

WASC 2292

S. Site Planning
Committee

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EXPLOSIVES RESEARCH AND DEVELOPMENT ESTABLISHMENT

SOUTH SITE PLANNING COMMITTEE

REPORT ON THE SOUTH SITE PLAN

PREAMBLE.

In connection with the utilisation of the South Site, E.R.D.E., Waltham Abbey, the Chief Superintendent appointed a committee in April 1950 with the following terms of reference.

- (i) To submit to him a plan in detail of the proposed development on the South (Quinton) Site.
- (ii) To co-ordinate the disposal or rehabilitation of existing buildings and the provision of new buildings and facilities.
- (iii) To co-ordinate the disposal or rehousing of existing stores not in service.

In interpreting these terms of reference certain principles, laid down by C.S., E.R.D.E. were taken into account. These were:-

- (a) Research laboratories should as a rule be located on the North (Hoppit) Site: larger scale development on the South Site.
- (b) The administrative centre will remain located near the present position at the North Site.
- (c) Any facility which exists on both sites should be integrated with a single control at one or other.
- (d) Facilities should be planned on an adequate but realistic scale.
- (e) Use must be made of existing buildings where suitable.

After E.R.D.E., had taken over the site of the Royal Gunpowder Factory at Waltham Abbey, development of facilities was in the hands of a Planning Officer and his Staff. A scheme to accommodate the work was drawn up, covering both the North and the South Sites, and initial stages had already been implemented by the time the Planning Section ceased to exist in 1950, and the Committee was formed.

The Committee found no reason to depart radically from this scheme. Its main work has, therefore, been to harmonise the requirements of the various fields of work and to present them in a comprehensive and detailed form.

The proposed utilisation of the site has been displayed on a map (B.W.D. 62/51) which the following pages are intended to amplify and explain.

The Committee has given some attention to items (ii) and (iii) of the terms of reference and has become aware of the large amount of work undertaken by the previous Planning Section in conjunction with the Safety Officer, in decontaminating and clearing the site. The R.G.P.F. had been vacated as it stood and also has been used as a transit store for stores and plant seized from enemy countries. The Establishment staff is still engaged on disposing of unwanted material arising from these causes, but these activities are not reported further in this document.

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INTRODUCTION

During the 1939/45 war the manufacturing activities of the Royal Gunpowder Factory were transferred to more modern factories and in 1945 some sections of the Armament Research Department were transferred to the site of the old factory at Waltham Abbey and became the Chemical Research and Development Department. In 1946 the I.S.R.G. was transferred from P.S.E.S., at Stevenage and given accommodation in the south-west corner of the South Site. In 1947/48 the activities of the C.R.D.D. clarified and it was renamed Explosive Research and Development Establishment having its headquarters in the offices of the R.G.P.F.

The Royal Gunpowder Factory had been developed from the original Gunpowder Mills situated on the banks of the River Lee near the town of Waltham Abbey. During its development, it acquired lands to the North and South. The South area with which this report is concerned, includes Quinton Hill, Cob Field and Cob Mead. This area of approximately 250 acres lies between Sewardstone Road on the East, River Lee on the West with Cobbins Brook as its Northern boundary.

The site divides itself into two distinct regions. The eastern half is entirely a clay structure and includes Quinton Hill and the western half is marsh land consisting of deposited top soil and peat on a bed of water-bearing ballast. The transport requirements of the R.G.P.F. caused the latter to be made into a series of islands by cutting canals eastwards from the river and joining the canals at the eastern ends. On the islands so formed were erected buildings for the stoving of cordite, and these were termed "waterstoves".

A corridor of land connects the South Site to the North Site. This corridor runs from Frog Island along the east bank of the River Lee past the Lower Islands to the Refinery Gate on Highbridge Street. This land is not included in the South Site Plan.

It is interesting to note that the land which adjoins the boundaries of the South Site has affected the planning in various ways. The land to the north of Cobbins Brook is partly common land and partly an industrial development area. It is understood that a trunk road is to be driven across this land in an east-west direction; this may limit the explosives safety distances and affect the explosives development near the northern boundary of the site. Development along this boundary so far has been in non-explosives processes and services.

To the east of the South Site lies the Sewardstone Road (A.121) and beyond it a housing estate, separated from it by some farm land. The farm house, Quinton House, is on the road and represents the nearest building to the east boundary of the South Site.

The western boundary on the site is partly on the western bank of the River Lee and to the south is a common boundary with R.S.A.F.

On its southern boundary the site adjoins farm land and old gravel workings now used by the British Electricity Authority (Brimsdown Power Station) as a sludge disposal area. The farm land has been purchased by the Establishment to accommodate 'outside safety' distances of buildings to be used for explosives processes.

The Plan consists of a map Ref. B.W.D.62/51 of the South Site as it is intended to be developed together with this report commenting on the proposals and containing, for comparison a reduced map of the lay-out of the Site as taken over from R.G.P.F., and a number of sketch maps showing particular details of the plan, such as main services. In this plan the site has been divided into a number of "work areas" which are defined on the map. Reading anti-clockwise

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from the S.E. corner they are:-

- | | | |
|-----|---------------------------------------|--|
| (a) | Plastic Propellant Area..... | Coloured Pink. |
| (b) | Cordite Area..... | Coloured Green. |
| (c) | C.D.B. Area..... | Coloured Blue. |
| (d) | Nitric Esters Area..... | Coloured Brown, hatched. |
| (e) | R.D.X. Area..... | Coloured Brown with dark edging. |
| (f) | Acids Area..... | Coloured Brown, north of
"Guncotton Rd." |
| (g) | Utilities Area..... | Uncoloured, but buildings
coloured according to their
use. |
| (h) | Process and Plant Development Area... | Coloured Brown. |
| (j) | Magazine Area..... | Area and Buildings left
uncoloured. |
| (k) | Climatic Testing Area..... | Coloured Grey. |
| (l) | I.S.R.G. Area..... | Coloured Yellow. |

Administrative, Stores and Welfare Buildings are coloured Red, and Engineering Services buildings Mauve. These occur mainly in the Utilities Area, where there are also some Process and Plant Development Laboratories, coloured Brown, where the operations do not call for mounded buildings.

The Areas coloured Pink, Green, Blue and Grey are under the supervision of S.P.R.I. S.E.I. and S.C.E. have joint interests in the Areas and buildings coloured Brown, and the I.S.R.G., is under the technical supervision of the Superintendent I.S.R.G. The General Magazine Area will be supervised by the Safety Officer.

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FACILITIES FOR RESEARCH AND DEVELOPMENT SECTIONS

These facilities are outlined below in the order of "work areas" given in the previous section.

(a) Plastic Propellant Area.

The Plastic Propellant Area (coloured pink on the map) is a strip of land in the eastern half of the site lying to the south of the I.S.R.G. road. It also includes an adjacent area in the western half containing four mounded buildings.

The area is to be devoted to making plastic propellants for rockets, etc., and filling rockets with them. Two units are to be accommodated, a small-scale unit limited to filling rockets of 6" diameter or less and the other for rockets up to a diameter of about 18". Each unit will prepare its own propellant.

The smaller unit will be housed in one building, but the larger one requires a range of buildings with suitable safety distances between them. The raw materials are held in building P.719 from which they pass to P.723 which is devoted to mixing, incorporation, etc. In P.724 the resulting charge is loaded into rocket bodies.

Use is being made of every existing building on the site. Five new buildings are being erected for Temperature Conditioning, Proof Stand, Pug-extrusion, Powder drying and Shift House.

As the outside safety distances from the explosive buildings extend beyond the confines of the site, a plot of ground to the south has been bought. It is not planned to bring the new plot inside the security fence at present; It will continue to be used as agricultural land.

The only new road required is a spur connecting the raw materials store (Building P.719) to the I.S.R.G. road. A system of paths has been planned connecting the buildings to one another and to the I.S.R.G. road.

(b) The Cordite Area.

The Cordite Area (coloured green on the map) occupies a site immediately to the north of the Plastic Propellant Area, lying between the I.S.R.G. road and the Black Ditch and includes some of the original "water stove" area.

The area will include two buildings which will be re-erected on the southern slope of Quinton Hill (in the C.D.B. area); these are so situated that they can be supplied with experimental nitric esters directly from the Nitric Esters Area or nitroglycerine from the extraction plant in the C.D.B. area.

The purpose of the installation in the Cordite Area is to study the problems of production of cordites in all sizes normally manufactured. Therefore, the equipment to be installed is adequate to produce fairly large sizes of cordite but only in experimental quantities.

Two plants are to be installed, one being a small-scale, self-contained unit. The other is to be accommodated in a number of buildings in the eastern half of the area so that the solventless, the semi-solvent or the solvent techniques can be used as required. It will not be easy to fit the processes into the existing buildings which do not lend themselves to convenient layout; this can be tolerated in view of the small output. Some new buildings are required for the small self-contained unit.

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The buildings in the water stove area are to be used for preparation and storage of raw materials, and for experimental processing of small-arms propellants. For the transfer of these materials to the eastern half of the area, a service road is to be built passing under the main north-south road. This service road is to join the ring-road in the eastern half of the area.

New shift houses for male and female process workers in the Cordite and C.D.B. areas are placed in this area near No.2 Gate.

(c) The C.D.B. Area.

The C.D.B. area (coloured blue on the map) lies to the north of the Cordite area but does not extend into the western half of the Site. Its northern boundary is nearly at the crest of Quinton Hill.

It will be devoted to extending the C.D.B. process to forming larger propellant charges than have been possible on the present plant situated on the North Site, but which will be transferred to the C.D.B. area (N.567).

The layout of the large plant has been based on the production of charges up to nine feet long and 24 inches in diameter.

A simplified version of the process layout is as follows. "Containers" are made in N.563 whence they are sent to N.550 for filling with powder from Store N.554. The filled containers are taken to N.556 for vacuum impregnation, after which they are allowed to cure in N.553 for several days before returning to N.550 for dismantling. The charge is trimmed, finished and inspected in N.569 and N.572.

In addition to the two manufacturing plants, there are required offices and laboratories for process control and inspection N.562. Storage is to be provided for raw materials N.568 and facilities provided for storing, loading and despatching the finished charges (N.574).

The greatest possible use has been made of existing buildings. Those structures in the area which have been found to be unsound or unserviceable are to be demolished before the area is given over to explosives work.

A new road is to be driven through the area from the No.2 (or I.C.I.) Gate to the central North-south road. Its route has been planned to give the best benefit to the process.

(d) The Nitric Esters Area.

This area (coloured brown and hatched) is a small one lying to the north of the C.D.B. area, and takes advantage of the south slope of Quinton Hill. This was the site of a nitroglycerine plant in the latter part of the 19th century, but there was an explosion in 1894, and the site and buildings have since been abandoned. It is planned to demolish the remains of the old buildings and to erect a series of buildings to form a unit capable of small-scale manufacture of a variety of experimental Nitric Esters.

It is anticipated that much of the output will be used in the Cordite area and, therefore, the two buildings (N.548 and N.549) will be reconstructed and allocated to the Cordite section to receive the nitric esters for their use. If it is found necessary to supply the C.D.B. area with nitric esters the present plan will allow of it.

No new roads are required but the area will be served by paths.

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(e) The R.D.X. Area.

The R.D.X. area (coloured brown with dark brown edging) lies to the north of the C.D.B. area and occupies the northern slope of Quinton Hill as far as Guncotton Road.

The area was specially laid out in 1938/39 for the preparation of R.D.X. and incorporation of R.D.X./T.N.T. All the buildings are designed for their present purposes. They are connected together and to Guncotton Road by an adequate system of tarmac paths.

(f) The Acids Area.

The Acids area comprises the eastern part of the narrow strip of land between Guncotton Road and Cobbins Brook. It accommodates a Nitric Acid Concentration Plant at G.445, 447 and 448 and a Sulphuric Acid Concentration Plant in buildings G.443 and 441. Eventually the latter will be demolished.

The purpose of the plants in the Acids area is to concentrate and supply suitable sulphuric and nitric acids to the Experimental Plants. The area also accommodates one of the plants to be mentioned in the next section.

(g) Utilities Area - Laboratory and Pilot Plant Buildings.

This area lies around the centre of the north edge of the site where there are many buildings previously used for the manufacture of Guncotton. Of these N.500 and G.421 are already in use as chemical and semi-technical laboratories, the latter having been converted recently for S.E.I. Branch, G.418 houses pilot plants, and after repairs, will be available for further pilot plants. It is planned to convert G.E.417 and G.430 for future use, a Chemical Engineering Laboratory for S.C.E. Branch being included in the plans.

Building G.443, which lies in the Acids Area, also houses a pilot plant rightly belonging to this area. On the other hand the area also accommodates a number of the ancillary services described in the next section of the report. There remain a few buildings which are unfit for use and these will be demolished, as will some of the temporary buildings now being used by the laboratory staff until the conversion of permanent buildings.

New shift houses for S.E.I./S.C.E., process workers, male and female, will be built east of the Canteen.

(h) Process and Plant Development Area.

This area is coloured brown on the map and lies in the western half of the site to the south of the extension of Guncotton Road, together with a small adjoining area stretching eastwards to the Nitric Esters Area. The southern boundary of this western area is the Black Ditch. It is a thickly wooded area which will not lend itself easily to building development, part of it being intersected by old effluent settling ditches. It is proposed to provide a number of mounded process buildings in it for pilot or large-scale trials of explosives manufacturing processes and plant which require explosive safety conditions.

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Some such buildings exist, most of them requiring repair; and four future buildings are shown on the map, lying each side of a new east-west road which will be driven across the area to open it up and give access of Frog Island, part of which will become a decontamination and burning ground. A large but shallow concrete pond, used at one time as a condenser condenser water cooling pond, is situated in the area. Among the present buildings in this area are many of a temporary nature and these will be demolished

If the Initiator Manufacturing Group is to be accommodated in Waltham Abbey it will be situated in the north-west of this area.

(j) General Magazine Area.

The area and buildings tentatively allotted for General Magazines are left uncoloured on the map, and lie around the middle of the western edge of the site.

The policy for storage of explosives has been that each Work Area would have enough local storage capacity for a week's working. The general Magazine Area is required to hold larger quantities both of manufactured products awaiting despatch and of explosive materials awaiting processing.

For magazines it is proposed to use some of the 44 Water Stoves which are built in 8 streets. They are surrounded on three sides by mounds formed by taking earth from adjacent areas and this has left the land between the Stoves uneven and swampy.

The canals will be filled in and a new system of paths made to serve the buildings. When the main road system is complete, the western limb of the ring-road will pass from north to south through the Magazine Area. It is not proposed to install main drainage facilities in this area.

(k) Climatic Testing Area.

This area (coloured Grey on the map) lies to the south of the General Magazine Area.

In buildings in this area it is proposed to carry out trials on long-term storage of explosives and propellants under hot and cold conditions, with facilities for testing and examining samples after storage. The immediate requirements are for two climatic huts, a breakdown and inspection laboratory and a rough-usage area which will be accommodated on the sites of 4 existing water stoves.

If further Climatic Huts become necessary on the South Site at Waltham Abbey, they would be placed in part of the General Magazine Area.

(l) I. S. R. G. Area.

This area (coloured yellow on the map) accommodates the Inter Services Research Group in the extreme southwest area of the site. It is a self-contained section devoted to research, development, storage and issue of special equipment.

It is divided into three parts devoted to: -

- (a) laboratory and development work
- (b) storage of explosive equipment
- (c) storage and packing of inert equipment.

All All the buildings in the area are already in use and it is anticipated that no new buildings will be required under present conditions. The buildings are being rehabilitated under a Ministry of Works Project.

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ACCOMMODATION FOR ANCILLARY SECTIONS

The ancillary sections are those which exist to provide the Research and Development Sections with facilities or services. Some ancillary sections deal directly with the practical requirements of the Research and Development Sections as for example the Engineering Workshops, the Stores, the Building Works Yard and the Decontamination and Burning Ground. Others deal with welfare of staff, e.g., Surgery, Canteen, Shift Houses, etc., and yet others with the running and security of the Establishment, e.g., Clerical services, clocking stations, and police section houses.

As far as possible the policy has been followed of centralising ancillary services where they are easily accessible from the proposed road system.

(a) The Engineering Workshops.

These workshops are to be concentrated at the old Power House (GE.403) which itself is to be converted into a modern machine-shop. An annexe is to be added to house Electricians, Chemical Plumbers, Welders, etc., and the building will include offices for Engineering Staff and Foremen, and changing and washing accommodation for the tradesmen concerned.

(b) B.W.D. Workshops.

The B.W.D. area, including new carpenters' shop, etc., will be adjacent to the Engineering Workshop area, as part of the general concentration of ancillary services. Changing and washing facilities will be provided locally. The present Building Works' area which consists mainly of temporary buildings will be vacated and the buildings demolished.

(c) Stores.

A central storage site is planned around Building G.431 (coloured red on the map) with a ground floor and first floor for lighter stores and bays to north and west for heavier stores and plant. In the same area new buildings will be provided for an Acid Store, and a Solvent Store. An existing derelict building G.422 to the west will be demolished, making an area available for access to G.417 and G.423 and for outside storage or future buildings if required. The existing two-storcyed machine shop (GE.432) will be available for stores use when the new machine shop is established. G.423 is also available for re-conditioning and use.

The site for the Stores has been chosen to give easy access from the public road, and the proposed internal roads to the rest of the site; it allows space for handling lorry traffic.

It is Stores' policy to accommodate bulk raw (non explosive) materials in the locality where they are to be used, and no provision is made at central Stores for storage of these materials. Cloakrooms for Stores' Staff will be provided in the Stores buildings.

(d) Decontamination and Burning Ground.

An area has been allocated for the destruction of waste explosive and the cleansing of plant contaminated with explosives. This area will be situated on Frog Island which lies off the north-west side of the site. It will require road access to be carried over the arm of the river separating Frog Island from the rest of the South Site.

It is planned to use the existing buildings which used to constitute No. 9 Boilerhouse and which are now empty. (M.319).

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(e) Welfare.

The existing Canteen, in the Utilities Area will be modernised to give accommodation for industrials in one dining hall and non-industrials in the other. The Canteen will accommodate 340 industrials and 140 non-industrials in two sittings, and will be provided with a reading room for non-industrials.

Accommodation for tea breaks will be made within each Section. The Canteen will supply food and drink for tea breaks to the place allotted in a Section.

In general, lavatory accommodation will be provided as required for male and female workers in the vicinity of places or work. In addition, public conveniences will be provided at points along the main roads. Final siting is deferred pending the receipt of M. of W's sewerage proposals.

As the area is so extensive it is not practical to centralise shift accommodation. Separate Shift accommodation is to be provided near the place of work and has been included in the plans for the Plastic Propellant, Cordite and C.D.B. areas, for the S.E.I./S.C.B. Laboratory and Development Areas and for the new Engineering Workshops, B.W.D. Workshops and Boiler House.

(f) Medical Facilities.

These facilities have been agreed with the P.M.O.

A new Surgery Building will be provided near No.2 Gate. In this position it will be central for the site as a whole, and, at the same time, will be convenient for access from the North Site by Public road. This surgery will be the Headquarters of the Medical Officer for the whole Establishment and will provide for medical inspection, first-aid treatment, X-ray and resuscitation. The motor ambulance will be stationed at the Fire Station.

First-aid points, accessible to the motor ambulance are to be provided in each work-area. They will be equipped with first-aid kits and stretchers, and be in the charge of a trained man working nearby. Gas masks and compressed air breathing apparatus will be available at those points where they are likely to be required.

(g) Police.

Modern police houses will be provided adjacent to both gates (Gates 1 and 2) complete with search facilities. Six or seven police call boxes will be provided, mainly around the boundaries, for the use of policemen on patrol. A patrol path will be provided inside the new perimeter fence.

(h) Fire Precautions.

A modern and larger Establishment fire station than that which exists on the North Site is required. It has been decided to serve both sites from one fire station, but its location has not been decided. A suitable site would be on the South Site near No.2 Gate and the main Surgery. The motor ambulance will be based on the fire station. It is proposed to provide two high vantage points on the site, P.711 in Cordite Section, and at the water tower in the R.D.X. area to enable a watch to be kept over a large area.

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The site is already provided with a system of fire hydrants fed from the M.W.B. main network and accessible from the paths used by the permanent fire brigade. This system will be augmented, and a final plan showing water mains and hydrants will be provided by M. of W. in due course. Next to most hydrants will be hose boxes containing hoses and nozzles. Most buildings will be provided with stand-pipe with hose connection for first-aid fire fighting. These are intended for local use.

In addition sprinkler, drenching or foam appliances will be provided locally where there are special fire hazards.

No extension of the Merryweather alarm system is planned, and it is intended that alarms of fire should be given on the automatic telephone system. Trained auxiliary fire squads will be based at suitable points and there will be installed means to rally them to their rendezvous.

(j) Administrative and Clerical Services, Sub-Library.

It is recommended that a typing pool be provided on the site and a branch-library equipped with its own copies of the more used standard reference books and provided for a limited time with certain current periodicals. It is suggested that the typing services and sub-library be located in the two storeyed building N.505 which can be made suitable for this purpose. In addition, this building will provide occasional office accommodation for "visiting" senior staff, a reception room and a small conference room, female staff rest room and messenger's room.

The main notice board (non-industrial) for the South Site will be located in the sub-library.

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DISTRIBUTED SERVICES

(a) Roads and Haulage.

It has been agreed as a policy that the existing light rail transport system will be replaced with a road and path system. The site will be opened up with a main road network, in general 15' to 18' wide, and paths serving individual buildings 6' to 9' wide. The existing canals to the west of the site will be filled up.

The entrances from the public road will be altered to conform to the Ministry of Transport standards. Transfer of goods from public road vehicles to internal trucks will be arranged at loading bases as necessary on the site.

Transport inside the factory will be by electric or motor-driven dillies and tractors capable of being driven on the paths.

Truck maintenance will be under the charge of Engineering Section and battery charging stations will be provided locally, one in the C.D.B. area and another in the Engineering area.

Sodium lighting is being adopted on all main roads and paths will be lit as necessary.

(b) Rail Access.

Connection to the British Railways system is through the sidings of the Royal Small Arms Factory using the existing spur at the "Acetone Bank" on the western edge of the site. It is recommended that this rail-head should be retained and Royal Small Arms Factory be asked to maintain the line through their factory in good condition. Means will be provided for off-loading from railway wagons on to internal road transport, or to barge transport on the river.

(c) Waterways.

The River Lee flows down the western boundary and the tributary Cobbins Brook forms the northern boundary of the site. The tributary called Black Ditch flows from east to west through the centre of the site. The Establishment has the responsibility of maintaining these last two waterways as storm water channels and it may be desirable to navigate them. The River Lee is navigable in both directions and can be used to gain access to the North Site or the Woolwich.

The canal system on the western side of the site, which served the old water stoves, will be filled in.

(d) Steam Service and Boiler House.

Of the original four Boiler Houses taken over from the Royal Gunpowder Factory, three were scrapped and distribution now takes place from Building GE.400.

The installation consists of three pairs of Babcock & Wilcox water tube boilers. Each pair has a capacity of 18,000 lb. of steam per hour at 120 lb./sq.inch maximum pressure.

Water is drawn from the river to supply the boilers. At present it is piped to a well and hence to the pond in the Process and Plant Development Area. From there it is pumped to the water treatment installation feed well. The pond used to be a

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spray cooling pond for condenser water from the old power station, but now that power is no longer generated, the pond temporarily serves as a boiler feed water reservoir and settling tank. Ultimately the water will be taken directly from the river or, when necessary, from the M.W.B. supply and the pond will be drained and filled in.

The raw water is treated by a lime-soda installation next to the Boiler House and the treated water is stored in a well from which it is fed into the boilers. No condensate is returned to the boiler from the external steam distribution system.

There are three distribution mains, one serving buildings to the east of the boiler-house, one serving the section to the south east, and one going due south and serving the western half of the site. (Fig.3). The main supplying the south east is being relaid under the development scheme to serve the C.D.B., Cordite and Plastics Propellants Areas.

The greatest part of the steam load is for space heating of buildings. There are considerable losses in the distribution pipes, the aggregate length of which is many miles.

Because the Boiler-house must be continuously manned, a new Cloak room and mess room for stokers will be built in the Boiler-house.

(e) Electricity.

A large portion of the site is still fed with direct current from rotary converters in building GE.403 adjoining the Boiler-house. It is planned to replace all the direct current systems and to use alternating current purchased from the Eastern Electricity Board. The change is already partly made.

The main feeder comes into the site from the Electricity Board's sub-station near Highbridge Street via Lower Islands. The feeder is designed to supply 3,000 K.V.A. at 11,000 volts. It feeds the Transformer House - Building G.429 at the north of the Site.

A ring main will be installed running through C.D.B. Cordite and Plastic Propellant areas down to I.S.R.G., and returning through the Climatic Hut and Process and Plant Development Areas. The layout is shown in Fig.4. This ring main is designed to feed four, and later perhaps five sub-stations from which distribution to the various buildings will take place at low voltage. A three-phase 4-wire system will be used giving 415 volts three-phase and 240 volts single-phase. These voltages are standard throughout the whole Establishment. Some of the low tension supply is already installed on posts as an overhead system, but it is proposed that the future policy will involve underground distribution to individual buildings.

There is a low tension supply at present from the Royal Small Arms Factory feeding I.S.R.G. area. This will be discontinued when the high tension supply to the sub-station for the I.S.R.G. area is connected up.

(f) Water.

Water is brought from the Metropolitan Water Board main in Sewardstone Road. There are two feeders of 4" diameter, one adjacent to each gate. It is planned to provide also a third feeder at the extreme south east corner of the Plastic Propellant Area. The sources of the water are Ramney Marsh, Lee Road or Cheshunt pumping stations.

The whole site is covered with a network of mains, as shown in Fig. 5. There is a supply connection to the Royal Small Arms Factory, Enfield, at the extreme wouth west corner.

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In addition to the M.W.B. water system there is an untreated water supply pumped from wells which are fed from the River Lee near Frog Island, to a reservoir of 100,000 gallon capacity on the top of the Quinton Hill. Mains exist to supply water from this reservoir to a number of buildings. The reservoir can alternatively be fed from the M.W.B. mains. There is also a 10,000 gallon elevated tank - N.541 which originally supplied untreated water to the N.G. plant and may still be used for R.D.X., and the future Nitric Esters Plant.

(g) Gas.

Town gas is drawn from the main in Sewardstone Road and enters the site through two 4" mains adjacent to the two gates. There is also a supply from the Royal Small Arms Factory into the I.S.R.G. area (Fig. 6).

At the Guncotton gate a booster is installed to increase to about 4 feet of water the pressure of the gas in the main supplying the northern parts of the site.

The layout of the gas mains is that laid down in the old R.G.P.F. days, and although some were renewed in 1910 recent investigations have shown that the existing mains are probably very faulty and complete replanning and relaying is recommended.

It is not anticipated that there will be a big demand for gas; the new demand is mainly to serve laboratories.

(h) Compressed Air.

At present compressed air is fed to a limited number of buildings from compressors in the old Power House - GE.403. These will be dismantled when the Power House is taken over as a machine shop. The policy is not to provide compressed air service over a large area but to install a number of small interchangeable motor-driven compressors at certain points on the site to serve local demands.

(j) Refrigeration.

This is not to be a general service. There is a brine plant (200,000 B.T.U/hr.) giving refrigerated brine in G.428 which serves the R.D.X. plant and is also tapped for use in the Pilot Plant building G.418. All other refrigeration required will be provided as required by local units.

(k) Telephones and Public Address System.

The telephone system will be through a 500-line Automatic Exchange to be situated on the North Site. It is anticipated that there will be a considerable increase in demand for telephones and a survey is being made of the number of extensions necessary.

It is proposed that a Public Address system be installed.

(l) Drainage and Sewerage.

The R.G.P.F. was not connected to the local sewerage system. This resulted in there being no sewerage system installed to serve individual buildings.

A plan has been prepared to bring sewerage services to the various areas in a progressive manner (Fig.7). It is not possible for every area to be served, as those areas close to the River Lee would involve a disproportionate cost.

/Drainage

SECRET

Drainage from the areas south of Quinton Hill will be collected at the No. 2 Gate and passed eastward to the public sewer; that from the areas north of the Hill will be passed northward across Cobbins Brook to the public sewer. It will be necessary to provide pumping stations to pump sewage to these outlets from the more westerly regions served.

Surface drainage from the paved sections of the Utilities Area will be collected and discharged to the waterways.

(m) Chemical effluent.

In the area of the Chemical Engineering Laboratory and Pilot Plant houses provision will be made for treating chemical effluents before discharge.

Special arrangements are provided in the Nitric Esters' and C.D.B. areas for disposing of wash water through settling tanks to a pond where residual explosives can be detonated.

(n) Laundry.

It is not proposed to provide a laundry in the first instance. Arrangements are in hand for having all laundry work done at Woolwich.

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MISCELLANEOUS.

(a) Fences and Entrances.

It is proposed to enclose the whole site except Frog Island with an 8' security fence. The southern area of Frog Island will be surrounded by a danger fence for the burning and decontamination ground.

On the east of the site there will be two entrances from the Sewardstone Road. No.1 Gate, will occupy the position of the present Guncotton Gate. No. 2 Gate, will be a new one about 60 yards south of the present "I.C.I." Gate. Both Gates will be set back 55' from the verge of the Sewardstone Road and given adequate clear view in each direction to conform with the Ministry of Transport Standards.

No. 3 Gate in the North west corner of the site will give access to the present path through the Lower Islands to the North Site. It is hoped that this path will be enlarged later on to give road access to the North Site.

No. 4 Gate will give access to Frog Island.

No. 5 Gate will provide standard gauge rail access to the sidings in Royal Small Arms Factory, Enfield.

No. 6 Gate is a wicket gate at the extreme south west corner of the I.S.R.G. area which connects with Royal Small Arms Factory, Enfield, and is used for the purpose of police patrol.

A water gate will be provided at the extreme western end of the Black Ditch to allow navigation from the River Lee.

Only Nos. 1 and 2 Gates are likely to be permanently manned by the police.

The old Cordite and Quinton Gates will be abandoned.

(b) Estate Management.

Proposals have been drawn up by the Sub-Committee on Estate Matters to enable the estate to be run with a minimum of labour, i.e., the maximum amount of open ground should be evenly graded so that it is capable of being kept in order by mowing machines.

A large number of trees were condemned by the Essex County Council because of disease and these have been removed. Every effort will be made to keep good trees but those which are dangerous or unsuitable will be removed. An afforestation scheme will be adopted to provide sufficient trees to maintain screening, wind-break, blast-break, soil conservation and amenity. This cannot be achieved quickly and it is desired that the plan should be followed progressively as each area is dealt with by the M. of W.

(c) Civil Defence.

The plans for Civil Defence of the area have not yet been put forward. In the meantime no existing Civil Defence building is being demolished.

The only buildings of any significance available are No.516 near the Canteen and R.600 adjoining the north-south road just south of the Black Ditch.

/(d)

SECRET

(d) Note on Contraband Areas.

The whole area is subject to contraband regulations with the exception of certain buildings in the I.S.R.G. area and the two areas immediately adjacent to Nos. 1 and 2 Gates, including the Surgery.

A box system for transporting smoking material is being arranged for the I.S.R.G. area and the Canteen. Cigarettes will be purchaseable at the Canteen counter.

(e) Note on Suitability of Land for Buildings.

Many buildings on the southern slopes of Quinton Hill have shown bad cracks in their structure, thought to be due to movement of the foundations on the clay subsoil. They might, on the other hand, be attributable to the 1894 explosion. Some afforestation on these slopes is desirable to render the clay pervious.

On the Western Side of the Site, building floor levels must be kept high enough to avoid danger of flooding from the river.

REFERENCES

- (a) Minutes of the South Site Planning Committee.
.... File A/5/4/9.
- (b) Original statements of Sections' requirements
are filed in File A/5/4/9.
- (c) Survey of all existing South Site buildings,
showing type of construction, state of
repair, suggested use, and disposable
contents. File A/5/4/9.

E.R.D.E.
Waltham Abbey.
October, 1951

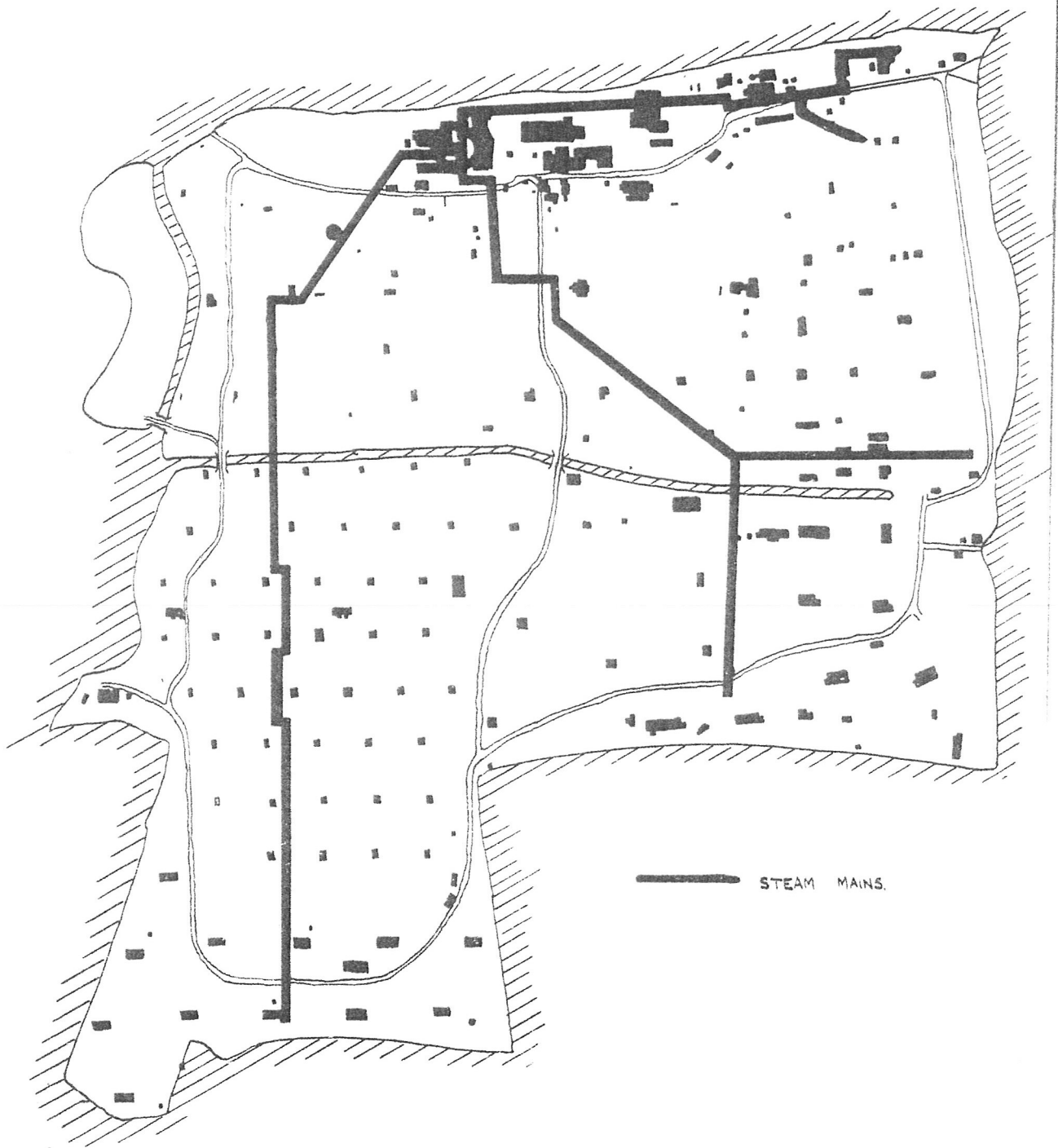


FIG 3. DIAGRAM SHOWING PRINCIPAL STEAM MAINS.

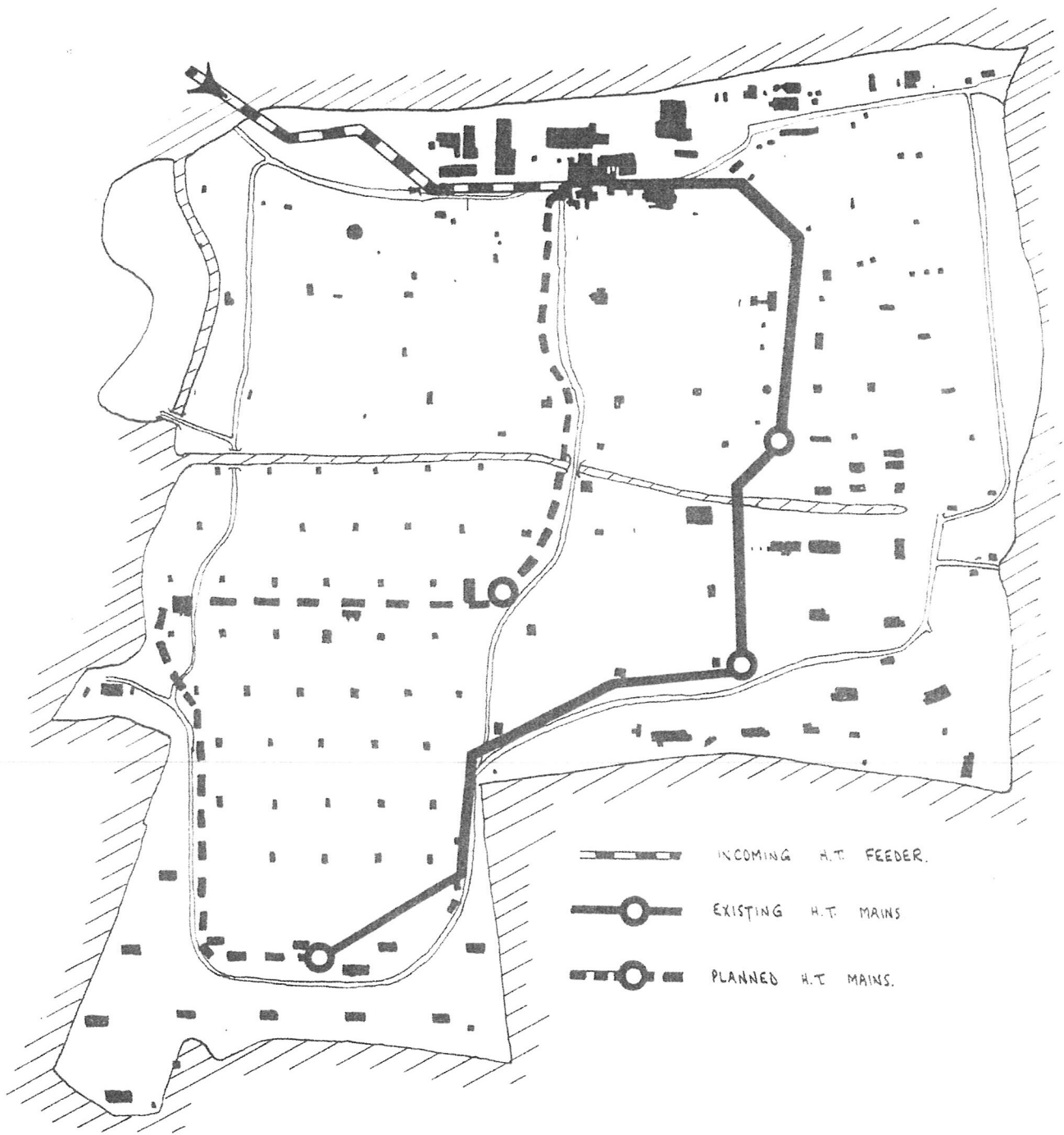


FIG 4. DIAGRAM SHOWING EXISTING AND PROPOSED H.T. ELECTRICITY MAINS.

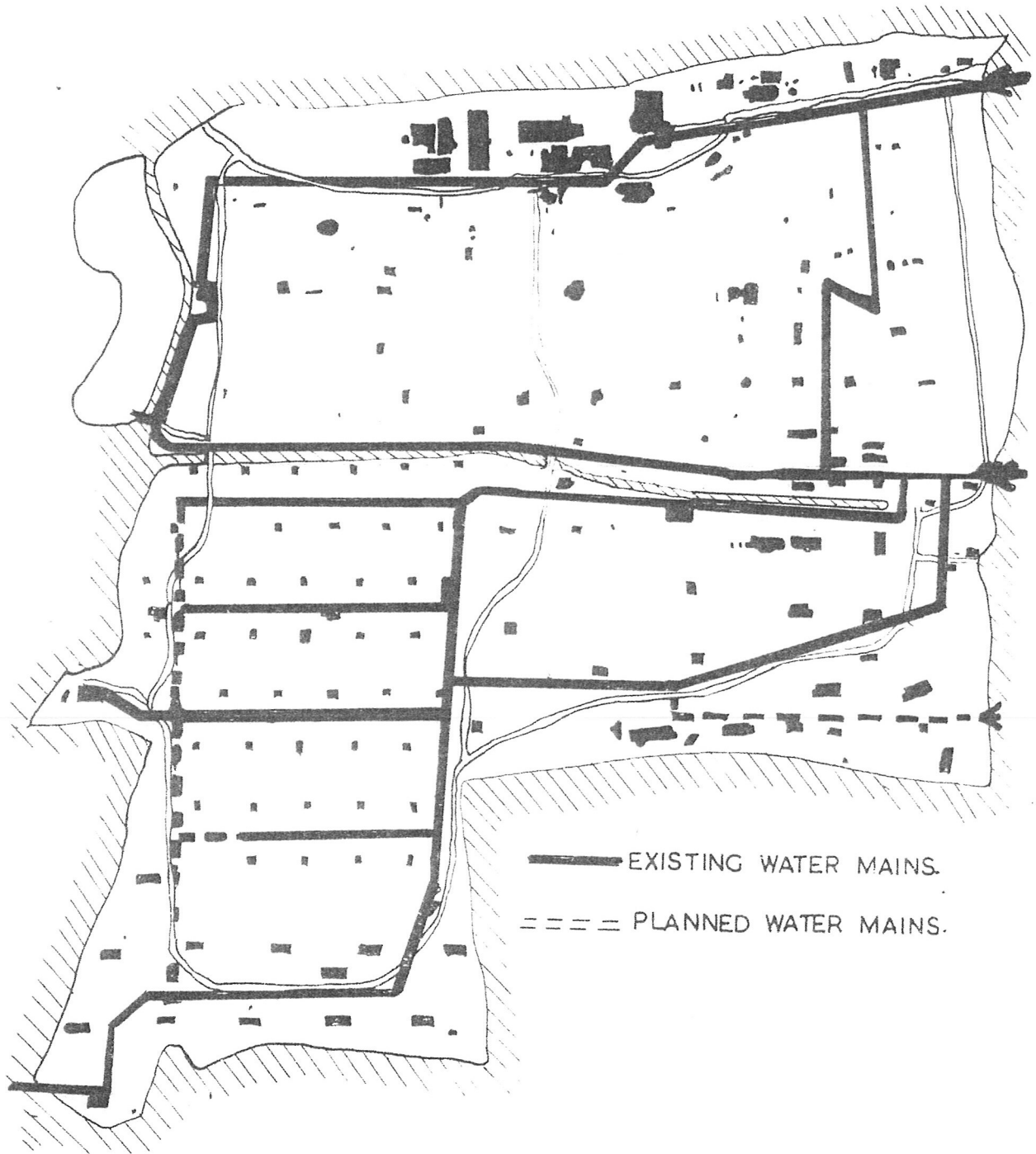


FIG.5 DIAGRAM SHOWING PRESENT AND PROPOSED WATER MAINS
COOLING WATER PUMPED FROM THE RIVER IS NOT SHOWN

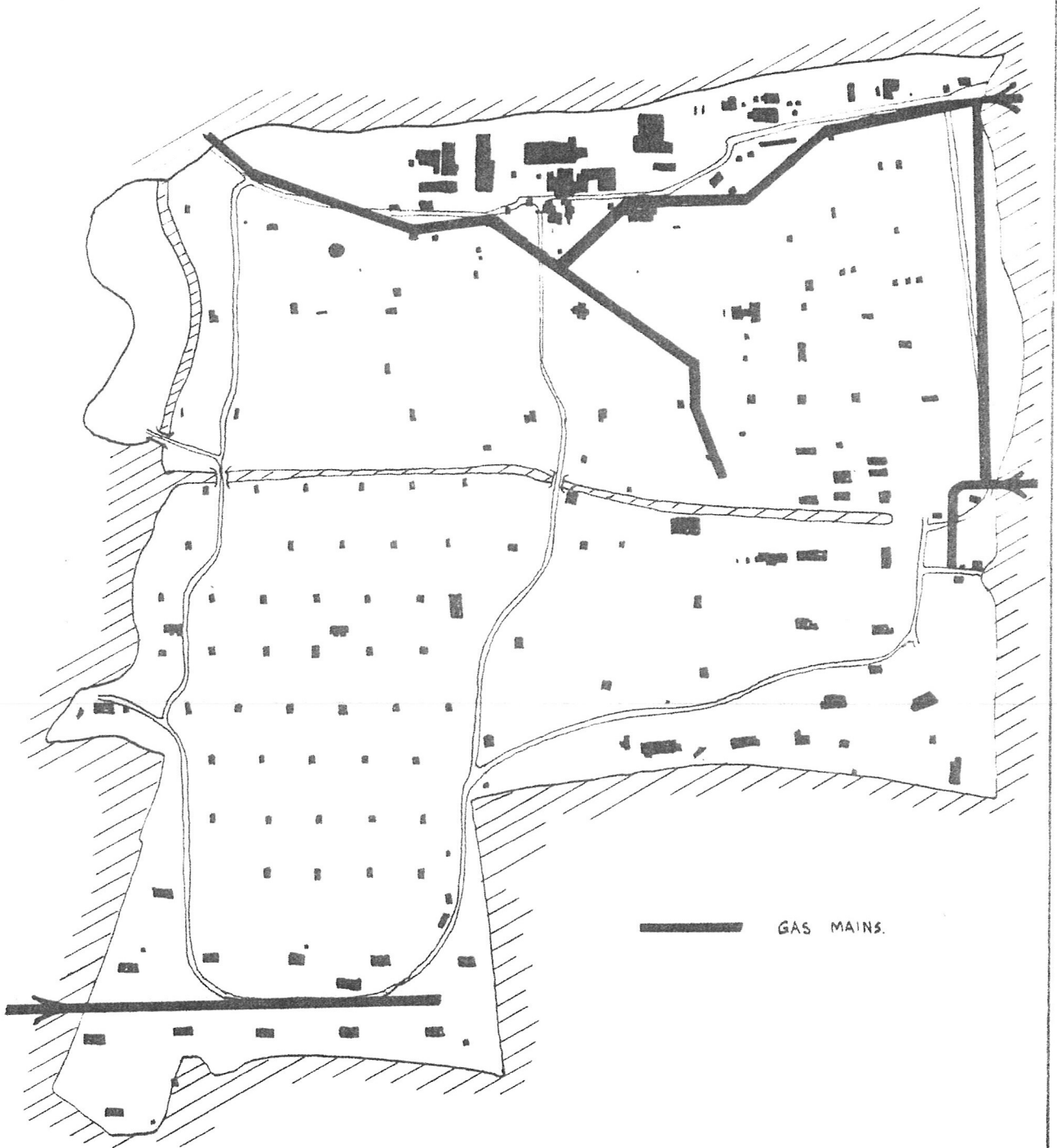


FIG. 6. DIAGRAM SHOWING GAS MAINS.

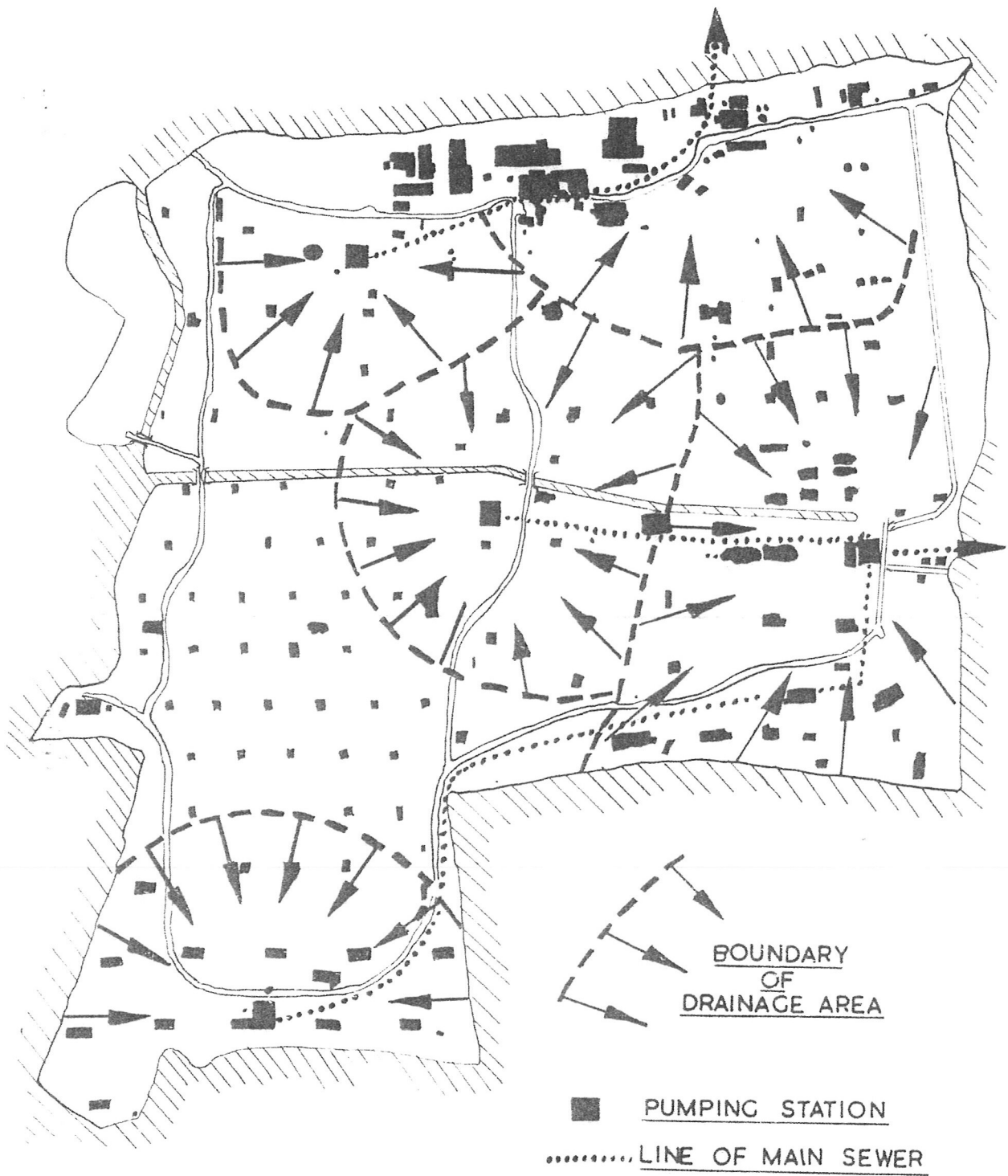


FIG.7. DIAGRAM SHOWING DRAINAGE SYSTEM.