are very important in locating a plant within the zone.

9.2 HOUSING

If the population projections discussed in Section 7 are realized, a substantial demand will be created for all types of housing in the Masan area. This demand will be superimposed upon a housing deficiency reported to exist there now. The 1969 Masan Statistical Yearbook reports a shortage of over 10,000 housing units. The housing situation is shown in Table 9-2.

Table 9-2

1968 HOUSING SITUATION IN MASAN

Population	172,574
Families	31,859
Number of houses	21,104
Shortage	10,755

Source: 1969 Statistical Yearbook, City of Masan, page 89

If the population growth rate of 7.8 percent for the City of Masan were realized during the 1970's, there would be a requirement for some 5,000 to 6,000 new housing units per year in addition to a substantial number of dormitory-type accommodations for young unmarried workers. This is based on the addition of approximately 200,000 persons to the present population of Masan. If 30,000 of these represented young unmarried workers living in dormitories and employed in industries locating in MAFEZ, this would leave a total of 170,000 persons who would have to be housed in standard accommodations. A general order-of-magnitude calculation of the housing requirements is shown in Table 9-3.

Table 9-3

FUTURE HOUSING REQUIREMENTS
IN THE CITY OF MASAN

	Persons
Total population increase (1971-1980)	200,000
Less young workers living in dormitories	30,000
Population difference living as families and therefore number of housing units required	170,000
	Housing Units
Number of units for new families (based on 5 persons per household)	34,000
Housing units required for replacement of old units, units converted, and units lost from the housing inventory for other reasons (approximately 20% of current inventory)	6,000
Existing housing shortage	10,000
Total requirements for new housing	50,000
Annual requirements (ten years)	4,000 to 6,000

To meet the estimated annual requirements of 4,000 to 6,000 units annually, a very significant housing program will have to be undertaken in the Masan area. In addition, dormitory accommodations for 30,000 persons will also be needed. Since it is expected that these dormitories will have to be constructed within the next few years, this could represent an additional 4,000 to 5,000 dormitory units per year over the next six to eight years. A demand of this magnitude could support a factory-built modular housing industry at Masan. Without an orderly housing program, the development of MAFEZ within a reasonable time period could be impeded. New industries will not locate there if workers and housing are not available.

The need for a dormitory program will become critical in the next few years. The eleven firms that have signed to locate in MAEEZ plan to employ approximately 2,100 female workers. This represents over ten percent of the total females in the 15-24 year-old category in the City of Masan. Based on this, it is assumed that this type of worker will soon have to be recruited from outside Masan and will require housing accommodations.

9.3 COMMUNITY FACILITIES

It should be the goal of the City of Masan to serve as a subregional center to Pusan. To accomplish this, it will be necessary to create a living environment so that people would prefer to live with their families in Masan rather than live in Pusan and commute to Masan. In order to accomplish this, it will be necessary to implement the general plan that has been prepared for the expansion of Masan in accordance with the following principles:

- Housing must be developed in pleasant surroundings and at reasonable densities
- A strong, modern, commercial center must be developed that will serve a subregional function
- Recreational facilities and open space must be provided
- Excellent educational facilities must be developed

The accomplishment of these goals will be difficult because of the strong growth pressures that will result from the MAEEZ development. It will be easy to postpone or engage in substandard construction rather than build for permanency. The temptation to do this must be avoided.

9.3.1 Western Hotel

One of the essential needs will be facilities to accommodate visitors to Masan. It is estimated that a western-type hotel of approximately two hundred beds will be required to accommodate foreign visitors to MAFEZ alone. In addition, tourists will also be attracted to Masan, but should be relegated to secondary consideration since the national tourism program will provide accommodations elsewhere. Again, the hotel should be planned to provide for foreign visitors and foreign residents, with recreational facilities such as tennis courts, golf links, theater, and a general country club to encourage the mix of eastern and western cultures. In connection with the hotel-recreational complex, consideration should be given to the development of a western-type shopping center/foreign commissary complex to provide the transition from western to locally produced food products and clothing. MAFEZ should be the catalyst for the development of goodwill and cultural mix that is necessary for a successful operation. Efforts must be made to avoid the development of an isolated community around the zone.

9.3.2 Trade Center

A trade center is also another vital need. This center should be the focal point for the promotion of industries in Masan. It should incorporate the energies of all organizations in the promotion of the community and its advantages as well as its products. This center should be a vital entity and not become just an area for displaying community products.

The western hotel, convention center, and trade center could be developed as a single complex. This would have particular value if these facilities were located where they could catalyze the development of other urban facilities, and thus help set the tone and guide the direction of future growth of the City of Masan.

9.4 LAND REQUIREMENTS

Based on an overall density of 100 to 125 persons per hectare, some 1,600 to 2,000 hectares will be required for housing. Since housing usually represents about 35 to 40 percent of the total urban land requirements, approximately 4,000 to 5,000 hectares (or 40 to 50 square kilometers) of new urban land will be required. By comparison, the existing city of Masan is approximately 31 square kilometers in size.

As indicated previously, the only suitable space for urban development in the Masan area is the valley to the north and east. An essentially pioneering effort will be required to extend the urban infrastructure and transportation system into this valley. It is critical, based on this magnitude of demand and the attendant land requirements, that this effort be started as soon as possible.

The land requirements for dormitories to accommodate single workers will amount to about 40 hectares, based on a density of 700 to 800 persons per hectare. These will have to be located in close proximity to MAFEZ to facilitate transportation to and from the zone.

Several courses of action can be taken to alleviate the effects of the expected strong demand for housing. These include:

- Lengthen the development period for the zone
- Reduce employment densities in the zone and therefore the total employment target.

These two recommendations are consistent with, and in fact fortify, the need to tighten the industry selection criteria, which presumes a lengthening of the development period.

However, even with a slower growth, the housing problem in Masan will be a substantial one. A concerted effort will be required on the part of several of the ministries, the City of Masan and officials of the MAFEZ organization to develop a housing program that will meet the requirements outlined above. This program has high priority in the development of the free trade zone. Several steps are recommended to help solve the housing problem.

- Begin a public housing project that can be expanded in response to demand. The only area where nearly unlimited expansion can occur is in the aforementioned valley to the north.
- The necessary utilities, streets, and services should be extended to this valley to encourage the development of private homes as well. The plan to seek industries that employ higher skill levels should mean that a greater percentage of the workers will be able to finance and construct their homes without relying as heavily on some form of public assistance.
- Consideration should be given to building housing accommodations on parts of either Section II or III of the MAFEZ site. This suggestion includes several possibilities.
 1. Dormitory housing could be built adjacent to factories. This program is practiced in the export industrial estates and is working satisfactorily. Each firm constructs and operates its own dormitory accommodations and ancillary facilities.
 2. Temporary housing could be constructed that could either be relocated or converted to industrial use as demand for industrial land warrants. For example, dormitories might be designed which could be converted to factory buildings and temporary or mobile homes could be used that could then be moved when the land is needed for other uses.
 3. A portion of the site could be designated for permanent housing and future expansion of the free export zone could occur on the industrial land designated in the Masan General Plan located east of MAFEZ.

Several steps have already been taken to provide housing accommodations in the Masan area. These include the following:

- Land has been purchased north of the MAFEZ site for the construction of dormitories for workers. This construction should proceed as soon as possible. Even if dormitory accommodations were allowed next to factory sites, there are still many firms that would prefer the option of having their workers live in outside accommodations.
- MAFEZ staff housing has been constructed in Masan city approximately two kilometers west of the zone. The complex includes apartments for married workers and dormitories for single men complete with central kitchen, dining room, recreational facilities, and servant quarters. Adequate open space is available surrounding the complex for future expansion. Providing first class accommodations will be essential in attracting high-caliber personnel to staff the MAFEZ operation.
- MAFEZ has purchased the land and has started construction of the foreigners' apartments at a location approximately three kilometers north of the zone. These apartments are constructed to western-world standards with central heating, bathrooms, and dial telephones. Initial facilities will be provided for forty-eight families with choices of one, two, or three-bedroom units. As the zone develops, additional units will be constructed.

section 10

Financial Analysis

Section 10

FINANCIAL ANALYSIS

The purpose of this section is twofold. The first is to evaluate the costs involved and relate them to the revenues. The second is to analyze the potential for increasing the benefits from investment in the Masan Free Export Zone.

10.1 ESTIMATED DEVELOPMENT COSTS

Table 10-1 presents an estimate of the capital investment and operating costs for the development of the Masan Free Export Zone. Separate cost estimates are shown for Section I and Sections II and III combined.

The estimates are broken down into site (including land costs) and improvement costs. Site land purchase and development costs and utility improvement costs were obtained from the MAFEZ and MOC historical cost records and current construction budgets. The estimated costs shown for building improvements were furnished by MAFEZ. These were evaluated by Bechtel and found to be comparable on a unit-price basis with construction cost records for buildings of similar design. The low unit prices for these improvements are attributable to the low Korean wage scale and intensive use of hard labor. Administration costs and budget fund data were furnished by MAFEZ for inclusion as a direct cost item. These are on-going costs that will be adjusted in line with project development.

The costs of port development have been omitted from this estimate, since it has been recommended that the need and timing for the port development

be reevaluated in terms of current trends in ocean transportation: i. e., fewer ports serving larger geographical areas by means of containerized cargo carried over the express highway system.

In developing the costs for Sections II and III, the M.O.C. Report estimate was used, which implies that this land could be purchased for only slightly more than the amount per pyong paid for Section I. Therefore, the M.O.C. figure of 2,533 won per pyong was used in calculating this cost. This land is presently owned by the City of Masan and individual parties. If land costs prove to be substantially higher, the internal rate of return calculated below will change.

10.2 INTERNAL RATE OF RETURN

An internal rate of return analysis was prepared based on the costs indicated in Table 10.2 and the expected revenues from both the land and the standard factory buildings. A fifty year time horizon was used, and the present value of the land and land improvement costs were added back into the calculations at the end of that period. The land was assumed to retain its initial value, while the improvements were depreciated during that period.

Another important assumption used in this analysis is that all three sections of the zone will be filled by 1978, at which time income or revenues will remain level throughout the remainder of the period studied.

The internal rate of return for the MAFEZ project, based on these assumptions, amounted to 0.52 percent over the assumed 50 year life time. The slightly positive rate of return is due to economies of scale through development of Sections II and III of the zone. Thus the construction and operation of the zone will show a slightly positive cash flow over the life of the project. However, since alternative investments are available that would yield a higher rate of return, the MAFEZ development essentially represents a form of subsidy

SITE DEVELOPMENT AND IMPROVEMENT COSTS BY YEAR

(Unit 1000 Won)

SITE	Section I 182,878 Pyong			Section Tot.	1971
	1970	1971	1972		
Land Purchase (Sect. I:182,878 PY @ 2450 won/py)	448,000			448,000	
Access Road (Sect. II, III: @ 2533 won/py)		15,000		15,000	
Bridge	30,000	94,000		124,000	
Site Formation	146,000	202,000		348,000	
Road & Pavement	165,000	299,000		464,000	
Drainage		85,000		85,000	
Waterway Dike		237,000		237,000	
Embankment		71,000		71,000	
Temporary Water Supply		9,000		9,000	
Site Subtotal	789,000	1,012,000		1,801,000	
IMPROVEMENTS					
Water System (Sect. I:10,000; II, III:15,000 t/d)	24,000	146,000		170,000	
Lighting and Power (Sect. I:10,000; II, III:15,000 KW)	91,000			91,000	
Engineering Design	38,000			38,000	56,000
Warehouse			35,700	35,700	
Public Facilities (Admin.)		253,714	66,144	319,858	
Attached Facilities (Fence, etc.)		111,724	40,000	151,724	
Staff Apartment		73,916		73,916	
Dormitory		235,000		235,000	
Foreigners Apartments		250,000		250,000	
Office expenses during const.			15,412	15,412	
State Fund Support		100,000		100,000	
Administration Budget		124,000	124,000	248,000	
Installation Contingency Fund		16,829	12,109	28,938	
Communications			48,875	48,875	
Improvement Subtotal	153,000	1,311,183	342,240	1,806,243	56,000
TOTAL	942,000	2,323,183	342,240	3,607,423	56,000
Standard Factory (4)		297,501	1,116,000	1,413,501	
Off-site Road Improvement (allowance)			430,000	430,000	
	942,000	2,620,684	1,888,240	5,450,924	56,000

Note: Items in Masan Section II & III marked * have been factored from Section I on the basis of land area, $\frac{300,000}{182,878} = 1.6$

SECTION 1

Table 10-1

DEVELOPMENT AND IMPROVEMENT COSTS BY YEAR

(Unit 1000 Won)

Section I 182,878 Pyong			Section II and III 300,000 Pyong					Grand Tot.
1971	1972	Section Tot.	1971	1972	1973	1974	Section 2 & 3 Tot.	
		448,000		760,000			760,000	1,208,000
5,000		15,000						15,000
4,000		124,000						124,000
2,000		348,000		200,000	248,000	248,000	696,000	1,044,000
3,000		464,000		371,000	278,000	279,000	298,000	1,392,000
5,000		85,000			65,000	65,000	130,000	215,000
7,000		237,000			25,000	25,000	50,000	287,000
1,000		71,000			91,000	92,000	183,000	254,000
3,000		9,000						9,000
2,000		1,801,000		1,331,000	707,000	709,000	2,747,000	4,548,000
46,000		170,000				292,000	292,000	462,000
		91,000				130,000	130,000	221,000
		38,000	56,000				56,000	94,000
	35,700	35,700				57,120	57,120	92,820
3,714	66,144	319,858				186,128	186,128	505,986
1,724	40,000	151,724				242,758	242,758	394,482
3,916		73,916						73,916
5,000		235,000						235,000
9,000		250,000				400,000	400,000	650,000
	15,412	15,412				24,660	24,660	40,072
0,000		100,000				160,000	160,000	260,000
4,000	124,000	248,000			198,400	198,400	396,800	644,800
6,829	12,109	28,938			46,300		46,300	75,238
	48,875	48,875			78,200		78,200	127,075
1,183	342,240	1,806,243	56,000	-0-	322,900	1,691,066	2,069,966	3,876,389
23,183	342,240	3,607,423	56,000	1,331,000	1,029,900	2,400,066	4,816,966	8,424,389
7,501	1,116,000	1,413,501			297,501	1,116,000	1,413,501	2,827,000
	430,000	430,000						430,000
20,684	1,888,240	5,450,924	56,000	1,331,000	1,327,401	3,516,066	6,230,467	11,681,389

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Table 10-2

**CASHFLOW AND INTERNAL RATE OF RETURN
FOR SECTIONS I, II AND III
(Millions of Won)**

Internal Rate of Return 0.52%			
Year	Costs	Benefits	Cashflow
1970	942	0	- 942
71	2025	9	- 2016
72	2727	36	- 2691
73	1222	102	- 1120
74	3042	228	- 2814
75	143	276	+ 133
76	161	324	+ 163
77	180	372	+ 192
78	198	420	+ 222
79	↓	↓	↓
1980	↓	↓	↓
81	↓	↓	↓
82	↓	↓	↓
83	↓	↓	↓
84	↓	↓	↓
85	↓	↓	↓
1986	↓	↓	↓
↓	↓	↓	↓
2019	198	420	+ 222
2020	198	1628	+ 1430

1. Includes all costs except the following: staff apartments, dormitory, foreigners' apartments, and off-site road improvement.
2. Lease income only (land plus standard factories). Assumes four year implementation for Section I and a four year schedule for Sections II and III together.

to the industries locating there. The subsidy amounts to the differential rate of return relative to the return which could be earned from alternative investments.

The objectives underlying the establishment of MAFEZ were, however, to secure benefits that would otherwise not accrue to the economy. Such benefits far overshadow this subsidy. These benefits include:

- Increased foreign investment
- Employment for Korean workers who would not otherwise be employed (including the multiplier effects of such employment)
- Effecting a technological transfer
- Acting as a catalyst for industrialization
- Using Korean utilities and raw materials that otherwise would not be used.

From the standpoint of zone administration, it has been recommended that the administrative budget be kept under the national budget. Based on the above estimates, the cash flow will be about even over the 50 year project life. After the initial capital investment outflow, however, there will be a positive cash flow and the difference can be remitted to the national accounts.

10.3 FOREIGN EXCHANGE BENEFITS

The development of MAFEZ will result in substantial earnings of foreign exchange for the Korean economy. The amount of foreign exchange earnings will depend upon the types of industry attracted to the zone and the amount of value actually added within the zone. Greater benefits will be achieved from industries that require higher skilled labor (see discussion in paragraph 10.4).

In estimating the foreign exchange benefits, Category ID (Table 10-4) was used which represents the complete development of the zone with industries utilizing relatively low skilled workers. An estimate of the foreign exchange earned by sources is shown in Table 10-3. It is assumed that this case represents a minimum, and that Categories II and III at that same employment level would result in higher foreign-exchange earnings, since they would pay higher wages for more skilled-labor inputs, use more utilities, and probably involve the purchase of more raw materials from the Korean economy.

10.4 POSSIBILITIES OF INCREASING BENEFITS

The overall policy of the MAFEZ Administration should be to try to maximize the benefits to Korea from the investment in the zone. On the investment side of the ledger, most of the development costs are essentially fixed both in time and amount. The only possible changes of any consequence would be to postpone or eliminate the proposed new wharf and the attendant cost for channel dredging, and perhaps to slow down the development of Sections II and III in response to a more rigid industrial-selection criterion.

On the benefits side of the ledger, there are four major areas where the overall benefits to Korea might be increased. These are:

- Increased wage and salary payments
- Greater utility requirements
- Increased purchases of raw materials and services
- Greater return from greater Korean ownership of firms

The other benefits are essentially inelastic. The land rental, for example, is fixed by the number of hectares.

Table 10-3

FOREIGN EXCHANGE BENEFIT FLOW ALL SECTIONS
(Millions of Won)

	Section		
	I ¹	II, III ²	Total
Wage Income	7,320	11,700	19,020
Utilities			
Water	48	77	125
Power	150	240	390
Other	198	317	515
Total	396	634	1,030
Lease			
Land	98	157	255
Standard Factory	82	131	213
Total	180	288	468
Raw Material	1,598	2,557	4,155
Ownership	3,196	5,114	8,310
TOTAL	12,690	20,293	32,983

1. Section I data taken from Table 10-2.
2. Section II, III wage and lease income calculated as for Section I. Utilities, raw material, and ownership income derived from ratio of employees of Section II, III to Section I: 40,000/25,000 = 1.6.

In order to obtain a gross comparison of benefits based on the length of the development period and the ability to attract industries that would bring higher value-added activities to Korea, several possible development patterns were analyzed.

Since the most significant benefits will come from wages and salaries paid to employees, a matrix was prepared (Table 10-4) relating skill requirements with various employment levels. The employment levels in the matrix range from 25,000 workers, the target established for Section I of the zone, to 75,000 workers, the target for the full development of all three sections.

The skill levels in Category I are based on the assumption that the firms locating in MAFEZ will employ a high proportion of low-skilled workers in assembly and essentially repetitive tasks. Categories II and III are based on the assumption that, by following a more selective approach to promoting the zone and selecting industries, manufacturing firms that need higher skill levels can be induced to locate there.

To relate the length of the development period to the benefits that might be realized, it was assumed that (based on patterns already apparent) Section I would be filled within a short period of time with industries that would have an employment mix characterized by Category I. On the other hand, to attract industries with the employment mix characterized by Category II, a more deliberate promotional effort would be required and a longer time period needed to fill the zone.

The higher skill levels in Category IIA would result in higher wage and salary benefits accruing to the Korean economy. Utility requirements are also assumed to be higher because of the greater use of machinery per worker. A larger purchase of local raw materials and services is also implied, since assembly type industries, which would be more

Table 10-4

CALCULATION OF SUPPORT POPULATION BASED ON SELECTED EMPLOYMENT LEVELS AND SKILLS REQUIREMENTS

Selected Skills Requirements	Employment (C.A.)	Employment (C.F.)	Employment (C.G.)	Employment (C.H.)
CATEGORY I				
Employment				
80% low-skilled factory workers (assemblers, seamstresses, etc.)	11,000	11,000	4,000	
15% managerial, technical, skilled, and semi-skilled	4,000	4,000		
Secondary employment	8,000	8,000		
Total Employment	23,000	23,000	4,000	
CATEGORY II				
Employment				
80% low-skilled factory workers (assemblers, seamstresses, etc.)	16,000	16,000	8,000	4,000
20% managerial, technical, skilled, and semi-skilled	7,000	7,000	17,000	7,000
Secondary employment	8,000	17,000	16,000	11,000
Total Employment	31,000	40,000	41,000	22,000
CATEGORY III				
Employment				
80% low-skilled factory workers (assemblers, seamstresses, etc.)	16,000	16,000	21,000	4,000
35% managerial, technical, skilled, and semi-skilled	9,000	17,000	18,000	21,000
Secondary employment	11,000	14,000	21,000	21,000
Total Employment	36,000	47,000	60,000	46,000

Assumptions: 1. For every 10 low skilled or unskilled workers, there will be one secondary worker.
 2. For every managerial, technical, skilled and semi-skilled worker, there will be one secondary worker.

prevalent in the low-skill category, essentially import almost all of their raw materials and have little machinery to service. Changes in income from Korean ownership could occur irrespective of the types of industries, so no increase in benefits was assumed for Category IIA over IA.

In estimating the requirements for utilities and purchased raw materials, the following assumptions were used:

Category IA: These were based on the estimates prepared for MAFEZ using inputs from the KEPZ experience. They are contained in the "Report on Master Plan and Final Design for Masan Free Export Zone." It was assumed that these would be a reasonable estimate of the utility requirements.

Category IIA: In preparing this estimate, the requirements were drawn from an industrial profile recently prepared for use in another country. This industrial profile had many similarities in that the employment levels were about the same and it did not include heavy primary industries. It did, however, include some metal-working, wire cable, tool and die, optics, and parts manufacturing industries that generally will require higher skill levels.

The gross foreign-exchange benefit streams from these two assumptions are shown in Table 10-5.

For purposes of comparison, it was assumed that the projected employment level of 25,000 and the expected benefits from Category IA would be fully attained each year beginning in 1974, while for Category IIA full benefits would not be reached until 1976, some two years later. The present worths of these benefit streams were then calculated based on a 15-year planning horizon and using an eight-percent interest rate. This analysis indicated that the benefits accruing to the Korean economy would be greater than investments that would result in the profile under Category IIA. Subsequent analysis indicated that if Category IIA took until 1977 before the

Table 10-5

SUMMARY OF GROSS FOREIGN EXCHANGE BENEFITS: SECTION I

Year	(Millions of Won)	
	Category IA	Category IIA
1970	0	0
71	635	737
72	2539	2944
73	6345	5888
74	12690	8834
75	↓	11778
76		14722
77		↓
78		
79		
1980		
81		↓
82		
83		
84		
85		
1986	12690	14722
Present Worth in 1970 at 8%	90874	97627

25,000 employment level and full benefits were reached, then the advantage would shift over to Category IA.

This model, based on the above-described assumptions, indicates that some selectivity should be exercised in accepting applications for MAFEZ, even though it might lengthen the period before full occupancy is achieved. Conversely, this additional time could be effectively utilized in promotional efforts directed at industries that would employ higher skilled labor and would perform more manufacturing activities in the zone. This longer development period would also be useful in allowing more time to establish training schools.

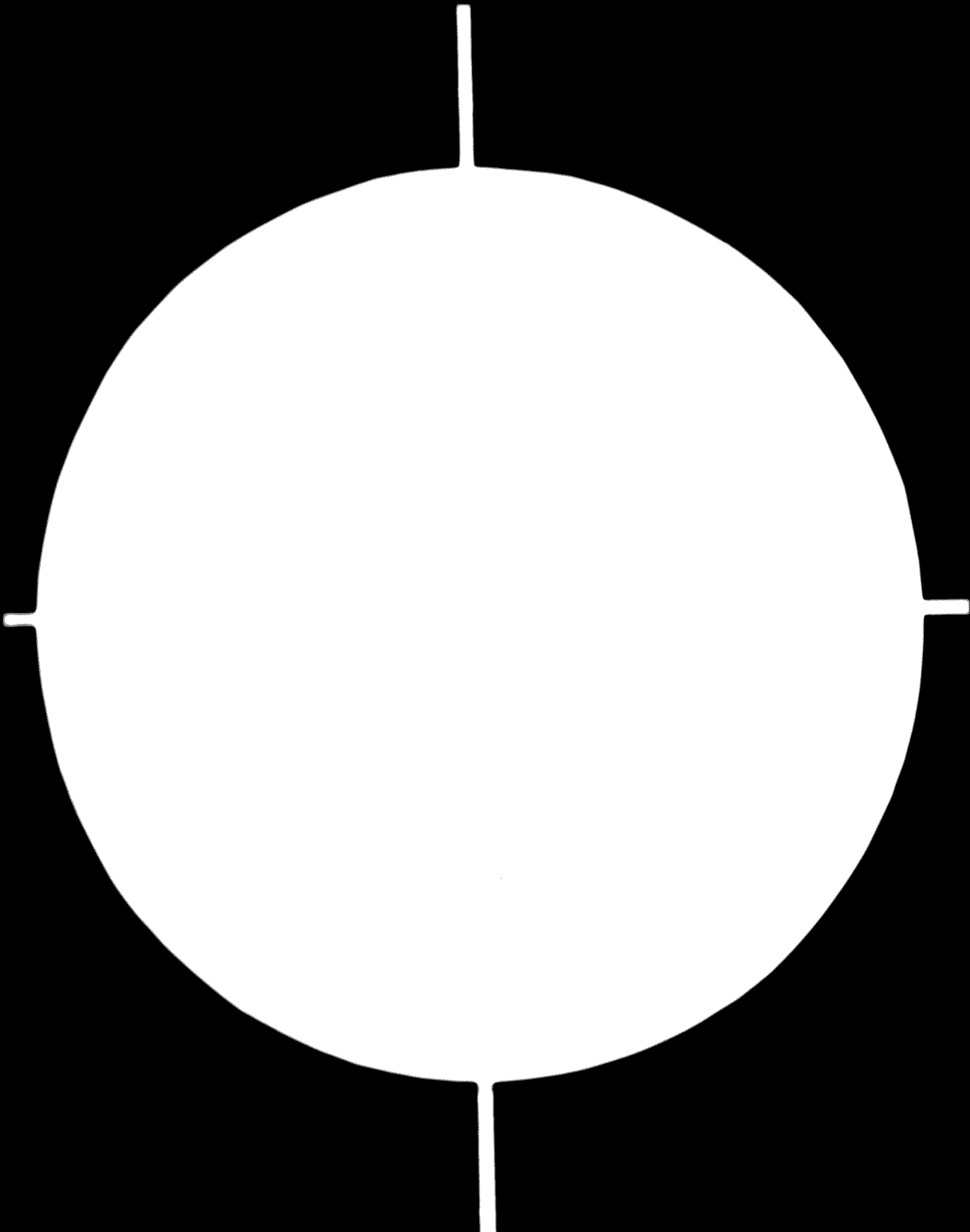
appendix A

**Proposed Yosu Free
Export Zone**

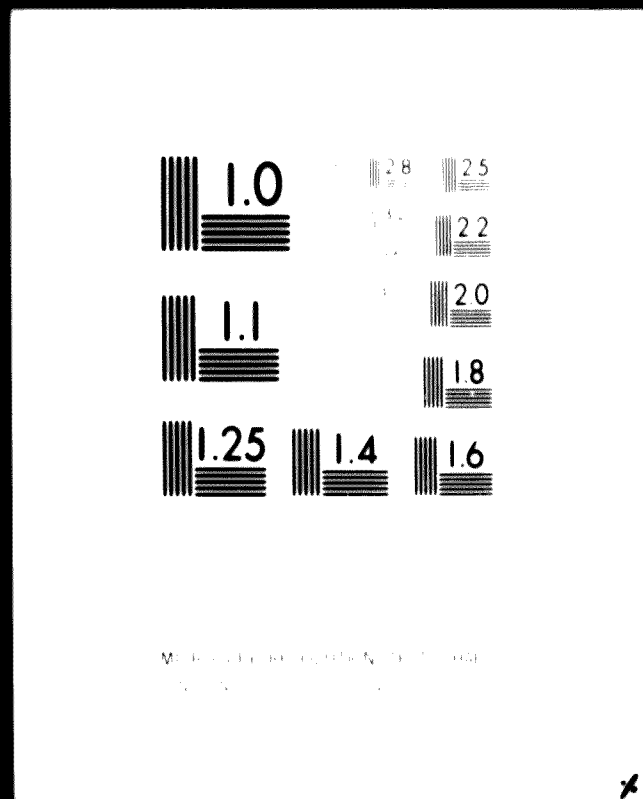
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APPENDIX A

PROPOSED YOSU FREE EXPORT ZONE

Because of its similarity and proximity, the Bechtel team investigated the proposed free export zone to be established at Yosu. Yosu is also located on the southern coast of Korea, approximately 192 kilometers by highway west of Masan. It will be linked with the expressway proposed along the southern coast. Also under construction is a new airport to be served by Korean airlines. Adequate space is available for future expansion into an international air freight terminal if the need develops.

The Caltex-Honam oil refinery is located (Figure A-1) on the north shore of the Yosu peninsula; it is served by 150,000-ton tankers. The Korean Ministry of Commerce and Industry has prepared two reports titled "Survey on Development of Yosu Industrial Area" and "Preliminary Survey Report on Heavy Chemical Free Export Zone" which describe in detail the planned industrial development along the north shore of the Yosu peninsula. The excellent deep-water harbor can be developed into a bulk-ore-carrier port with relatively minimum capital expenditure. This heavy industrial area and the proposed Yosu free export zone will complement each other in developing social infrastructure and commercial activity for the whole Yosu area.

The Korea Land Planners Association has issued a "Feasibility Study of the MCI Report on Establishment of Yosu Free Export Zone." In summary, this study recommends the establishment of the export zone in two locations. The first site contains 90,000 pyong and is located at the wharf designated New Port. The second site contains 200,000 pyong and is

at the Shin Wol Dong area located west of Yosucity proper (see Figure A-2). In view of the great potential commercial development of the Yosucity area, it is recommended that the New Port site be reserved for future general cargo port development. Temporary industries such as saw mills, bulk material transfer stations, prefabricated light industrial factories, and warehouses and even temporary housing can be established for revenue-earning use of the vacant port land. The port activities can then be expanded in line with demand.

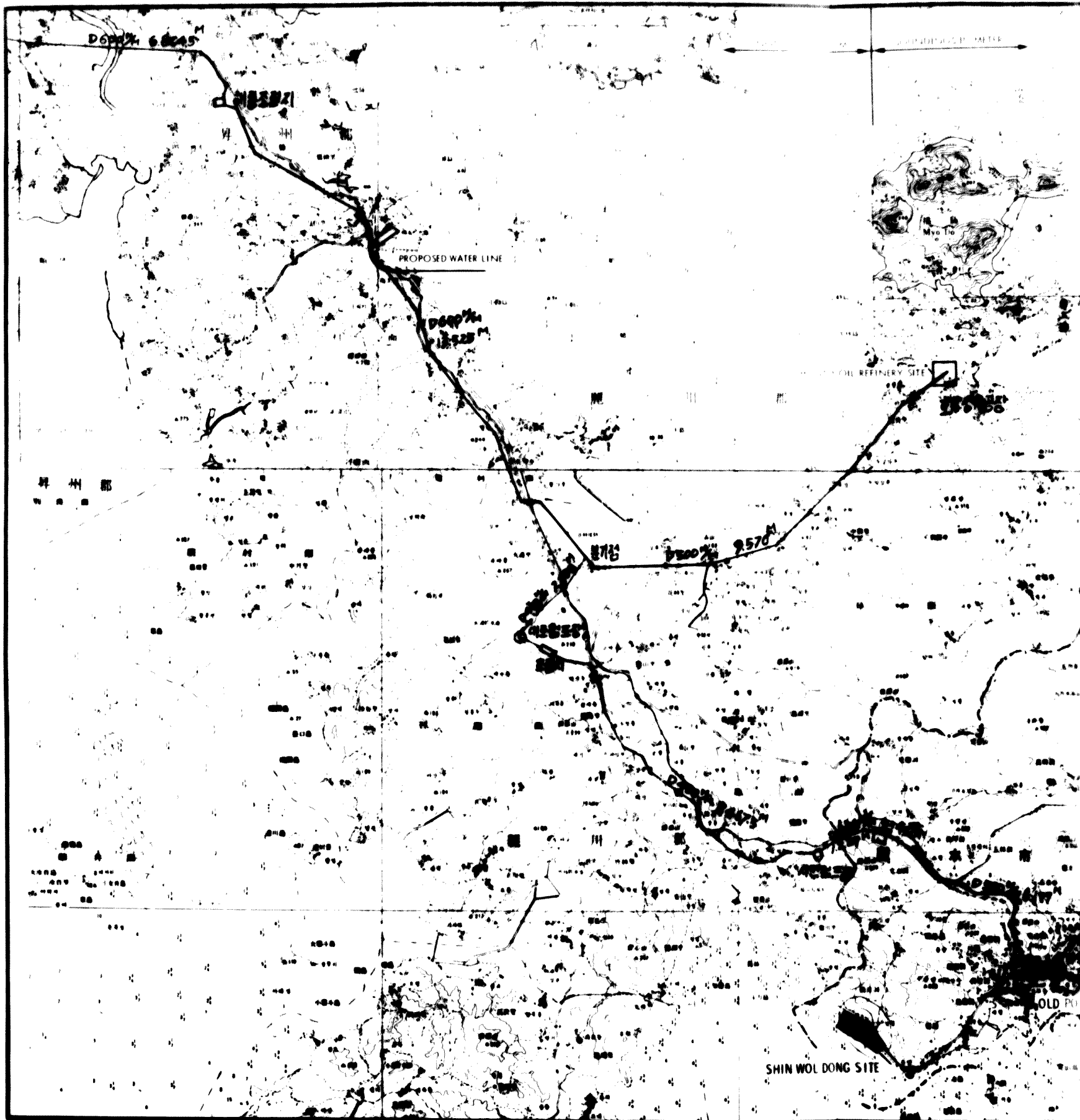
A.1 PHYSICAL PLAN

A proposed plot plan for the Shin Wol Dong site area was prepared and, as shown on Figure A-3, this was designed to be 300,000 pyong in size or the equivalent area of Sections II and III at MAFEZ. (See Table A-1.) The phased development as shown in this plan is recommended to minimize capital investment during the construction period. During the initial development period, traffic will flow mainly towards Yosucity proper. During the expansion period, the heavier traffic will preclude left-hand turns off the main road, so the future interchange should be constructed.

Table A-1

PROPOSED YOSU SITE AREA

	Yosu Shinwoldong	
	hectares	pyong
Public sites	3.9	11,827
Standard factory	8.2	24,682
Self-constructed factory	62.0	187,568
Road	25.1	75,923
Waterway	—	—
Total	99.2	300,000



SECTION 1

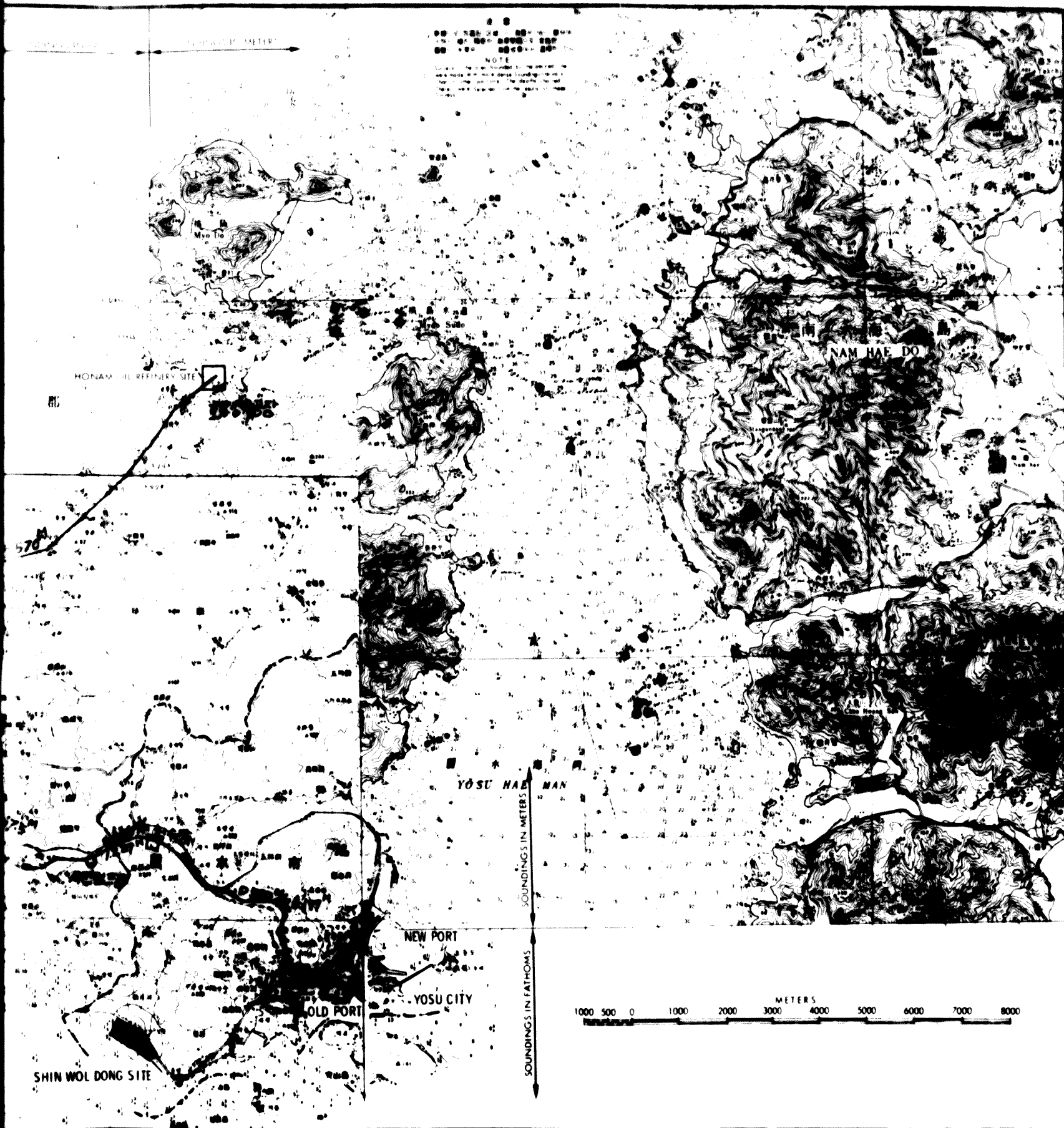
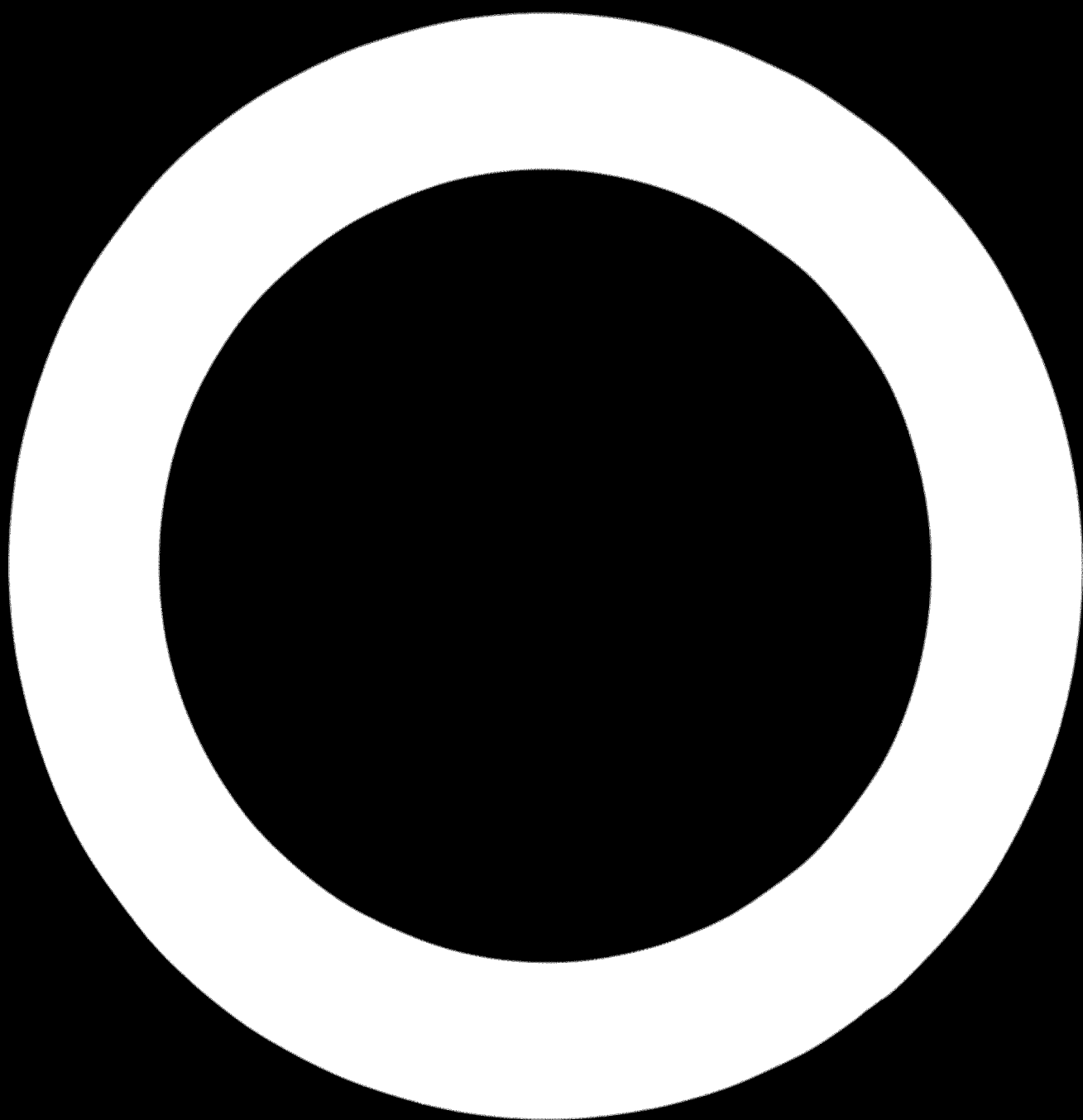
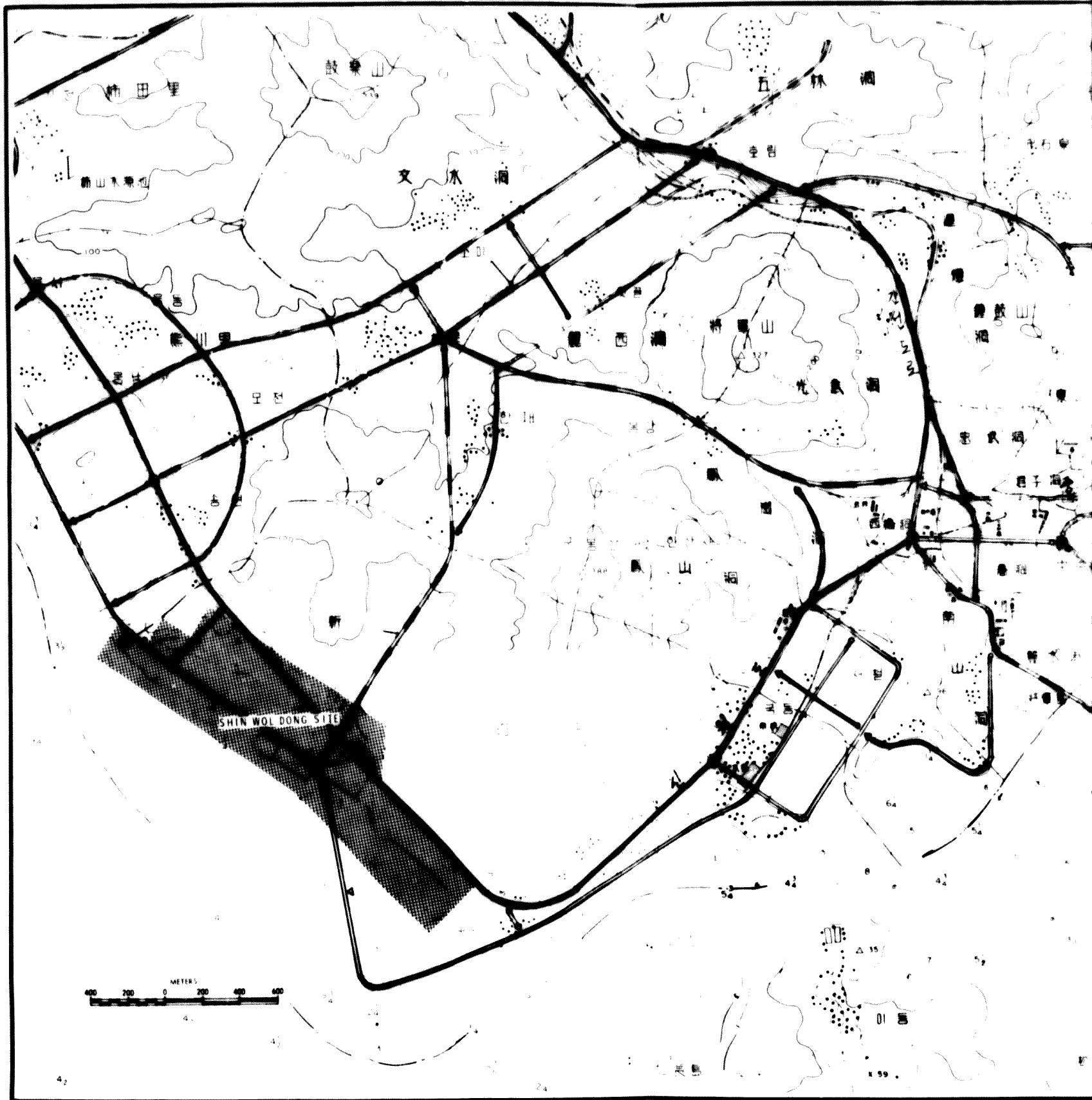


Figure A-1. Yosu General Area Site Map

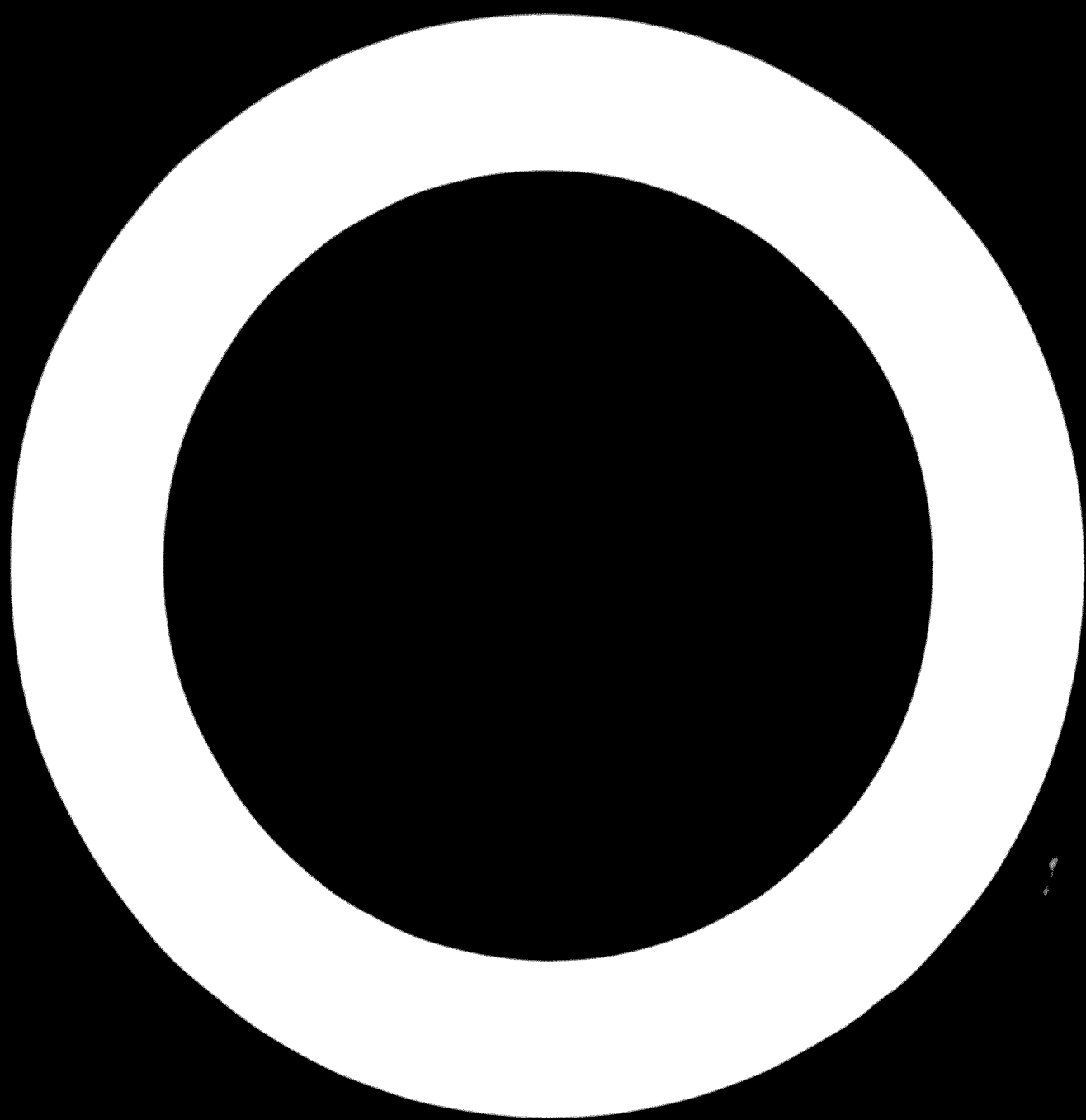


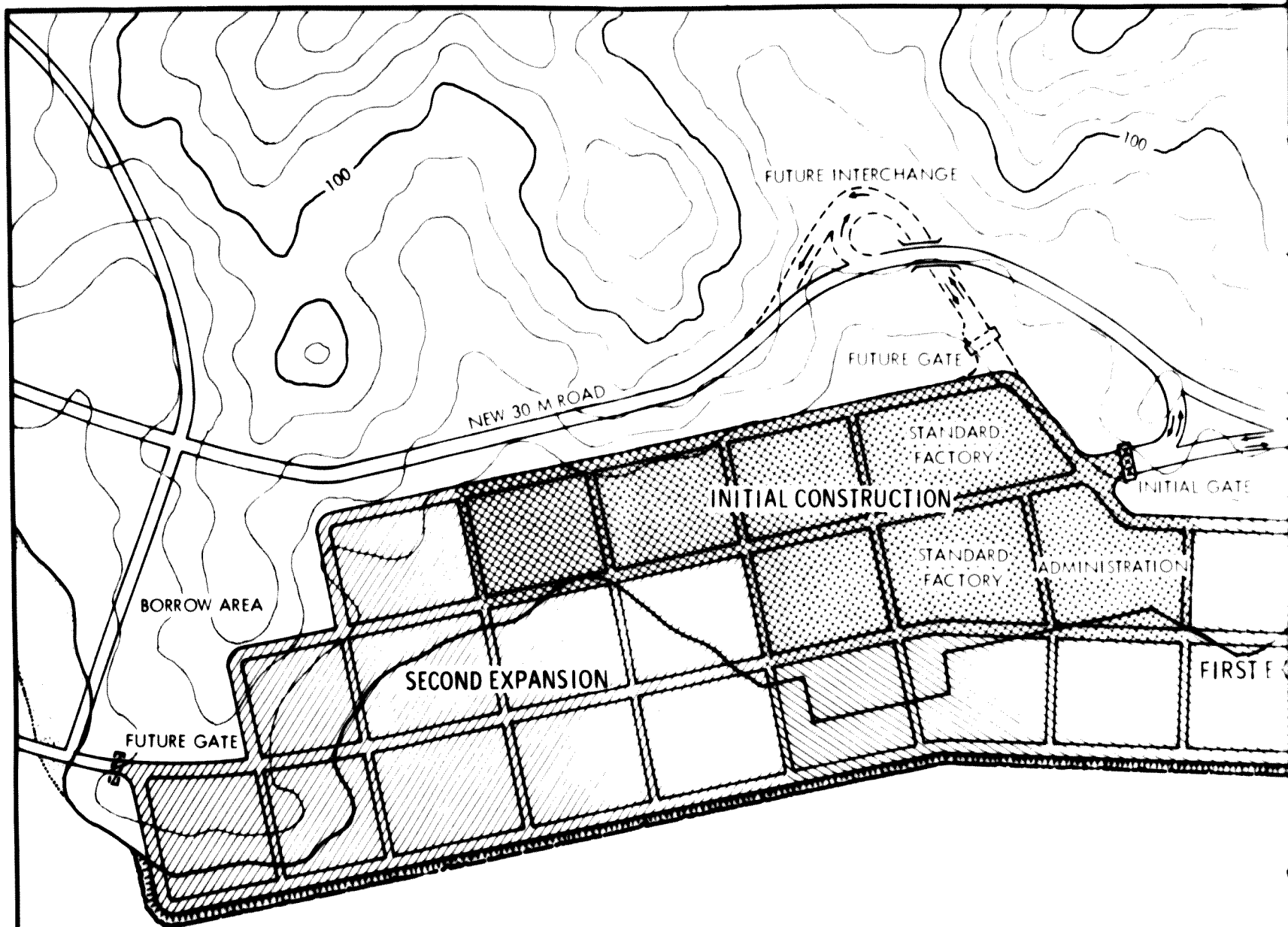


SECTION 1



Figure A-2. Yosu City Transportation Master Plan





PUBLIC LAND	39,100 M ²	11,827 PY
STANDARD FACTORY LAND	81,600 M ²	24,682 PY
SELF CONSTRUCTED FACTORY LAND	620,100 M ²	187,568 PY
ROAD	251,000 M ²	75,923 PY
TOTAL	991,800 M²	300,000 PY



SECTION 1

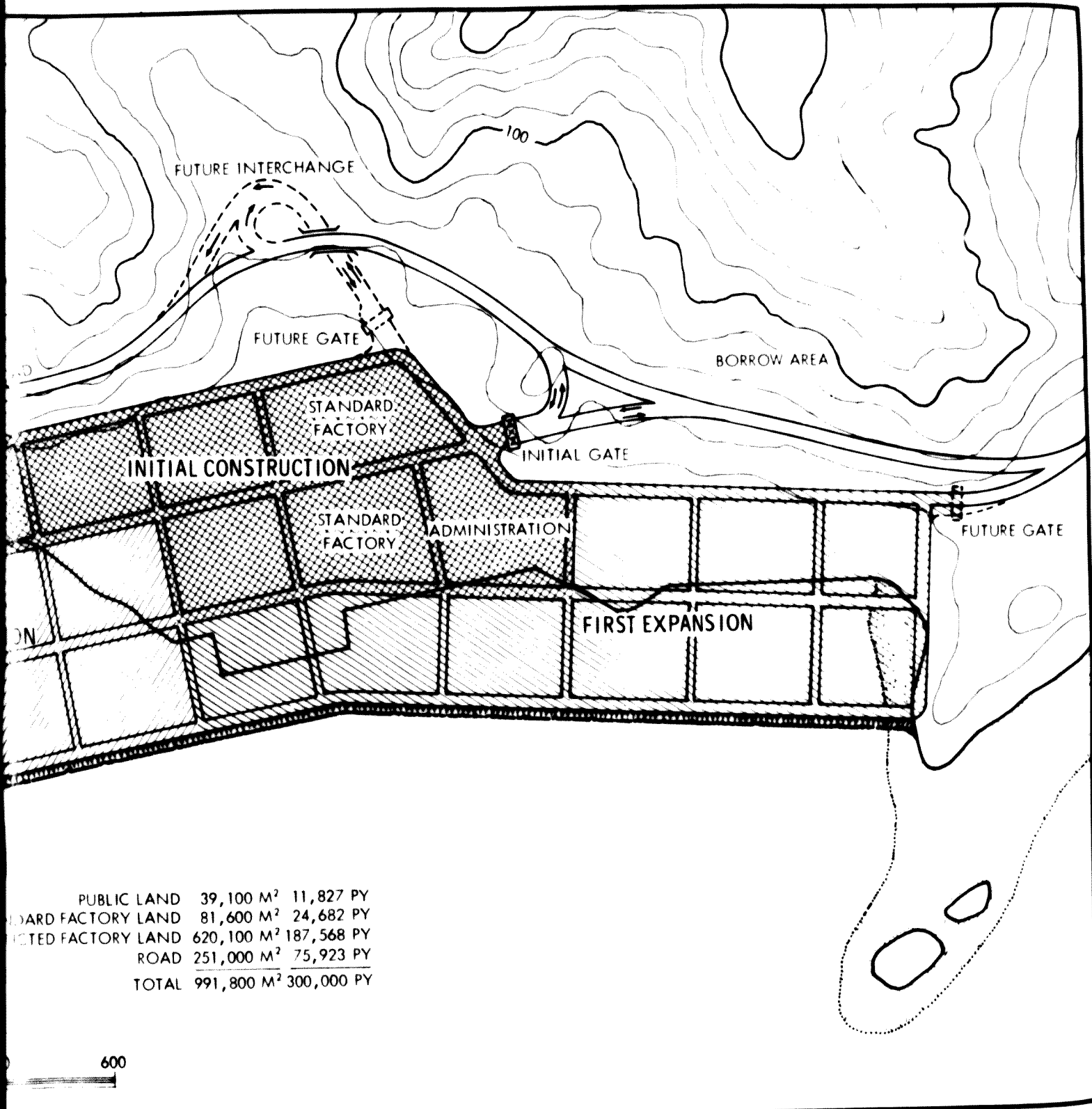
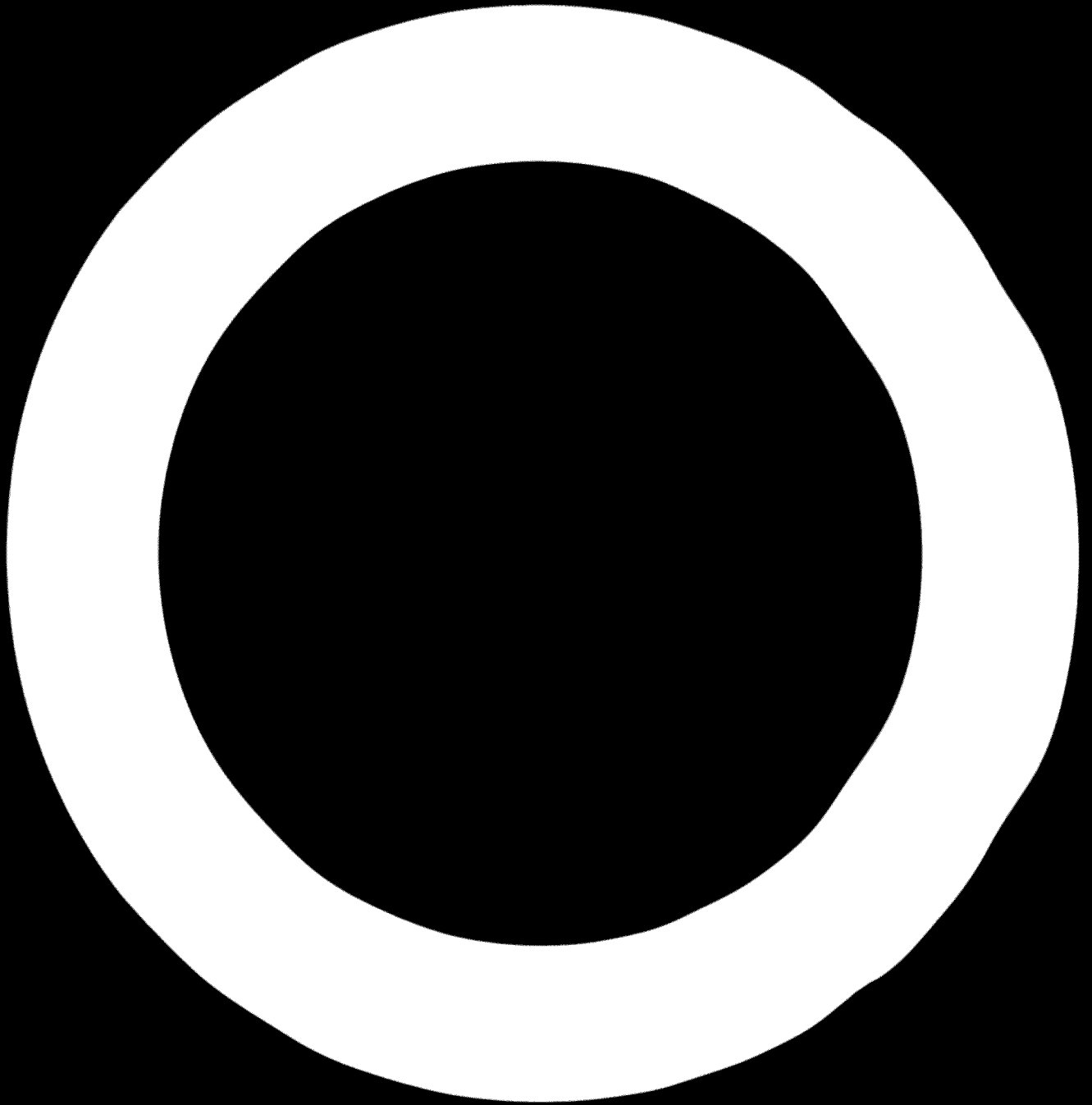


Figure A-3. Shin Wol Dong, Yosu Site

SECTION 2



The future gate shown on the second expansion will facilitate traffic flow to the north and away from Yosu city proper which will be congested as the city increases in size.

The initial construction site is on firm, relatively level land. As this area is being developed, fill material from the borrow area adjacent to the first expansion can be utilized to reclaim the tidal flats to the right of the old seaplane ramp. (See Figure A-4.) Likewise, the second expansion area can be filled while the first expansion area is being developed. Not shown are the additional building sites that can be developed in the borrow areas.

A.2 CAPITAL COST

Table A-2 shows the capital development costs of Yosu in comparison with MAFEZ Sections II and III. The two major variables in the table are the estimated land purchase price for MAFEZ and the water system cost for Yosu. The Yosu water system cost was estimated on the basis of 15,000 T/D at 384 million won by ratio with the 125,000 T/D expansion plan which is estimated to cost 3.2 billion won. An additional 115 million won is included for site distribution costs, for a site total of 499 million won. On inspection, the grand total shows the investment costs for either site to be comparable, so the decision to expand must be based on factors other than capital improvement costs.

Transportation costs from Yosu to Pusan will be higher than from Masan to Pusan, although the additional driving time will be only about two hours when the expressway is completed.

A.3 COMPARISON BETWEEN THE YOSU SITE AND MAFEZ

As indicated, the land cost for developing the Yosu site will closely approximate the costs required to develop Section II and III at MAFEZ.



Figure A-4. Proposed Yosu Site Photos

Table A-2

**SITE DEVELOPMENT AND IMPROVEMENT COSTS BY YEAR AND TOTAL
PROPOSED YOSU FREE EXPORT ZONE**

Unit 1000 Won

	Yosu (100,000 pyong)				Section II and III at MAFF (100,000 pyong)
	1972	1973	1974	Total	Total
SITE					
Land Purchase					700,000
Access Road					
Bridge					
Site Formation	160,000	160,000	160,000	480,000	690,000
Road Pavement	200,000	200,000	152,200	552,200	428,000
Drainage	39,100	30,000	30,000	99,100	130,000
Waterway Dike		125,000	125,000	250,000	50,000
Embankment					180,000
Temporary Water Supply	9,000			9,000	
Site Subtotal	408,100	515,000	467,200	1,390,300	2,747,000
IMPROVEMENTS					
Water System (15,000 T/D)	384,000	97,500	17,700	499,200	292,000
Lighting and Power (10,000 kw)	9,280	72,000	57,440	138,720	130,000
Engineering Design (same as Section II and III)	50,000			50,000	50,000
Warehouse (same as Section II and III)			57,120	57,120	57,120
Public Facilities (Administration) (same as Section I)	253,714	60,144		313,858	180,128
Attached Facilities (Fence, etc.) (same as Section I)	111,724	40,000		151,724	242,758
Staff Apartment (same as Section I)	73,916			73,916	
Dormitory (same as Section I)	235,000			235,000	
Foreigners Apartments (same as Section II and III)	250,000		150,000	400,000	400,000
Office Expenses during Construction (same as Section II and III)	24,000			24,000	24,000
State Fund Support (same as Section II and III)	160,000			160,000	160,000
Administration Budget (same as Section II and III)		198,400	198,400	396,800	396,800
Installation Contingency Fund		46,300		46,300	46,300
Communications	78,200			78,200	78,200
Improvement Subtotal	1,636,494	520,344	480,600	2,637,438	2,069,900
TOTAL	2,044,594	1,035,344	947,800	4,027,732	4,816,900
Standard Factory (4)	297,501	1,116,000		1,413,501	1,413,501
Off Site Road Improvement (allowance)	430,000			430,000	
	2,772,095	2,151,344	947,800	5,871,299	6,230,407

However, there are some important cost considerations that must be incurred by the firms locating there. These are:

- The buildings constructed on the site will cost less, since less foundation work will be required compared to the filled land at MAFEZ.
- Many products from factories, especially those that are containerizable will probably be trucked to Pusan for shipment. This means an added transportation cost compared to the same goods being shipped from MAFEZ.

Another cost consideration is that utilities and streets will be easier to maintain at Yosu, since there will be only a small amount of filled land.

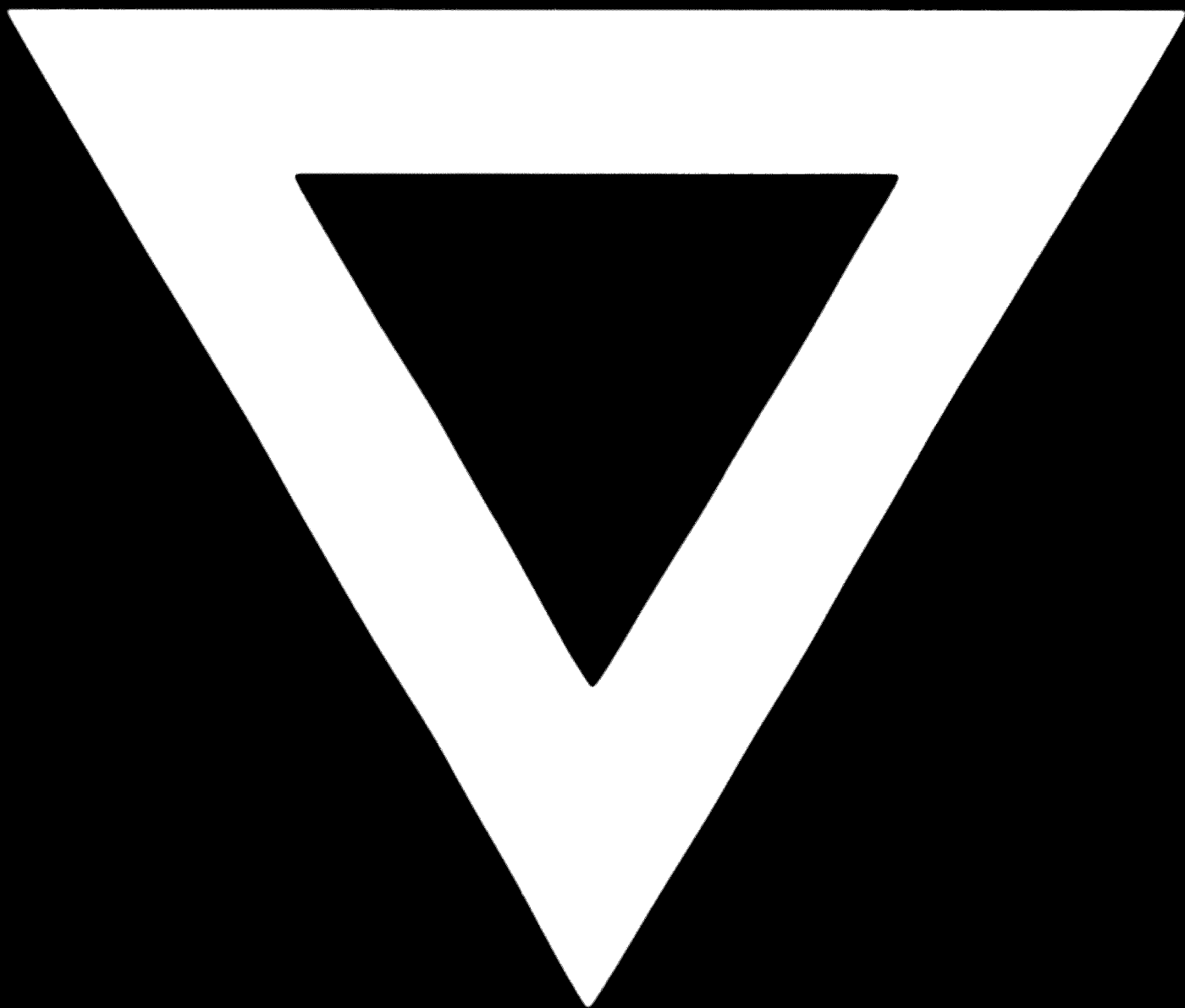
The population in Yosu and the surrounding region is smaller than in Masan. A rapid buildup of industries would soon absorb the existing labor force and workers would have to be imported. This would require a large investment in infrastructure also.

A.4 ORGANIZATION

It is recommended elsewhere that all free export zones be administered under a single program. This would offer the following advantages:

- The entire program would be in strong hands and could be coordinated.
- Both sites could be used to implement national policies toward exports and trade.
- The administration would be able to offer a wider variety of sites. For example, a firm with heavy machinery might prefer Yosu because of the land characteristics, while another firm might prefer the wider variety of community services available at MAFEZ.
- The development rate of both sites would be controlled to correspond to national goals for decentralization, for respective community growth rates, and for infrastructure investment.

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