## PLANNING APPLICATION FEES

Reg. Ref. 91A/1817 Cert. No. 27165

PROPOSAL. New access Road & Car Parking area

LOCATION. New access Road & Car Parking area

APPLICANT. J. Mansfield

| CLASS | DWELLINGS/AREA LENGTH/STRUCT. | RATE | AMT. OF FEE REC. | AMOUNT LODGED | BALANCE DUE | BALANCE PAID |
|---|---|---|---|---|---|---|
| 1 | Dwellings | @£32 | | | | |
| 2 | Domestic, | @£16 | | | | |
| 3 | Agriculture | @50p per m2 in excess of 300m2. Min. £40 | | | | |
| 4 | Metres | @£1.75 per m2 or £40 | | | | |
| 5 | x .1 hect. | @£25 per .1 hect. or £250 | | | | |
| 6 | x .1 hect. | @£25 per .1 hect. or £40 | | | | |
| 7 | x .1 hect. | @£25 per .1 hect. or £100 | | | | |
| 8 | | @£100 | | | | |
| 9 | x metres | @£10 per m2 or £40 | | | | |
| 10 | x 1,000m | @£25 per £1000m or £40 | | | | |
| 11 | x .1 hect. | @£5 per .1 hect. or £40 | £101.25 | £133.14 | £31.89 | Ack Payment |

Column 1 Certified:Signed:.....Grade.....Date.....

Column 1 Endorsed:Signed:.....Grade.....Date.....

Columns 2,3,4,5,6 & 7 Certified:Signed:.....Grade.....Date 21/11/91

Columns 2,3,4,5,6 & 7 Endorsed:Signed:.....Grade.....Date.....

LOCAL GOVERNMENT (PLANNING AND DEVELOPMENT) ACTS, 1963 TO 1982

## ASSESSMENT OF FINANCIAL CONTRIBUTION

REG.REF.:

CONT. REG.:

SERVICES INVOLVED: WATER/FOUL SEWER SURFACE WATER

AREA OF SITE:

FLOOR AREA OF PRESENT PROPOSAL:

MEASURED BY:

CHECKED BY:

METHOD OF ASSESSMENT:

TOTAL ASSESSMENT:

MANAGER'S ORDER NO: P/ /
DATED

ENTERED IN CONTRIBUTION REGISTER:

DEVELOPMENT CONTROL ASSISTANT GRADE

Mary Galvin.

DUBLIN COUNTY COUNCIL

**REG. REF:** 91A/1817.

**DEVELOPMENT:** New access road and car parking area.

**LOCATION:** Keatings Park, Rathcoole.

**APPLICANT:** J. Mansfield.

**DATE LODGED:** 18.11.91.

---

Permission was refused by An Bord Pleanala for a large development on the site on grounds of prematurity, inadequate parking, and sightlines, and general traffic hazard. (See 90A/143).

Roads Department cannot properly evaluate this application as the scale of the proposed development including related car parking is not indicated.

In view of the Bords decision a revised proposal should be submitted showing both a long term and short term plan for the development of the entire site. The short term plan should be greatly reduced in scale, and with access from the New Nangor Road only, to the north of the site. Adequate car parking should be provided and the parking difficulties experienced at Tallaght Town Centre should be taken into account when estimating parking requirements.


TR/BMcC
7.1.92.

**SIGNED:** T. Rogers **ENDORSED:** [signature]

**DATE:** 8/1/92 **DATE:** 8/1/92

Order No. P/158/92

# COMHAIRLE CHONTAE ÁTHA CLIATH

## Record of Executive Business and Manager's Orders

Outline permission for development of surface car parking and a new access road with footpaths from the Clondalkin Mills Estate at Nangor-Fox and Geese Road for Jim Mansfield.

James Mansfield,
Keatings Park,
Rathcoole,
Co. Dublin.

Reg. Ref. 91A-1817
Appl. Rec'd: 19.11.1991
Withdrawal Let. Rec'd: 14.01.1992

Report dated 14 January 1992.

On the 19th November, 1991, James Mansfield submitted an application for outline permission for development of surface caar parking and new access road with footpaths from the Clondalkin Mills Estate at Nangor-Fox and Geese Road on behalf of himself.

By letter dated 14th January, 1992, the applicant withdrew the application.

I recommend that no further consideration be given to this application in view of the withdrawal.

Endorsed:- _____
for Principal Officer

Order:- NOTED.

Dated: 16th January, 1992.

_____
Assistant County Manager

to whom the appropriate powers have been delegated by Order of the Dublin City and County Manager, dated 10th December 1991.

Mary Galvin.

DUBLIN COUNTY COUNCIL

REG. REF: 91A/1817.

DEVELOPMENT: New access road and car parking area.

LOCATION: Keatings Park, Rathcoole.

APPLICANT: J. Mansfield.

DATE LODGED: 18.11.91.

---

Permission was refused by An Bord Pleanala for a large development on the site on grounds of prematurity, inadequate parking, and sightlines, and general traffic hazard. (See 90A/143).

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In view of the Bords decision a revised proposal should be submitted showing both a long term and short term plan for the development of the entire site. The short term plan should be greatly reduced in scale, and with access from the New Nangor Road only, to the north of the site. Adequate car parking should be provided and the parking difficulties experienced at Tallaght Town Centre should be taken into account when estimating parking requirements.

PLANNING DEPT.
DEVELOPMENT CONTROL SECT
Date 09.01.92
Time 11.30

TR/BMcC
7.1.92.

SIGNED: T Fagan ENDORSED: [signature]

DATE: 8/1/92 DATE: 8/1/92

Mary Galvin SS only.

Register Reference : 91A/1817 Date : 25th November 1991

Development : Development of surface car parking and a new access road with footpaths from the Clondalkin Mills Site

LOCATION : Nangor-Fox and Geese Road

Applicant : Jim Mansfield

App. Type : OUTLINE PERMISSION

Planning Officer : M.GALVIN

Date Recd. : 18th November 1991

Attached is a copy of the application for the above development .Your report would be appreciated within the next 28 days.

Yours faithfully,

.....

DUBLIN Co. COUNCIL
28 NOV 1991
SAN. SERVICES

DUBLIN CO. COUNCIL
SUB PRINCIPAL OFFICER
SANITARY SERVICES
- 8 JAN 1992
Returned

Date received in Sanitary Services .....

FOUL SEWER

N/A.

PLANNING DEPT.
DEVELOPMENT CONTROL SECT
Date 08.01.92
Time 3.00

SURFACE WATER

Insufficient information.
The applicants have not submitted any drainage details.

3.1.92

SENIOR ENGINEER,
SANITARY SERVICES DEPARTMENT,
46/49 UPPER O'CONNELL STREET,
DUBLIN 1

Filed.

Register Reference : 91A/1817 Date : 25th November 1991

.....

ENDORSED _____ DATE _____

WATER SUPPLY.... NOT APPLICABLE R.J. Spain 9/12/91.....

09/12/91

.....

ENDORSED _____ DATE 6/1/92

PLANNING DEPT.
DEVELOPMENT CONTROL SECT
Date 08.01.92
Time 3.00

Mary Galvin.

**Dublin County Council** Comhairle Chontae Atha Cliath **Parks Department**

Bosca 174
P. O. Box 174
5 Rae Gardiner,
5 Gardiner Row,
Baile Atha Cliath 1.
Dublin 1.
Telephone. (01)727777
Fax. (01)727530

Mr. D. Drumgoole,
Senior Administrative Officer,
Planning Department.

Our Ref.
Your Ref.
Date 12.12.1991

**RE/ New Access Road and Carpark, Clondalkin Mills. Reg. Ref. 91A/1817.**

With reference to this application, the Parks Department's comments are:-

1. The proposed access road is shown across an area of land which is not in the ownership of the applicants, and is in the control of Dublin County Council. An extensive scheme of tree planting has been carried out at this location as part of an environmental improvement scheme for the Nangor Road. Before any road is constructed across this Council land, the applicant will have to obtain permission from Dublin County Council.

2. The boundary of the carpark and the lands alongside the Nangor Road will require to be defined by the erection of a low wall and railing, according to a specification to be agreed with the County Council.

It is recommended that Additional Information is sought in relation to these matters.

SENIOR PARKS SUPERINTENDENT

PLANNING DEPT.
DEVELOPMENT CONTROL SECT
Date 13.12.91
3.30

C Hayden

The shopping and office development is at present on appeal.

Please write to Mr. Mansfield referring to his 4 the paragraph and advise him that it is noted for him to bring this appl to the attention of Dan L. M. in the processing of the appeal MK 21/12.

91A-1817

James Mansfield,
Keatings Park,
Rathcoole,
Co. Dublin.

16 January 1992

**Re: Outline permission for development of surface car parking and a new access road with footpaths from the Clondalkin Mills Estate at Nangor-Fox and Geese Road for Jim Mansfield.**

Dear Sir,

I refer to your letter of 14th January, 1992, and note that you have withdrawn the above outline planning application, which was lodged in this Department on 19th November, 1991.

Yours faithfully,

for Principal Officer.

4/1/92.

Re: 91A/1817
Clondalkin Mills Site - car parking etc.

I refer to my planning application
Ref: the above & now wish
to withdraw same.

J. [illegible]

Mr. J. Mansfield,
Keatings Park,
Rathcoole,
Co. Dublin.

91A/1817

11 December 1991

RE: Development of surface car parking and a new access road with footpaths onto the Nangor-Fox and Geese Road, from the Clondalkin Mills Site.

Dear Sir,

I refer to planning application lodged on 18th November, 1991, in respect of the above.

In relation to Paragraph Four of letter of application, I wish to inform you that it would be a matter for you to bring all relevant points to the attention of An Bord Pleanala in the processing of the appeal in question.

Yours faithfully,

for Principal Officer.

**Dublin County Council** Comhairle Chontae Atha Cliath **Planning Department**

Building Control Department,
Liffey House,
Tara Street,
Dublin 1.
Telephone:773066

Bloc 2, Ionad Bheatha na hEireann,
Block 2, Irish Life Centre,
Sraid na Mainistreach Iacht,
Lower Abbey Street,
Baile Atha Cliath 1.
Dublin 1.
Telephone. (01)724755
Fax. (01)724896

Register Reference : 91A/1817

Date : 19th November 1991

Our Ref.

Your Ref.

Date

LOCAL GOVERNMENT (PLANNING AND DEVELOPMENT) ACTS 1963 TO 1990

Dear Sir/Madam,

DEVELOPMENT : Development of surface car parking and a new access road with footpaths from the Clondalkin Mills Site

LOCATION : Nangor-Fox and Geese Road

APPLICANT : Jim Mansfield

APP. TYPE : OUTLINE PERMISSION

With reference to the above, I acknowledge receipt of your application received on 18th November 1991.

Yours faithfully,

.....

for PRINCIPAL OFFICER

James Mansfield,
Keatings Park,
Rathcoole,
Co. Dublin.

Dublin County Council
Comhairle Chontae Atha Cliath

**Planning Application Form/ Bye - Law Application Form**

PLEASE READ INSTRUCTIONS AT BACK BEFORE COMPLETING FORM. ALL QUESTIONS MUST BE ANSWERED.

1. Application for Permission ☐ Outline Permission ☒ Approval ☐ Place ✓ in appropriate box.
Approval should be sought only where an outline permission was previously granted. Outline permission may not be sought for the retention of structures or continuances of uses.

2. Postal address of site or building .....
(If none, give description sufficient to identify).....

3. Name of applicant (Principal not Agent).....James Mansfield.....

Address.....Keatings Park, Rathcoole, Co. Dublin.....Tel. No..589080.....

4. Name and address of person or firm responsible for preparation of drawings Ove Arup and Partners Ireland, 10 Wellington Road, Dublin 4 Tel. No 1683112 18/4 £33.74

5. Name and address to which notifications should be sent James Mansfield, Keatings Park, Rathcoole, Co Dublin N 5214

6. Brief description of proposed development Provision new access road and car parking area.

7. Method of drainage ...../..... 8. Source of Water Supply ...../.....

9. In the case of any building or buildings to be retained on site, please state:- None
(a) Present use of each floor or use when last used. ...../.....
(b) Proposed use of each floor ...../.....

Grid Ref 16/11/91

10 Does the proposal involve demolition, partial demolition or change of use of any habitable house or part thereof? No

11.(a) Area of Site .....6.58 acres (2.66 Hectares).....Sq. m.

(b) Floor area of proposed development ...../.....Sq. m.

(c) Floor area of buildings proposed to be retained within site ...../.....Sq. m.

CLONDALKIN CO. DUBLIN A planning application for outline permission is being lodged by Jim Mansfield for the development of surface car parking and a new access road with footpaths onto the Nangor-Fox and Geese Road from the Clondalkin Mills Site

12.State applicant's legal interest or estate in site (i.e. freehold, leasehold, etc.) .....Agreement to purchase.....

13.Are you now applying also for an approval under the Building Bye Laws?
Yes ☐ No ☒ Place ✓ in appropriate box.

14.Please state the extent to which the Draft Building Regulations have been taken in account in your proposal:
See specification enclosed.

15.List of documents enclosed with application.
Copy of Newspaper Notice, 4 copies of Drg No PL10, 4 copies of specification

16.Gross floor space of proposed development (See back) ...../.....Sq. m.

No of dwellings proposed (if any) ...../.....Class(es) of Development .....Any other development.....

Fee Payable £.5.00/0.1 Ha. Basis of Calculation IR£133.14

If a reduced fee is tendered details of previous relevant payment should be given .....

Signature of Applicant (or his Agent) ..... Date 18-11-1991

Application Type O.P.

Register Reference 91A/1817

Amount Received £.....

Receipt No .....

Date 19/15

FOR OFFICE USE ONLY

2.4.4 18/11

## LOCAL GOVERNMENT (PLANNING & DEVELOPMENT) REGULATIONS 1977 to 1984.

Outline of requirements for applications for permission or Approval under the Local Government (Planning & Development) Acts 1963 to 1983. The Planning Acts and Regulations made thereunder may be purchased from the Government Publications Sales Office, Sun Alliance House, Molesworth Street, Dublin 2.

1. Name and Address of applicant.

2. Particulars of the interest held in the land or structure, i.e. whether freehold, leasehold, etc.

3. The page of a newspaper, circulating in the area in which the land or structure is situate, containing the required statutory notice. The newspaper advertisement should state after the heading Co. Dublin.

   (a) The address of the structure or the location of the land.
   (b) The nature and extent of the development proposed. If retention of development is involved, the notice should be worded accordingly. Any demolition of habitable accommodation should be indicated.
   (c) The name of the applicant.

   NB. Applications must be received within 2 weeks from date of publication of the notice.

4. Four (4) sets of drawings to a stated scale must be submitted. Each set to include a layout or block plan, proposed and existing services to be shown on this drawing, location map, and drawings of relevant floor plans, elevations, sections, details of type and location of septic tank (if applicable) and such other particulars as are necessary to identify the land and to describe the works or structure to which the application relates (new work to be coloured or otherwise distinguished from any retained structures). Buildings, roads, boundaries and other features bounding the structure or other land to which the application relates shall be shown on site plans or layout plans. The location map should be of scale not less than 1: 2500 and should indicate the north point. The site of the proposed development must be outlined in red. Plans and drawings should indicate the name and address of the person by whom they were prepared. Any adjoining lands in which the applicant has an interest must be outlined in blue.

5. In the case of a proposed change of use of any structure or land, requirements in addition to 1, 2, & 3 are:
   (a) a statement of the existing use and the proposed use, or, where appropriate, the former use and the use proposed.

   (b) (i) Four (4) sets of the drawings to a stated scale must be submitted. Each set to consist of a plan or location map (marked or coloured in red so as to identify the structure or land to which the application relates) to a scale of not less than 1:2500 and to indicate the North point. Any adjoining lands in which the application has an interest must be outlined in blue.

   (ii) A layout and a survey plan of each floor of any structure to which the application relates.

   (c) Plans and drawings should indicate the name and address of the person by whom they were prepared.

6. Applications should be addressed to: Dublin County Council, Planning Department, Irish Life Centre, Lr. Abbey Street, Dublin 1, Tel. 724755.

**SEPTIC TANK DRAINAGE:** Where drainage by means of a septic tank is proposed, before a planning application is considered, the applicant may be required to arrange for a trial hole to be inspected and declared suitable for the satisfactory percolation of septic tank effluent. The trial hole to be dug seven feet deep at or about the site of the septic tank. Septic tanks are to be in accordance with I.I.R.S. S.R. 6:75.

**INDUSTRIAL DEVELOPMENT:**
The proposed use of an industrial premises should, where possible, be stated together with the estimated number of employees, (male and female). Details of trade effluents, if any, should be submitted.

Applicants to comply in full with the requirements of the Local Government (Water Pollution) Act,1977 in particular the licencing provisions of Sections 4 and 16.

### PLANNING APPLICATIONS

| CLASS NO. | DESCRIPTION | FEE |
|---|---|---|
| 1. | Provision of dwelling — House/Flat. | £32.00 each |
| 2. | Domestic extensions/other improvements. | £16.00 |
| 3. | Provision of agricultural buildings (See Regs.) | £40.00 minimum |
| 4. | Other buildings (i.e. offices, commercial, etc.) | £1.75 per sq. metre (Min. £40.00) |
| 5. | Use of land (Mining, deposit or waste) | £25.00 per 0.1 ha (Min £250.00) |
| 6. | Use of land (Camping, parking, storage) | £25.00 per 0.1 ha (Min. £40.00) |
| 7. | Provision of plant/machinery/tank or other structure for storage purposes. | £25.00 per 0.1 ha (Min. £100.00) |
| 8. | Petrol Filling Station. | £100.00 |
| 9. | Advertising Structures. | £10.00 per m² (min £40.00) |
| 10. | Electricity transmission lines. | £25.00 per 1,000m (Min. £40.00) |
| 11. | Any other development. | £5.00 per 0.1 ha (Min. £40.00) |

### BUILDING BYE-LAW APPLICATIONS

| CLASS NO. | DESCRIPTION | FEE |
|---|---|---|
| A | Dwelling (House/Flat) | £55.00 each |
| B | Domestic Extension (improvement/alteration) | £30.00 each |
| C | Building — Office/ Commercial Purposes | £3.50 per m² (min. £70.00) |
| D | Agricultural Buildings/Structures | £1.00 per m² in excess of 300 sq. metres (min. - £70.00) (Max. - £300.00) |
| E | Petrol Filling Station | £200.00 |
| F | Development or Proposals not coming within any of the foregoing classes. | £9.00 per 0.1 ha (£70.00 min.) |
| | | Min. Fee £30.00 |
| | | Max. Fee £20,000 |

Cheques etc. should be made payable to: Dublin County Council.

Gross Floor space is to be taken as the total floor space on each floor measured from the inside of the external walls.

*For full details of Fees and Exemptions see Local Government (Planning and Development) (Fees) Regulations 1984.*

**COMHAIRLE CHONTAE ÁTHA CLIATH**
**DUBLIN COUNTY COUNCIL**
**46/49 UPPER O'CONNELL STREET,**
**DUBLIN 1.**

RECEIPT CODE

Issue of this receipt is not an

PAID ● —
CASH ✓
CHEQUE
M.O.
B.L.
I.T.

£ 133.14

N 51214

Received this 18th day of November 19 91

from James Mansfield
Kealings Park, Rathcoole

the sum of One hundred and thirty three Pounds
fourteen Pence, being fee for
planning application [access road with footpaths onto Naas Rd.
and access road from Clondalkin Paper Mills site] Class
Michael O'Hea

Cashier

S. CAREY
Principal Officer

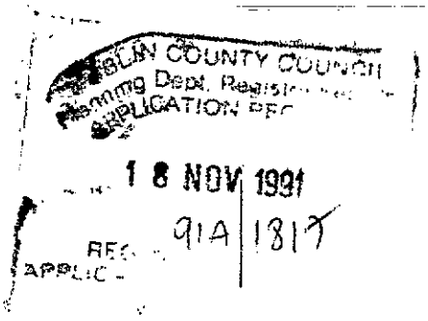
11

# J. MANSFIELD

JM

KEATINGS PARK, RATHCOOLE, CO. DUBLIN. TELEPHONE: 589080


Principal Officer
Planning Department
Dublin County Council
Irish Life Centre
Lower Abbey Street
Dublin 1




Monday 18 November

Dear Sirs

I enclose herewith a completed application for outline permission for the provision of a car parking area together with a new access road from the Clondalkin Mills site onto the Nangor - Fox and Geese Road at Clondalkin, Co Dublin.

You will be aware that we have previously indicated, in discussions with your Department, in relation to the proposed shopping and office development on the Clondalkin Mills site, the planning decision on which is now under appeal to An Bord Pleanála, that it was our intention to provide such an access and supplementary parking as soon as agreement for the acquisition of the necessary lands had been reached with the present landowners. This agreement has now been reached after protracted negotiations. Hence, the present application for the development as now proposed.

The provision of such an access and parking area was considered by your Roads Department to be necessary in improving the circulation within, access to and egress from the proposed shopping development on the Mills site. The intention to provide the road and parking together with a map showing such a proposal was presented by us at the oral hearing held by An Bord Pleanála in connection with the current planning appeal on the proposed development on the Mills site.

It is a material factor in relation to the latter even though it was not part of the original application for planning permission due to the delay in our reaching agreement for the acquisition of the relevant lands. It may indeed be advisable for the Planning Authority to bring this matter to the attention of An Bord Pleanála in connection with the aforementioned current appeal.

I enclose herewith a copy of the newspaper notice, completed application form plus copies of same, four copies of the relevant drawings of the proposals and a bank cheque in the amount of the relevant application fee. We should appreciate it if you would expedite a prompt and favourable decision on this application.

Yours faithfully

**Jim Mansfield**

Enc

# PROPOSED ACCESS ROAD ONTO THE NANGOR - FOX & GEESE ROAD

at

CLONDALKIN, CO DUBLIN

for

J MANSFIELD, ESQ.

## SPECIFICATION

for

## ROADS, DRAINAGE AND PUBLIC LIGHTING

D 91/072

NOVEMBER 1991

CONTENTS

# SECTION 1

SPECIFICATION FOR DRAINAGE, ROADS AND WATER SUPPLY

## GENERAL OBLIGATIONS

### 1.1 Execution of Works

The whole of the Works shall be executed in the manner specified and to the dimensions and in accordance with the particulars shown on the drawings or given in the Bill of Quantities. The Contractor shall be paid only for the work executed to the satisfaction of the Engineer. The Works shall be executed and maintained in the most approved and workmanlike manner, by workmen skilled in the various trades and callings required for carrying out and maintaining the Works. All materials which are used in connection with the Works shall be of the best quality of their respective kinds. All plant employed on the Works shall be to the approval of the Engineer.

### 1.2 Provision of Labour, Materials, etc

The Contractor shall at all times provide sufficient and adequate numbers of skilled men and labourers to carry out and maintain each and every part of the Works in a proper and expeditious manner, and shall provide all materials, tools, equipment, plant and everything necessary for the proper execution, completion and maintenance of the Works.

### 1.3 Contractor's Offices

The Contractor shall provide and maintain all such general and foreman's offices and huts as are necessary for the execution of the Works, and the siting of all such offices and huts shall be subject to the approval of the Engineer.

### 1.4 Sheds, Stores and Shelters

The Contractor shall provide and maintain all such sheds, stores and proper sanitary accommodation as are necessary for execution of the Works, and their siting shall be subject to the approval of the Engineer. The Contractor shall also provide and maintain approved portable shelters near all working points for the protection of his workmen.

## 1.5 Site Office for Engineer

The Contractor shall provide and maintain throughout the currency of the Contract for the exclusive use of the Engineer an approved lock-up office. The building shall have a light interior and be fitted with ample windows. The office shall be not less than 2.5 x 3.0m on plan and shall be equipped with a satisfactory method of heating and lighting by electricity, provided with a linoleum floor oovering, and furnished with a desk provided with lock and key, drawing bench and board, stool, writing desk, chairs, shelves, plan chest and any other necessary furnishings and fittings.

The Contractor shall provide attendance and daily cleaning. The Contractor shall also provide a telephone with a separate line to the Exchange and remove the Service on completion when directed by the Engineer. The exterior of the building shall be of clean and tidy appearance and shall not bear any name or sign other than the words 'Engineer - Ove Arup and Partners' on the door of the office.

The Contractor shall provide and fix on the exterior of the north facing wall of the Engineer's office a maximum and minimum Celsius thermometer complete with magnet and hood. Either attached to and forming part of this building or immediately adjacent thereto proper sanitary accommodation and washing facilities shall be provided complete with an efficient water supply, connection to the main sewer when available and adequate lighting. Immediately adjacent to the offices the Contractor shall provide and maintain in good conditon for the duration of the Contract, car parking facilities for the exclusive use of office staff. The area should be of adequate capacity to suit the expected demand and the area shall be effectively fenced off to prevent lorries and plant from passing through.

The siting of the above shall be to the approval of the Engineer.

## 1.6 Protection of Property

The Contractor shall take every precaution to preserve from damage any property, trees and shrubs, farm stock or crops situated on or near the Site of the Works and shall indemnify the Employer against all claims in connection thereto.

## 1.7 Protection of Existing Services

The Contractor shall be entirely responsible for locating the positions of all services, including mains, cables, pipes, sewers and drains, and shall allow in his rates for excavation for carrying out excavation in roads, and elsewhere where services are encountered, by hand digging so as to ensure that no damage is caused to services.

The Contractor shall make good, at his own expense any damage whatsoever to existing services to the complete satisfaction of and in accordance with the instructions of the Statutory Authority concerned, and shall keep the Employer indemnified at all times from claims in connection with the damage. All services which are encountered in the course of excavation shall be adequately supported and protected from injury to the satisfaction of the Statutory Authority or person in whom they may be vested. Allowance must be made in the excavation rates for the cost of providing such support and protection. Existing sewers and drains shall not be used for the discharging of ground water without the written consent of the Engineer. No drain or pipe of any description shall be disturbed until it has been inspected by the Engineer.

## 1.8 Protection of Works

The Contractor shall carefully cover up or otherwise protect all work liable to injury from the weather, stormwater, or any other cause during construction.

The Contractor shall allow for any contingencies or extra temporary works which may be necessitated by adverse site conditions or which may be required by the Engineer for the protection of the Works.

## 1.9 Safety Precautions for Road Users

The Contractor shall comply with the recommendations in the current edition of the 'Traffic Safety Measures for Roadworks' being Chapter 8 of the Traffic Signs Manual published by the Department of Transport.

It is emphasized that the Contractor's responsibility to guard street works extends to all persons whose use of the highway is reasonably foreseeable, including the blind or infirm. Guards or barriers must be such that they would be easily detectable by a blind person using a stick. All arrangements for the protection of road users and for the guidance and control of traffic shall be made in consultation with the Police and the Highway Authority.

## 1.10 Working Area and Access to Site

For the purpose of the execution and maintenance of the Works and subject to the provisions of the Contract as to rights-of way, and the granting of facilities to other Contractors and Statutory Under takers engaged on the Works or adjacent thereto, the Contractor shall be granted occupation of the areas of land shown by shading on the Key Plan. As soon as he is granted possession of any part of the land he shall erect along the boundaries of the working area a post and wire fence consisting of 100mm dia posts 2.0m long driven 0.5m into the ground at 3.0m centres. 10 S.W.G. galvanized wire shall be stapled to the posts 75mm down from the top. Coloured plastic markers shall be fixed to the wire at 1m intervals for easy identification.

The Contractor shall obtain the Engineer's prior written consent to the use of any land for a central mixing plant for concrete. On completion of the Contract, or before if required by the Engineer, the plant shall be removed and all damage to the land made good, including provision of topsoil if necessary, at the Contractor's expense. The Contractor will not be allowed to use adjacent hard surfaces, whether new or existing, for the repair and maintenance of vehicles and plant. If required proper facilities must be provided for this by the provision of a concrete area within the Contractor's compound with a concrete access drive to the nearest hard road. The Contractor shall, after carrying out the Works, reinstate all land defined as the 'Working Area' to the satisfaction of the Engineer. This Clause shall include any necessary soiling and seeding of the working area.

## 1.11 Work in Highways

In the execution of the Works in highways and in gaining access to the Site of the Works from highways the Contractor shall take such precautions and adopt such measures as are necessary to ensure the safety and convenience of the public and the owners and occupiers of affected properties, and to reduce to a minimum interference with the use of the highway and private property. In excavating for sewers to be laid in or across existing highways the Contractor shall at all times keep one half width of the carriageway open to traffic. In the event of single-way traffic becoming necessary the Contractor shall provide a width of at least 3m for the passage of vehicles.

## 1.12 Traffic Control

The Contractor shall erect and maintain on all works in highways and on the approaches to the Works, all traffic signs necessary for the warning, direction and control of traffic. The signs shall be illuminated by night and shall be for temporary use during the progress of the work, remaining the property of the Contractor on completion of the Contract.

## 1.13 Temporary Works

The Contractor shall provide and maintain temporary traffic ramps, bridges, roadways, sleeper tracks, stagings, etc, which may be required but which are not itemised specifically in the Bill of Quantities.

## 1.14 Statutory Undertakers

The Contractor shall grant facilities during the currency of the Contract to Statutory Undertakers for the purpose of laying new mains and services or adjusting existing equipment. The Contractor must ensure himself that all Statutory Authorities have completed their work before any permanent surfacing material is laid.

## 1.15 Soiling of Highways

The Contractor shall remove and cart away any mud, debris or spoil deposited on the highways immediately adjacent to or approaching the Works.

## 1.16 Suppression of Noise

The Contractor shall have due regard at all times for the need to reduce the noise level of plant to a minimum. This is particularly necessary where work is carried out in close proximity to hospitals, schools, housing and office development. Compressors and all other plant which is likely to constitute a nuisance or cause distress must be fitted with efficient silencing devices.

## 1.17 Order of Works

The Contractor shall, within two weeks of the date of the official order to commence the Works, submit to the Engineer, for his approval, a detailed programme setting out the stages and order in which he proposes to carry out and complete the Works within the prescribed time for completion, and phased in accordance with the requirements of the Employer.

## 1.18 Payment for Works

All items which are included in the 'General Obligations' section of this Specification and not specifically mentioned for payment in the Bill of Quantities shall be deemed to have been allowed for by the Contractor in his rates in the Bills of Quantities.

## MATERIALS

This Section must be read in conjunction with relevant Civil Drawings where additional information relevant to the forms of construction to be used under this Contract is given.

### 2.1 Irish and British Standard Quality

All materials used in the Contract shall be in accordance with the latest relevant Irish Standard. Where no Irish Standard exists, the latest relevant edition of the British Standard should be used. Whenever possible materials shall be obtained from manufacturers licensed to use the Irish Standards Mark.

### 2.2. Submission of Samples

As soon as possible after the official order to commence the Contract has been received the Contractor shall submit to the Engineer a list of the suppliers from whom he proposes to purchase the materials necessary for the execution of the Works. Each supplier must be willing to admit the Engineer or his representative to his premises during ordinary working hours for the purpose of obtaining samples of the materials in question. Alternatively if desired by the Engineer, the Contractor shall deliver to the Engineer's Site Office, without charge, and at least ten days in advance of use, samples of the materials. Aggregate samples shall be taken and tested in accordance with the provisions of BS 812. No source of supply shall be changed without the written authority of the Engineer. Samples of materials approved by the Engineer will be retained at the Engineer's Site Office until the completion of the Contract.

### 2.3 Cast Iron/Spun Iron Pipes and Fittings

All pipes and fittings shall comply with the latest Irish and British Standard as follows :

Grey Iron and Ductile Iron Pipe Fittings, I.S. 262. Part 1 and Part 2
Ductile Iron Pipes and Fittings to BS 4772.
Iron Spigot and Sockets Pipes and Fittings to BS 78 : Part 2.
Fugally Cast (Spun) Iron Pressure Pipes to BS 1211.
Iron Spigot and Socket Drain Pipes to BS 437.
For use with Drain Pipes to BS 437 and 6087.
Cast Iron Flanged Pipes and Fittings to BS 2035.
Spigot and Socket Pipes to BS 78 and BS 1211 shall be supplied with an approved type of flexible joint.

## 2.4 Concrete Pipes and Specials

Concrete pipes shall be spun and of approved manufacture and design conforming to the requirements of IS 6, IS 166 or BS 5911. The cement used in their manufacture shall be ordinary or rapid- hardening Portland Cement. Samples of the aggregate used in the manufacture and certificates of the date of manufacture shall be submitted to the Engineer when so required.

Where ordered or contained in the Bill of Quantities concrete pipes shall be spigot and socket with flexible joints of make and type approved by the Engineer.

## 2.5 Vitrified Clay Pipes and Fittings

Vitrified clay pipes and fittings shall comply with IS 106 or BS 65 and shall bear the marks detailed in the standard for the appropriate type and class of article. Unless otherwise stated in the Bill of Quantities or elsewhere, testing of pipes shall only be that laid down in the British Standard to cover the manufacturer's normal responsibilities. For work in foul sewers or elsewhere if required, ten per cent of the articles supplied shall be subject to a Hydraulic Proof Test as laid down in the British Standard.

Where Extra Strength pipes are required they shall comply with Table 3 and Table 4 for the appropriate size of pipe. In every case where Extra Strength pipes and fittings are required, the testing arrangements laid down shall be carried out. All pipes and fittings shall be of the spigot and socket or sleeve type, with flexible joints of a type approved by the Engineer and shall be made and jointed in accordance with the manufacturer's instructions. When British Standard Surface Water pipes are specified they shall be structurally sound without cracks or serious defects and free from cracks and blisters on the inner periphery.

## 2.6 Block Manholes

Blocks shall be solid building blocks to IS 20 : 1964 with average compressive strength of 700 lbs/in$^2$.

Blockwork shall be laid 225 thick in stretching bond with all joints filled solidly in (1 : 3) cement mortar and neatly flush pointed internally as the work proceeds. Joints shall not exceed 10 mm in thickness and no liquid grouting of the joints will be permitted. The whole of the blockwork shall be set level, straight and carefully plumbed.

Pipes up to 300 diameter to be arched over in blockwork. Pipes over 300 diameter to be protected by a reinforced concrete lintol extending the full length of the wall in which the pipe occurs. Lintols to be reinforced with 4 No. 12 MS bars and 6 MS links at 225 c/c. Foul manholes should be rendered internally and externally in (1 : 3) cement mortar 25 thick and finished with a steel trowel. Surface Water manholes should be rendered externally only.

## 2.7 Manhole Covers and Frames

Manhole covers and frames shall be Ductile Iron and shall comply with the requirements of IS 261, 1984 or BS 497 1976.

Covers to be sited in and adjacent to roadways to be Grade A and in all other locations Grade B.

## 2.8 Ladder Rungs

Ladder rungs shall be 25 mm mild steel, heavily galvanised after manufacture and shall be to the dimensions set out on the drainage detail drawing.

## 2.9 Road Gullies

Precast concrete gullies comply with the requirements of BS 556, trapped with capped rodding eye, 375 mm diameter and 750 mm deep. Gullies shall be set on a 150 mm bed and surrounded with a minimum of 150 mm Grade 20 Concrete.

Gulley frames shall be set on at least one course of brickwork to finish with the top of the slope at not more than 5 mm below finished road surface. No brick packing shall extend in height for more than three brick courses.

Gulley cover and frame shall be a heavy duty straight bar gully grating in cast iron and with a cast iron frame to IS 261 : 1984 (Ref. IGAI-300) or BS 497.

## 2.10 Inspection Chambers, Gulley Traps etc.

Armstrong Junctions, raising pieces, gully traps etc. shall be in clayware to BS 65. Covers and frames, gratings etc. to be cast iron coated in bitumastic paint or galvanised mild steel subject to Engineers approval.

## 2.11 Bricks

Bricks shall be either concrete building bricks to I.S. 189 or B.S. 6073 Part 1 and 2, or clay building bricks to I.S. 91 or B.S. 3921. All bricks shall be of uniform colour, machine pressed, true to gauge and conform to the relevant standards.

They shall be carefully stacked by hand off the carriageway and footway area. They shall not be tipped from a vehicle and all bricks chipped, cracked or with broken arrises will be rejected. Samples of all bricks intended for use in the permanent works shall be submitted for approval.

## 2.12 Granular Bed and Surround for Sewers

Unless otherwise specified, the material for granular bedding shall be coarse graded aggregate between 5mm and 20mm size complying with BS 882 and obtained from an approved source.

## 2.13 Cement

Ordinary Portland and Rapid Hardening Portland cement shall comply with the requirements of IS 1 or BS 12. Sulphate Resisting cement shall comply wih BS 4027. Except where otherwise ordered by the Engineer, ordinary Portland cement shall be used. Cement delivered to the site in bags shall be in consignments of not less than one tonne, in sound and properly secured original sealed bags of the manufacturer. It shall be stored in dry weatherproof sheds having raised wooded floors and free from condensation. Cement delivered to the site in bulk shall be stored in approved bins which shall be weather-proof, free from condensation and any other defects likely to cause air-setting or other forms of deterioration.

Cement shall be delivered in quantities sufficient to ensure that there is no suspension or interruption of the work of concreting and each consignment shall be kept separate and distinct. Any cement that shall have become injuriously affected by damp or other cause shall be removed from the site by the Contractor and replaced.

## 2.14 Hydrated Lime

Hydrated lime shall comply with the requirements of I.S. 8 or BS 890.

## 2.15 Cement Mortar

Cement mortar shall consist of Portland Cement and natural sand. The constituent materials shall be accurately gauged and mixed in an approved manner in proportion by volume as follows:-

| | |
|---|---|
| For brickwork and pipe joints | 1:3 cement/sand |
| For rendering | 1:3 cement/sand |

## 2.16 Cement/Lime Mortar

Cement-lime mortar shall consist of Portland cement, hydrated lime and natural sand in the proportion of 1:1:6 by volume.

## 2.17 Sand for Mortar

Sand used for mortar shall comply with the requirements of BS 1200 and the grading shall be to Table 1.

## 2.18 Aggregates for Concrete

Aggregates for concrete shall consist of natural sand and rounded natural gravel and shall comply with the requirements of I.S. 5 or BS 882. Coarse and fine aggregates shall comply with Tables 4 and 5 and all-in aggregates with Table 6. Tests for the determination of impurities in the sand shall be made when required by the Engineer.

All aggregates shall be kept free from contact with deleterious matter and shall have been deposited on site not less than 24 hours before batching. Aggregates of different sizes shall be stored in separate stacks or hoppers clearly marked with the size contained therein. All aggregates shall be stored in such manner as will ensure effective and thorough drainage of each grade of aggregate. Aggregates shall not be deposited nearer than 6m to any carriageway. When granite is required as the coarse aggregate for concrete it shall comply with I.S.5 or BS 882 and shall consist of crushed granite graded in accordance with Table 4 of the Standard.

## 2.19 Water

Only fresh, clean water supplied by a Public Utility Company shall be used for the mixing of concrete, mortar or grout. Under no circumstances shall water from rivers, streams, sumps, ditches, etc, be utilised for this purpose. The Contractor shall provide all fittings, pipe lines, water carts, and equipment necessary for supplying water to the Works.

## 2.20 Ready-Mixed Concrete

Ready-mixed concrete shall not be used on the Works except with the prior permission of the Engineer. Application for such permission, must include the following information :-

a) Name and address of supplier and location of mixing plant.
b) Details of plant and facilities.
c) Details of method of delivery.
d) Source of aggregates.
e) Distance of mixing plant from site.

Ready-mixed concrete shall generally be in accordance with I.S. 194 or BS 5328.

The normal clauses and requirements of this Specification shall apply to ready-mixed concrete just as to concrete mixed on the Site.

If permission to use ready-mixed concrete is granted, the Contractor shall arrange :-

a) with the supplier for samples of aggregates and sample loads of each mix to be delivered to the site for examination and testing
b) for inspections, checks and tests by the Engineer at the mixing plant or on the site at any time during the period of the Contract
c) for meeting all costs, including transport, provision of apparatus, etc., in connection with the inspections, checks or tests.

With every load of concrete brought to the site there shall be a delivery note containing the following information :-

a) Date.
b) Time of loading concrete into vehicle.
c) Time of leaving mixing plant.
d) Mix of concrete.
e) Quantity of water added.
f) Time of adding water if different from (b).

The Contractor shall cause to be added by his representative receiving the deliver :-

a) Time of delivery.
b) Time load is finally placed in position.
c) Position placed.

The delivery notes shall be handed to the Engineer for his retention at the end of each day's work.

## 2.21 Hardcore

Hardcore shall consist only of broken bricks, hard stone or concrete, free from dust, loam, wood, rubbish or organic materials. All pieces shall be greater than 75mm and less than 225mm in any one direction.

Hardcore having a polished or rounded form or containing laiminated or soft stone is not approved.

## 2.22 Clause 804, Type B Granular Material

This material shall comprise crushed rock, crushed slag, crushed concrete or well-burnt non-plastic shale within the following grading limits:-

| BS Sieve Size | %age by wt passing |
|---|---|
| 75mm | 100 |
| 38mm | 85 - 100 |
| 10mm | 40 - 70 |
| 5mm | 25 - 45 |
| 600 micron | 8 - 22 |
| 75 micron | 0 - 10 |

Testing shall be in accordance with the requirements of BS 1377 Test 7A except for shale when Test 7B will be acceptable, and all material used within 450mm of the surface of the road shall be frost resistant as defined by the Standard Test specified in Transport and Road Research Laboratory Report No.LR90.

## 2.23 Dowel Bars and Tie Bars

Mild steel dowel bars and tie bars shall comply with the requirements of BS 4449 and shall be free from oil, paint, dirt, loose rust and scale.

Dowel bars for transverse expansion and contraction joints shall be straight, and free from burred edges or other irregularities which might restrict the free movement of the steel in the concrete.

## 2.24 Joint Sealing Compound

Joints shall be sealed with a hot-poured, ductile, rubber/bitumen material which shall adhere readily to the concrete and to the preformed filler. It shall not be excessively soft or tacky at a temperature of 50°C nor brittle at a temperature of 0°C, and shall comply generally with the requirements of BS 2499 using Grades A1 or A2 as appropriate in accordance with the recommendations contained therein.

## 2.25 Tack Coat

Bitumen emulsion shall be used for all tack coats and must conform to the requirements of BS 434 for Class A1-40 or K1-40. The rate of spread shall be 0.4 to 0.6 1/m² unless otherwise stated and the work shall comply with the requirements of BS 434 : Part 2.

## 2.26 Flexible Surfacing (Carriageways)

The specification for the flexible surfacing to be used in the Contract is detailed in Drawings. Generally the materials used and the method of laying shall conform to the requirements of the relevant BS as follows:-

| | |
|---|---|
| Rolled Asphalt | BS 594 |
| Dense Tarmacadam<br>Medium Textured Tarmacadam<br>Dense Bitumen Macadam<br>Open Textured Bitumen Macadam<br>Cold Asphalt | BS 4987 |

## 2.27 Precast, Concrete Kerbs, Quadrants, Channels and Edging

The units shall be hydraulically pressed and the aggregate used shall be granite. They shall comply with the requirements of IS 146 or BS 340. Purpose-made radius kerbs and channels shall be used for all radii of 12m or less. When kerb lines are required to be laid to radii of between 12 and 30m straight kerbs each 0.6m long shall be used. Proper ramped and crossing kerbs are to be used at vehicular crossings.

## 2.28 Flexible Surfacing (Footways)

The specification for the flexible surfacing to be used in the Contract is detailed in Drawings. Generally the materials used and the method of laying shall conform to the requirements of the relevant BS as follows:-

| | |
|---|---|
| Rolled Asphalt | BS 594 |
| Dense Tarmacadam ) | |
| Medium Textured Tarmacadam ) | BS 4987 |
| Dense Bitumen Macadam ) | |
| Open Textured Bitumen Macadam) | |
| Cold Asphalt ) | |

## 2.29 Bituminous Sealing Grit

Bituminous sealing grit shall consist of specially selected blast furnace slag fines coated with bitumen. The grit shall not exceed 3mm nominal size and the material shall comply with the relevant sections of BS 4987.

## 2.30 Concrete Blocks

Concrete blocks for paving shall be of type, thickness and colours as specified in Drawings and shall comply in all respects with the recommendations of IS 20.

## 2.31 In-Situ Concrete Manholes

Manholes shall be constructed in Grade 30 concrete in accordance with the details and to the positions shown on the drawings or as directed by the engineer.

## 2.32 Precast Concrete Manholes and Inspection Chambers

Precast Concrete units shall comply with BS 5911 and shall be of the dimensions on the drawings. See Section 3.73.

## WORKMANSHIP

### SETTING OUT AND SITE CLEARANCE

#### 3.1 Setting Out

The Contractor shall set out the whole of the Works and shall be responsible for establishing and maintaining them correctly in accordance with the Contract Drawings or with such further drawings as may be supplied or directions that may be received from the Engineer.

Any work carried out incorrectly shall be taken out and replaced to the satisfaction of the Engineer and at the Contractor's expense.

#### 3.2 Clearing Site

The Contractor shall remove buildings, walls, gates, fences, advertisements and other structures and obstructions, grub up and remove hedges, bushes and shrubs and clear the site of the Works at such time and only to the extent required by the Engineer. The material so obtained shall, so far as suitable be reserved and stacked for further use; all rubbish and material unsuitable for use, in the opinion of the Engineer, shall be removed from the site by the Contractor.

#### 3.3 Clearing Hedges

All holes resulting from the clearance of hedges and their roots shall be filled with approved material which shall be consolidated to the level of the adjacent ground.

#### 3.4 Felling Trees

Where either shown on the Drawings or directed by the Engineer trees shall be uprooted or cut down as near to ground level as possible and removed from the Site. Stumps and tree roots shall, unless otherwise directed by the Engineer, be grubbed up and deposited off the Site in dumps to be provided by the Contractor. Holes left by the stumps or roots shall, within one week, be filled with suitable material, and compacted.

No tree of any type or girth shall be felled, trimmed or otherwise damaged unless a specific order is issued in writing by the Engineer.

No separate allowance will be made for the felling of trees of less than 500mm girth, or for the removal of stumps of less than 150mm diameter. Allowance for such items shall be assumed to have been made in the sums entered against hedge-clearance or excavation in the Bills of Quantities.

## 3.5 Extent of Excavation

Excavation for roads and drains shall be carried out to such length and area as may be considered desirable by the Engineer. Any ground which is excavated to a greater depth than is required due to an error on the part of the Contractor shall be filled with approved material to the correct level. If, in the opinion of the Engineer, the bottom of the excavation does not provide a satisfactory bearing the Contractor shall excavate to such extra depth and fill with such material as the Engineer may order to the required levels.

## 3.6 Excavation for Road Structures

Excavation to formation for carriageways, verges and pavings, shall be to the lines, levels and contours shown on the Drawings, and shall be to such depth below finished road or paving level as is required according to the specified thickness of the road structures. All excavated material shall be removed and deposited in embankments or otherwise as directed and any surplus taken to tip. When completed the formation shall be at the required level and parallel to the required finished surface of the road.

## 3.7 Filling to Road Structures

Material for use as filling under roads, footways, verges and in hollows shall consist of selected excavated or imported material approved by the Engineer. It shall be deposited and compacted in layers not exceeding 300mm deep in the loose and the moisture content of each layer shall be adjusted to the satisfaction of the Engineer either by watering through a rose or allowing to dry out as the case may be. Each separate layer shall be thoroughly compacted by continuous rolling with a smooth wheel roller of eight to ten tonnes weight. Where the material consists of hard dry clay, a towed smooth pneumatic rubber-tyred roller exceeding ten tons in weight shall be used with a minimum of eight passes. The wheels of the rubber-tyred roller must be able to move with the vertical profile of the ground. Where the clay is wet a smooth wheeled roller of the former type is to be used. Inaccessible areas shall be thoroughly compacted by power-operated rammers of weight and type approved by the Engineer.

## 3.8 Trimming of Formation of Carriageway

Immediately prior to the laying of the sub-base material, the forma tion of the carriageway shall be trimmed and adjusted true to the required finished levels, including rolling with one pass of an eight to ten ton smooth-wheeled roller if considered necessary by the Engineer, whose approval to the preparation work must in any case be obtained before each layer of material is placed. The true formation of the carriageway shall not be run over by works traffic, nor shall it be allowed to weather, but shall be covered with the sub-base material immediately the formation is approved. The formation of the carriageway shall when tested with a 3m straight edge have no depression greater than 25mm.

## 3.9 Cold Weather Working

No material in frozen condition shall be incorporated in the Works neither shall material for use in road pavements be laid on any surface which is frozen or covered with ice.

## 3.10 Use of Surfaces for Construction Traffic

Construction traffic used on pavements under construction shall be suitable in relation to the thickness of the courses it traverses in order that damage is not caused to the sub-grade or the material already constructed.

## 3.11 Sub-Base to Carriageway

The first layer to be laid on the formation will be the sub-base as shown on the Drawings. The material shall be uniformly spread and not tipped in heaps, and consolidated by a smooth wheeled roller of 8 to 10 tonnes weight to the required levels and to the specified minimum consolidated thickness. If any clay or mud work through to the surface the affected areas shall be cut out as directed by the Engineer and replaced with fresh material as specified.

The finished surface of the sub-base shall when tested with a 3m straight edge have no depression greater than 20mm.

Where any completed area of sub-base is not immediately covered with the next construction layer, it shall be protected by a mem brane of 500 Grade plastic sheeting with 300mm laps set to prohibit ingress of moisture. Alternatively a bituminous emulsion may be used as specified in BS 434 : Part 2, Recommendation No.9.

## 3.12 Compaction

Compaction of formation and/or sub-base shall be carried out to Clause 802 table 8/1 of the Specification for Roadworks D.O.E. All soft areas which develop during compaction shall be removed and replaced with approved materials and compacted in layers not exceeding 225 mm in depth.

## 3.13 Concrete Mix Design

Mixes for the Classes of concrete shown in the following Table shall be designed by the Contractor:-

| Concrete Grade | Maximum Aggregate Size mm | Cement Content kg/m³ | Min.28 day Compressive Strength | |
|---|---|---|---|---|
| | | | Prelim.Test MN/m² | Works Test MN/m² |
| 35 | 20 | 360 | 45 | 35 |
| 30 | 20 | 290 | 40 | 30 |
| 20 | 40 | 240 | 30 | 20 |
| Lean | 20 | - | - | 10-20 |

The cement content in any mix shall not exceed 530 kg/m³ of concrete. The quantity of water used shall not exceed that required to produce a concrete with sufficient workability to be placed and compacted where required. The Contractor shall make laboratory trial mixes using the aggregate proposed for the work. The trial mixes shall be made in the presence of the Engineer or his representative and shall be repeated until the proportions necessary to produce a concrete complying in all respects with the requirements of the Specification have been determined. These proportions shall be adjusted as work proceeds if it is shown that the mix is unrepresentative of the concrete produced by the mixing machinery or if the concrete is incapable of being placed and compacted by the machinery being used.

When additives are specified or approved for concrete these shall be included in the mix for the assessment of all cube strengths.

## 3.14 Concrete Mixing

Concrete shall be mixed in approved machines equipped with means whereby the quantity of water added to each batch of concrete may be accurately controlled. The mixer drum shall be turned a sufficient number of times to mix the materials dry and a minimum mixing time of one minute shall be allowed after the water is added. The entire contents of the drum shall be discharged before any materials for the succeeding mix are placed therein. Only such quantities of concrete as are required for immediate use shall be mixed at any time. All concrete to be placed shall be in such a condition that it is capable of being fully compacted. Any concrete which has not been compacted into its final position within 2 hours shall be replaced by fresh concrete.

Any condemned concrete shall be removed from the site or disposed of as directed.

Concrete shall at all times be kept free from deleterious matter and shall not be placed directly on the ground before placing into its final position. Metal or timber sheeting of adequate area shall be used for this purpose and the surface shall be wetted and brushed clean of all surplus concrete once in every hour during use and at the end of each period of work.

Under no circumstances shall concrete mixers be sited on completed carriageways, nor shall any aggregates or other materials be deposited on or within the limits of the proposed highway. The discharge of cement slurry, or washings from mixers, over a completed carriageway, or into adjacent drains, sewers or gullies is forbidden.

## 3.15 Placing and Compaction of Concrete

No concreting shall be carried out neither shall mortar or grout be used in a descending air temperature in the shade of 3°C nor shall such materials be used until the rising air temperature in the shade reaches 3°C. No concrete shall be dropped into any part of the Works from a height greater than 2.0m. It shall be lowered in skips or by other means approved by the Engineer. Concrete shall be adequately compacted by ramming, tamping or vibration as may be particularly specified for each part of the Works to ensure that the finished concrete is as dense as possible and free from voids, tightly packed around reinforcement and has a close-knit surface free from laitance and froth.

## 3.16 Cube Tests for Grade 35 and Grade 30 Concrete

During the progress of concreting 150mm cubes shall be made, cured and tested all in accordance with BS 1881. When required the cubes shall be sent to a testing laboratory approved by the Engineer. All cubes shall be cast in the presence of the Engineer's Representative and their reference numbers shall be submitted to the Engineer in a weekly report. The location from which the samples have been taken for each cube shall be noted in each report together with the date on which the cube was made.

Cubes shall be made in pairs at intervals each day, each pair being from a different batch of concrete. At the start of the paving work one pair of cubes shall be made for each 12m run of carriageway. This rate of testing shall be continued until such time as the Engineer may order a reduction in the number of specimens required. One of each pair of cubes shall be tested at 28 days and the result of this test shall provide the basis of assessing compliance with the requirements for strength. The other cube of each pair shall be tested at 7 days to provide an early indication of any changes in the quality of concrete being produced. The 7 day strength should attain two thirds of the 28 day strength.

If the minimum crushing 'strength' is not so attained the Contractor shall without expense to the Employer, cut cores from locations selected by the Engineer. Where this is done the strength of cores when tested in accordance with BS 1881 will be accepted as taking precedence over the cube strengths in determining the strength of concrete. Correction for age of concrete from which cores are taken shall be made in accordance with CP 114, Table 9.

## 3.17 Testing of Grade 20 Concrete

The testing requirements for this Class of concrete shall be as for Classes 35 and 30 except that the frequency of testing shall be at the discretion of the Engineer. It is intended here that cubes shall be taken at any time according to the purpose for which this Class of concrete is being used, but in any case sufficiently frequent to ensure consistency in quality and strength with that of the trial mix.

## 3.18 Lean Concrete Carriageway Base

The aggregate shall be 40mm all-in aggregate to Table 6 of BS 882. The ratio of cement to aggregate by weight shall be sufficient to produce average crushing strengths to the requirements of Clause 3.19. The ratio of cement to aggregate by weight shall not, however, be more than 1:18 nor less than 1:20 except with the approval of the Engineer. The concrete shall be mixed in accordance with Clause 3.14.

## 3.19 Cube Tests for Lean Concrete

The making, curing and testing of cubes shall be in accordance with BS 1881 except that the cubes shall be compacted by means of an electric or pneumatic hammer. The hammer shall have a square or rectangular foot having an area between $0.01m^2$ and $0.015m^2$ and sufficient pressure shall be used directly on each of the three layers of material filled into the mould to result in the material being compacted to refusal. During the progress of laying lean concrete, 150mm cubes shall be made in pairs as for Carriageway Concrete (Clause 3.16), with a minimum of one pair of cubes being made for each 18m of carriageway. One cube of each pair shall be tested at 7 days and the other at 28 days. The average strength of any group of three 7 day cubes shall not be less than $7MN/m^2$ and the crushing strength of any one cube at 28 days shall be within the range 9.5 to $15.0MN/m^2$. Should the cube strength fall outside this range the Engineer may require the use of different materials or mix proportions.

## 3.20 Cost of Concrete Cube Tests

The Contractor shall provide the materials for and bear the cost of all Works tests including labour, moulds, transport, fees, laboratory fees and all other expenses, and these costs shall be deemed to be included in the rates tendered against 'concrete' in the Bill of Quantities.

## 3.21 Placing and Compaction of Lean Concrete

Restrictions regarding cold weather working referred to in Clause 3.15 shall apply also to lean concrete. Construction shall be to the specified thickness after compaction. Where a base of more than 200mm thickness is required, the material shall be placed in two layers, each of which is half the total finished thickness of the base, the upper layer being placed immediately after laying and compacting the lower layer so that in any vertical section the lean concrete shall be fully compacted throughout the whole depth and finished within three hours from the time of the completion of the mixing of the first batch of lean concrete in that section. If for any reason this time limit is exceeded, the bottom layer of concrete shall be sealed with bitumen emulsion (as specified for the upper layer) and the placing of the upper layer shall be delayed for four days.

Compaction shall be carried out by means of a vibratory tandem roller weighing between 1 and 1½ tonnes. The roller shall make two initial passes without vibration. Subsequent passes (being not less than six) shall be with vibration. Compaction shall continue until visible movement of the surface of the layer beneath the roller ceases and until the surface is closed. Finally the roller shall pass over the surface without vibration to eliminate all roller marks. The compaction achieved shall be such that the density of the compacted concrete shall be not less than 95 per cent of the theoretical density of the material as compacted to zero air content calculated from the specific gravities, determined in accordance with BS 812, and the nominal proportions of the constituents, including the water.

Subject to restrictions as to weather conditions, the lean concrete base shall be laid continuously throughout the working day, and at the end of each day's work a construction joint shall be formed by means of a securely fixed vertical stop end. Any poorly compacted concrete which is revealed when the stop end is removed, shall be cut out and a 1:1 cement/sand mortar shall be applied to a thickness of 12mm to the face so exposed before the laying of further adjoining lean concrete.

The surface of the finished lean concrete shall conform to the lines and levels shown on the drawings and, when tested with a 3m straight edge shall not show any depression greater than 12mm.

Within one hour of being compacted and finished to the satisfaction of the Engineer, the surface of the lean concrete shall be sprayed with bitumen emulsion to Tack Coat specification but at a rate not lighter than 0.9 litres/m² and blinded with sand.

All traffic shall be kept off the lean concrete base for 7 days after laying and for a further 7 days no traffic other than that which is essential for the laying and rolling of the surfacing shall be allowed on the base.

## 3.22 Forms for Carriageway Slabs

Forms shall be of steel and shall be of depth equal to or greater than the thickness of the slab. The forms shall be of approved section and construction and shall be perfectly straight or suitably curved to comply with the requirements of Clause 2.32, have a broad base and be of sufficient stiffness to withstand, without displacement or distortion, the passage of the compacting plant. They shall be provided with an efficient locking device to ensure continuity of line and level through joints with steel pins to hold them in position. The forms shall be set true to line and level and shall be supported on thoroughly compacted material for their entire length. They shall be inspected for alignment before concreting commences and forms varying by more than the specified carriageway tolerance shall be taken up and reset. Packing up forms with pieces of slate, etc, shall not be permitted. All formwork shall be thoroughly cleaned and well greased or oiled before concrete is placed and shall remain in position after the concrete is placed for at least 48 hours.

## 3.23 Laying of Flexible Surfacing to Carriageways

Work involving the use of tar or bitumen or any combination thereof shall not be continued if the temperature of the surface to be covered is at or falls below 2°C. Nor shall it be resumed until the temperature of the surface to be covered is at or rising above 1°C. If the surface to be covered is cleaned by the use of water the surface must be allowed to dry before any surfacing material is laid. Immediately prior to the laying of flexible surfacing the Contractor shall clean the surface of the base to remove all foreign matter and the surface must be inspected by the Engineer before proceeding with the laying of the flexible material. All gully ramps are removed at this stage. (See Clause 3.66).

The surfacing shall be spread by an approved mechanical paver and consolidated to the required thickness by a roller of not less than eight tonnes weight.

The material shall be rolled in a longitudinal direction from the sides to the centre of the carriageway, overlapping on successive passes by at least half the width of the rear roll. Rollers shall not stand on newly laid material while there is a risk that the material will be deformed thereby.

Where the laying of the wearing course is included in the same contract, it shall immediately follow the laying of the base course, but no wearing course shall be laid on any section of the road until the Engineer is satisfied that the base course is laid to his satisfaction.

In areas where, due to difficulties of access, compaction is not possible by roller such areas shall be thoroughly punned until the same degree of compaction is achieved. Where precoated chippings are to be rolled into the wearing course all drainage channels adjacent to kerbs shall be kept free of chippings for a width of 300mm. Over the remainder of the carriageway the minimum texture depth of the chippings shall be 3mm. The level of any point on the surface of each of the pavement courses shall conform to that shown on the drawings and shall when tested with a 3m straight edge have no depression greater than 10mm.

Where joints between laying widths, or transverse joints have to be made in wearing courses they shall be cut back to a vertical face which shall be coated completely with a grade of hot tar or hot bitumen suitable for the purpose immediately before the adjacent area is laid. In two stage construction where basecourse only is required as a first stage the basecourse shall be treated as a wearing course for the purposes of joint treatment. All joints shall be offset at least 300mm from parallel joints in the layer beneath.

If required by the Contract, the surface of the wearing course shall be blinded with bituminous sealing grit spread at the rate of 210m² to 250m² to the tonne and this shall be lightly rolled in. All surplus grit shall be removed on completion. The sealing grit must be applied on the same day as the wearing course is laid and, where the application of the wearing course is to be delayed for more than a week, in two-course construction, the basecourse must also be sealed to the same specification.

## 3.24 Tolerances

The surface level of each layer of construction and of the prepared formation shall not deviate vertically at any point from the true level by more than the permitted tolerances indicated below:-

| | |
|---|---|
| Finished Surface Concrete | ± 7mm |
| Flexible | ± 10mm |
| Basecourse | ± 10mm |
| Base | ± 12mm |
| Sub-Base | ± 20mm |
| Formation | ± 25mm |

In the case of flexible surfacing, the wearing course on completion of construction is permitted to be 10mm high or low except, where the application of the latter in combination with the basecourse upper limit would result in a reduction of the specified thickness of the wearing course greater than 15%.

## 3.25 Kerb Foundations

The precast concrete kerbs shall be laid as the placing of the concrete foundation proceeds. The Grade 20 concrete shall be of a stiffer mix with a lower water/cement ratio. The ratio shall be at the discretion of the Engineer but shall normally be in the region of 0.35. The concrete foundation shall be placed over a minimum width of 300mm and to an initial thickness of 200mm in order that the foundation may be consolidated to the required minimum thickness of 150mm by the laying of the kerbs themselves. The actual uncompacted thickness may have to be adjusted in the light of experience as work proceeds. The kerbs must be laid on the foundation before the concrete's initial set has taken place but in any case no later than 30 minutes after the concrete has been placed. Protection from weather shall be provided by a shield of plastic sheeting, supported so as not to touch the concrete surface, until the kerbs are backed with 150mm concrete haunching as described in Clause 3.33.

## 3.26 Laying of Kerb

The kerb shall be laid to a true alignment vertically and horizontally and be full bedded. After the kerb line has been approved by the Engineer the kerbs shall be haunched immediately with 150mm thickness of Grade 20 concrete to within 75mm of the top of the kerb. Kerbs shall be open jointed with a maximum gap of 3mm between adjacent kerbs and no mortar shall be used in the vertical joints. Purpose made radius kerbs shall be used for all curves of radius 12m or less. Straight kerbs of length 600mm shall be used for curves of radius exceeding 12m and straight kerbs of length 1m for curves of radius exceeding 30m and for all straight runs.

The Contractor shall take precautions to prevent the dislodgement of kerbs by vehicular traffic and shall make good any damaged kerbs.

## 3.27 Granular Sub-base to Footways

The sub-base shall be of granular Clause 804 material or other approved and shall be uniformly spread and consolidated by a vibratory 2 to 3 tonne roller to the required levels shown on the Drawings and to a minimum thickness of 75mm. If any clay or mud work through to the surface of the material the affected areas shall be cut out as directed by the Engineer and replaced with fresh material.

## 3.28 Flexible Surfacing to Footways

The base-course material shall be spread evenly and the surface shall conform to the required levels and cross-section within a limit of 6mm in 3m. Consolidation shall be carried out with a tandem roller of 2 to 3 tonnes weight. Immediately before the wearing course is laid the surface of the base-course shall be thoroughly cleaned and a tack coat applied to the area. The wearing course material shall be spread evenly and the surface shall conform to the required levels and cross-section within a limit of 3mm in 3m.

The finished surface shall be left 3mm proud of all boxes, manhole covers, kerbs, edgings, etc, and shall, if so required by the Contract, be blinded with bituminous sealing grit at the rate of 210m² to 250m² to the tonne and this shall be lightly rolled in. All surplus grit shall be removed on completion. In areas where due to difficulties of access, compaction is not possible by roller, such areas shall be thoroughly punned until the same degree of compaction is achieved at each stage of construction.

## 3.29 Trimming of Side Slopes

The side slopes of cuttings and embankments shall be trimmed to such inclinations as are shown on the drawings or to such other profile or slope as the Engineer may direct but not exceeding an inclination of 1 in 1½.

## 3.30 Soiling of Side Slopes, Berms and Verges

The soiling of embankments cuttings, etc, shall be carried out to a consolidated thickness of 150mm. Prior to placing topsoil the areas shall be cleared of all brickbats, rubbish, large stones and all extraneous matter. Where seeding or planting is to follow, the surface shall be raked and cross raked or harrowed and Cambridge rolled, and rolled and cross-rolled until a fine tilth is obtained.

DRAINAGE

## 3.31 Excavation for Drain Trenches and Manholes

Drain trench and manhole excavations shall be straight and true to the lines and levels shown on the Drawings. The sides shall be vertical and to the specified maximum width. The Contractor shall so arrange his excavation programme that the laying and bedding of pipes shall follow immediately.

Inverts of trenches shall be trimmed and shaped by hand to accurate lines and levels and shall be cleared of all boning pegs large stones and other hard objects. Where necessary joint holes shall be neatly cut and shall not be larger than is necessary for making the pipe joints.

Any trench which is excavated to a greater depth than is required, due to an error on the part of the Contractor, shall be filled to the correct level with lean mix concrete.

## 3.32 Timbering to Drain and Manhole Excavations

The sides of excavations shall be adequately supported by means of timber walings, struts and runners of sufficient number and dimensions to prevent the falling-in, movement or slipping of the ground, injury to workmen and damage to the Works or adjacent property. Steel sheeting may be used in lieu of timber runners subject to the approval of the Engineer. Where flexible type bedding is used, timbering or sheeting at or below the level of the bed shall be withdrawn immediately before the placing of the bedding material.

In the event of a slip occurring the specified maximum trench width shall be restored with lean concrete up to a height of 300mm above the crown of the pipe.

## 3.33 Excavations to be Kept Free of Water

The Contractor shall keep all excavations free of water during the course of the Contract.

## 3.34 Backfilling to Trenches and Manholes

Backfilling of trenches and to the sides of manholes shall be commenced immediately each length of drain trench has been tested and approved. Manholes shall be built up complete with covers for this purpose as work proceeds. The backfilling shall be undertaken immediately the specified operations preceding it have been completed. Layers not exceeding 225mm deep in the loose shall be rammed solid, each layer being separately compacted by power operated rammers of weight and type approved by the Engineer. Watering shall be carried out only at the descretion of the Engineer.

The Contractor shall be permitted to leave sheeting or timber in trenches only when the Engineer has given a written order to that effect.

## 3.35 Gravel Backfill to Trenches

Under carriageways and internal floors where additionally ordered trenches shall be backfilled with 38mm all-in gravel aggregate to Table 6 of BS 882. The filling for the first 300mm shall be lowered into the trench in skips and be thoroughly hand punned. The remaining depth shall be filled with the material in 300mm layers each power rammed with a machine of an approved type to ensure maximum compaction for the full depth of the filling.

## 3.36 Reinstatement of Surfaces over Excavations

The provisions of this clause shall apply only in cases in which an existing paved or ground surface is required to be restored on completion of the Works, and will normally apply to the construction of drains which are not in any road which is to be constructed under the Contract and which are off the main site of the Works.

The Contractor shall carefully restore the surface over excavations to as near their original conditions as practicable. Where excavations are in existing roads, tracks, or footways, the surface of the excavation shall be reinstated in a temporary manner as hereinafter described.

A layer of clean clinker shall be laid on top of the filling to a consolidated thickness of 75mm. This shall be followed by a 75mm consolidated layer of old road metalling. Finally a 60mm consolidated thickness of 40mm nominal size bitumen macadam to Tables 13 to 16 inclusive of BS 4987 shall be laid level with the adjacent road surface. Consolidation of these various layers shall be by mechanical rammer.

For a period not exceeding three months the Contractor shall maintain the temporary surface in a safe and satisfactory condition for vehicular and pedestrian traffic by making up with 10mm nominal size bitumen macadam to Tables 33 to 36 inclusive of BS 4987 and rolling from time to time as required. At the end of this time the temporary bitumen macadam shall be removed, the edges trimmed, the trench made good and finally reinstated with base course and wearing course to the appropriate material specification.

Where excavations are carried out in gardens and fields, etc, the topsoil over the width of the excavation shall be carefully separated from the subsoil and removed to heaps clear of the Works and separated from other spoil heaps. On completion of backfilling of the excavation to the satisfaction of the Engineer the topsoil shall be replaced.

At the appropriate season or otherwise as instructed all damaged areas shall be re-seeded in accordance with the requirements of the owners of the land or highway concerned and all trees, bushes, shrubs, plants, etc, which have been removed, damaged or destroyed shall be replaced.

The Contractor shall inspect the trench from time to time after reinstating as above and shall maintain the surface level with the surrounding ground and make good throughout the period of the Contract.

## 3.37 Concrete Bed, Haunching and Surround to Drains

Where shown on the Drawings or considered by the Engineer to be necessary, a Grade 20 concrete bed 150mm thick shall be provided over the full width of the trench (the timbering being withdrawn for this purpose) and, after the pipes have been jointed and tested they shall be haunched up or completely surrounded as required with concrete of the same mix. Haunching shall be carried up to the centre line of the pipes, the concrete shall completely fill the trench up to that level and shall have a minimum clear horizontal thickness of 150mm on each side of the pipe barrel. The haunching shall then be sloped up to the crown of the pipes.

Pipes which are to be surrounded shall also have a covering of concrete not less than 150mm thick.

Preformed joint filler shall be placed at pipe joints and shall extend through the full thickness of the concrete in contact with the pipe. Such joints shall not be more than 5m apart.

## 3.38 Placing of Granular Bedding Material Stage 1

The trench floor shall be cleared of all loose stones, lumps of clay, etc, before the bedding is laid. The material shall be laid over the full width of the trench and shall be evenly spread and carefully compacted and the surface after compaction shall be true to the required gradient. Any clay, soil or foreign matter falling onto the granular bed from the trench sides or any other source shall be immediately removed, and in this connection the Engineer may require the bedding to be completely removed and replaced with fresh material in order to ensure the elimination of foreign matter.

Timbering or any other form of trench support shall be withdrawn as the bedding material is placed so as to avoid disturbance of the bed by later removal.

The depth of the bedding material when fully compacted shall be in accordance with the details shown on the Drawings.

## 3.39 Laying of Pipes on Granular Bed

After the granular bed has been prepared the pipes shall be laid with the minimum disturbance to the bedding material. All adjustments to line and level must be made by adding or removing bedding material under the body of the pipe and not by wedging and blocking.

Flexible jointed pipes shall be used and the joints shall be well and carefully made in accordance with the manufacturer's instructions. Where the pipes are too large to be easily manhandled into position, a crane and jacking equipment must be used. During the jacking operation the pipe shall remain suspended from the crane. If necessary additional bedding material shall be used to prevent the pipe settling after the release of its weight.

## 3.40 Placing of Granular Bedding Material Stage 2

After jointing and, if necessary, testing the pipes, bedding material shall be carefully placed in layers of not more than 150mm thickness equally on each side of the pipes and so compacted under and alongside the pipes up to the level of the centre of the pipes and laterally up to the undisturbed soil of the trench sides as to eliminate all cavities and ensure equality of density throughout and equal to that of the material laid in Stage 1. All trench side supports shall continue to be withdrawn as filling proceeds. Walking on the pipes or the application of any other force which may disturb them will not be permitted until after the Stage 2 procedure has been completed.

## 3.41 Refilling Trenches with Selected Excavated Material

Except where special backfill material is specified trenches shall be refilled with approved excavated material.

The initial layer of backfill material shall be free from stones, shall not be thrown directly onto the pipes but shall be carefully placed and compacted in thin layers by hand up to 300 mm above the top of the pipe or special surround.

Backfill around pipes, including concrete or other special materials, shall be carefully packed under and around the pipes.

Filling above the initial layer shall be deposited and compacted in layers not exceeding 225 mm loose depth to a dry density not less than that of the adjoining soil.

Mechanical appliances may be used for compaction of the backfill above the initial layer, providing the appliance is suitable for the conditions and will not damage or displace the pipes.

## 3.42 Gully Connections in Flexible Construction

All gully connections shall be surrounded with 150mm concrete Grade 20. The length of pipe on the main drain run to which the gully is connected shall be similarly surrounded with 150mm of Grade 20 concrete which shall not extend over the joints at either end of the main drain pipe.

## 3.43 Testing of Drains and Connections

All jointed pipe drains shall be tested with air after being laid and jointed and before surrounding and backfilling is commenced to ensure that the jointing is satisfactory. No pipes are to be covered up until inspected by the Engineer. The air test shall be repeated after the completion of backfilling and manhole construction, the length being tested between manholes. The Engineer will also require a further test to be carried out on completion of the Contract prior to the commencement of the Maintenance Period.

The apparatus used for air testing shall be of a type approved by the Engineer and the test shall in all cases be applied in the presence, and to the satisfaction of the Engineer or his representative. Air shall be pumped into the length of pipes under test until a pressure equivalent to 100mm of water is indicated and maintained without loss exceeding 25mm for five minutes without further pumping. Concrete pipes may be damped prior to testing.

In the event of the failure of such tests, or any infiltration occurring, the Contractor will be required to locate the defect and make good by providing and laying new pipes or otherwise repairing the leak as directed.

## 3.44 Trench Widths

Calculations for pipe loadings have been based on maximum widths of trenches. The Contractor must allow for carrying out the Works within these widths, which are measured soil face to soil face and include the thickness of timbering or sheeting. The maximum permitted trench widths are set out in the table below and will be strictly enforced. The Contractor may reduce the trench width provided adequate room is allowed for the proper support of the trench and for the laying, aligning and jointing of the pipes and for the placing of the bedding and covering materials as required.

Maximum Permitted Overall Trench Widths

| Nominal Internal Diameter of Pipes mm | Maximum Overall Width of Trench mm |
|---|---|
| 150 | 600 |
| 225 | 700 |
| 300 | 750 |
| 375 | 1050 |
| 450 | 1150 |
| 525 | 1200 |
| 600 | 1350 |
| 675 | 1450 |
| 750 | 1500 |
| 825 | 1600 |
| 900 | 1900 |

The same principle shall apply to dual trenches, subject to the maximum width of half the maximum permitted trench width in respect of each of the pipes plus the specified distance between pipe centres.

3.45 Junctions and Connections

Where shown on the Drawings or directed by the Engineer, pipe junctions shall be inserted during the construction of the drains. Junctions on the drains which are not immediately connected up shall be closed with stoneware disc stoppers set in and filled up to the ends of the sockets with puddle clay. All junctions with the drains shall be wholly surrounded with 150mm of Grade 20 concrete. Connections shall be tested in the manner prescribed for drains. The inside of the last pipe and the outer face of the stopper shall be painted red to indicate a foul connection of blue to indicate a surface water connection. Where it s necessary to make a saddle connection to an existing sewer or drain, a template shall be made in the shape of the saddle to be fixed, and the outline of the template shall be marked on the wall of the sewer or drain by means of a chisel.

The hole as marked shall be neatly cut out to the required shape to suit the saddle. Saddle junctions shall be inserted in the drain so that the junction piece is oblique with the direction of the flow of the drain and as near as practicable to the crown thereof. The saddle shall be bedded in cement mortar, care being taken to clean all surplus mortar from the inside of the junction piece and to remove any mortar and debris which may fall into the drain. When a connection is to be made to an existing manhole, the soffit of the connection shall be level with the soffit of the main sewer or drain, and the connection shall be turned into the main sewer or drain so that it is rebuilt in the manner specified for new manholes and the wall of the manhole made good neatly in granolithic rendering. The manhole shall be made watertight.

## 3.46 Drains in Common Trench

Drains in common trench shall be laid not less than 600mm apart, and where necessary because of larger diameter pipes, manholes, etc, this distance apart shall be increased so that the piped, manholes and concrete surround can be positioned to the Engineer's satisfaction.

The maximum distance centre to centre for pipes to be laid in Common Trench shall be 1.5m. Where due to the difference in invert levels a step in the trench formation is required, the Contractor shall excavate the trench to produce a sound true and even bed for each pipe, and to ensure that the formation which is to support the higher level drain is not disturbed or damaged. Any part of the formation which is distrubed or damaged shall be excavated to such additional depth as may be required by the Engineer and made up to proper level with all-in ballast.

## 3.47 Manholes Generally

Manholes shall be constructed in accordance with the details and to the positions shown on the drawings or as directed by the Architect. Excavations shall be of the minimum dimensions for the construction of the chamber, allowing for any necessary timbering.

Invert channels shall form a vertical transition between the gradients of the incoming and outgoing drains and where there is a change in horizontal direction of these drains, the channel shall be curved in plan to the largest possible radius. The channel shall be accurately finished to a smooth curved surface with either purpose made channels or in-situ concrete finished with 25 of 1 : 1 cement mortar rendering. The sides of the main channels above half diameter shall be vertical up to the level of the soffit of the inlet pipe.

Benching shall have a minimum fall of 25 mm from back to front and 25 mm radius nosing to the channel, the whole of the benching and vertical sides of the channel to be finished in 1 : 1 cement mortar rendering, (25 mm thick) finished to a smooth hard surface with a steel trowel.

External manhole covers and frames to be circular pattern Grade A, Heavy Duty, in paved areas and medium duty in grassed areas complying with BS 497. Internal covers to be medium duty double seal air tight covers and frames to Engineers approval.
Frames to be bedded 1 : 3 cemet mortar on a minimum of two courses of brickwork with the surface flush with the existing or proposed adjoining ground level. Normally acceptable tolerances will be within the range of true level and 5 mm below.

Two sets of manhole lifting keys for each type of cover shall be provided and handed over to the Engineer's Representative as soon as fixing of the covers commences.

Manhole ladder rungs shall be mild steel complying with the requirements of B.S. 1247 to Local Authority standard pattern. They shall be hot-dip galvanised after manufacture.

The centres of the treads are to be 300 mm apart vertically as shown on the drawings. The bottom rung to be not more than 300 mm above the benching and the top run shall be not more than 450 mm below the top of the manhole cover.

Where detailed, ladders shall be fixed vertically to manhole and shaft walls. Ladders shall be wrought iron to BS 51 with 20 mm diameter rungs shouldered and riveted to the stringers at 300 mm centres. The stringers shall be attached to the walls at their head and foot by galvanised rag bolts of 20 mm diameter and stayed to the walls by galvanised steel or wrought iron stayes of the same section as the stringers, set not more than 2.5 m apart vertically and fixed to the wall with 20 mm diameter rag bolts.

Any fish plates on the stringers shall be of the same section as the stringers, secured with 2 bolts on each side of the joint. The bolts shall be cup headed and when secured shall not project more than 3 mm beyond the nuts.

All manholes, when completed, shall be watertight.

## 3.48 Cement Rendering in Manholes

Cement rendering shall be applied in two layers of equal thickness the first coat being scored while soft and thoroughly wetted before the second coat is applied. The surface to be rendered shall be thoroughly cleaned with a wire brush and shall be wetted immediately before the application of the rendering. The rendering shall be finished with a steel float to a hard, smooth uniform surface and all external and internal angles shall be left clean and sharp. Surface Water Manholes to be rendered in two coats externally. Foul Manholes to be rendered internally and externally in two coats.

## 3.49 Testing of Manholes

When manholes are required to be tested the inside of the manhole shall be cleared of all dirt and foreign matter. All outlet pipes shall be closed by means of expanding stoppers. The manhole shall then be completely filled with water and after time has been allowed for absorption to take place, refilled to the level of the top of the cover.

For two hours no more water shall be added to the manhole and if at the end of this time the water has not dropped in level by more than 25mm, the manhole shall be regarded as satisfactory. Should the drop in level be more than the amount stated, the outside faces of the manhole shall be uncovered, leakages located and the manhole emptied. After all defective areas in the walls have been made good the test shall be reapplied and the process repeated as may be necessary until the manhole satisfies the requirements of the test.

## 3.50 Land Drains

Trenches are to be excavated to the widths and depths indicated, and trench bottoms graded to falls.

Pipes are to be 100 mm diameter clayware to BS 1196 or 100 mm diameter slotted/perforated uPVC to BS 4660 or BS 5481 or similar approved.

A minimum of 150 mm of bedding of approved filter material is to be laid in the trench under the pipes, and the trench filled with filter material to within 150 mm of finished ground level or as shown on the drawings.

The Contractor is to take all necessary precautions during the construction of adjacent work to prevent unsuitable material being mixed with the filter material.

## 3.51 Connection Markers

The position of the closed end of each junction or connection shall be indicated by a marker consisting of a 100mm x 100mm x 1220mm timber post, driven 600mm into the ground and connected to the end of the last pipe by a stout galvanized wire. The posts are to be creosoted to 700mm from the bottom end. The remainder of the posts to be painted red in the case of foul connections, and blue in the case of surface water connections.

The stopper closing the end of each junction or connection shall be similarly painted.

GENERAL

## 3.52 Reinstatement of Working Area

The reinstatement of the working area shall include the removal of all stone, debris, rubbish, excavated material and clay from the surface of the working area, the grading and levelling of the area to the level of the adjacent land, the removal of all vehicle and plant tracks from the surface, and the ploughing up, disc-harrowing, chain-harrowing and rolling with a Cambridge roller and levelling and grass seeding any areas of working space which in the opinion of the Engineer have become over-consolidated due to the passage of plant and execution of the Works. The term 'working area' shall be deemed to include any areas of land used as access routes on to the Site and the Contractor shall allow for compliance with the provisions of this Clause.

## 3.53 Use of Explosives

No explosives shall be used for any purpose unless the Contractor has obtained the written approval of the Engineer.

## 3.54 Solid Rock

The term 'solid rock' shall mean boulders exceeding 0.500m³ in volume, or rock which, in the opinion of the Engineer, requires drilling and blasting, wedging, sledging or barring for its removal. No soft or disintegrated rock or shale rock which may be broken up with a pick, loose, shaken, or previously blasted rock, broken stone in rock fillings or elsewhere and no rock which may fall into the excavation shall be considered as solid rock.

## 3.55 Connections to Existing Outfall Sewers, Drains and Manholes

Where described in the Contract, existing sewers and drains shall be properly extended, connected and jointed to new sewers, culverts, drains or channels. All such connections shall be made during the construction of the new main sewer, drain or other work and their positions recorded by the Contractor who shall hand to the Engineer a copy of the record of the connections made the previous day. Where pipe connections are made to a brick sewer, concrete culvert, stone built or lined channel, the pipes shall be well and tightly built into the concrete, brick or masonry work and be so placed as to discharge at an angle not greater than 60 degrees to the direction of flow of the main sewer, drain or channel and with the end of the pipe carefully cut to the necessary angle. Where the connections are between pipe sewers or drains, special connecting pipes as described in the Contract shall be laid true and properly jointed.

Where connecting to an existing manhole, the side of the manhole is to be exposed to take the new connection modification to existing benching etc. shall be carried out in accordance with the requirements of the engineer and the manholes shall be rendered watertight on completion.

Before entering or breaking into an existing sewer or drain, the Contractor shall give notice of his intention to do so to the authority responsible for the pipeline to which the connection is to be made.

## 3.56 Precast Concrete Manholes

Concrete manholes shall be precast and constructed in accordance with the details shown on the Drawings. The base, invert and benching shall be formed in situ of Grade 20 concrete and the chamber and shaft shall be made of purpose-made rings and components of approved design. The 150 mm thick concrete surround shall also consist of Grade 20 concrete. The bottom ring on the chamber shall have a plain butt end resting on the concrete base, and the concrete surround to this ring shall be placed, consolidated and allowed to set undistrubed for 24 hours before any further chamber rings are placed.

Construction joints in the concrete surround shall be horizontal and be placed 150 mm below the joint in the rings. The face of the construction joint shall be cleaned and scrubbed with a wire brush and painted with a 1 : 1 cement/sand mortar before further concrete is laid. In jointing the chamber and shaft rings the lower rings shall be 'buttered' with 1 : 3 cement mortar and the next ring lowered into position, carefully adjusted to be truly vertical with step irons correctly located. Excess mortar shall be struck off immediately and a neat flush joint formed on the interior and exterior of the rings.

Where it is necessary to provide a backdrop and rodding eye in concrete manholes, suitable lengths of chamber rings shall be provided so that the position of the rodding eye hole does not occur at or near a joint between chamber rings, and the rodding eye hole shall then be cut through the chamber ring so as to provide an invert level with that of the backdrop junction. A special short length of pipe shall then be cut to fit the inside of the chamber ring to form the rodding eye as shown on the standard detail drawing. The surface of the rodding eye hole shall then be made good in cement mortar rendering.

Manholes constructed in sewer lengths composed of pipes with flexible joints must be provided with short lengths of pipe which pass through the thickness of the manhole wall and form a normal flexible joint with the first pipe of the main sewer immediately outside the manhole wall. The manhole cover frame shall be bedded in cement mortar on a maximum of three courses of 225 mm. Engineering brickwork to bring the cover up to the finished level of the adjacent surface in carriageways, footways, and car parks, and to 225 mm above in fields.

A 25 mm thickness of granolithic rendering shall be applied in two coats in the in situ concrete benching the first coat being scored to form a key for the second coat.

GENERAL

3.57 Completion of Drainage Works

On completion of drainage works the Contractor shall engage a specialist firm of Drain Clearing Contractors to thoroughly cleanse all pipe lines and carry out a C.C.T.V. survey of all lines to check and confirm the satisfactory condition of the completed works or to identify any areas damaged during construction. The completed audio visual cassette record shall be the property of the Engineer who shall retain it as a record of the completed system. Any faults identified shall be made good by the Contractor at his own expense. A P.C. sum is included in the Bill of Quantities to cover these works.

WATER SUPPLY

4.1 Pipes for watermains shall be :

uPVC Pressure Pipes to IS 123, BS 3505 or BS 3506.

4.2 Pipes for watermains shall be :

Asbestos Cement Pressure Pipes complying with IS 188 or BS 486.

4.3 Pipes for watermains shall be :

Ductile Iron Pipes cast and spun complying with I.S. 261 or BS 4772.

4.4 Valves, Tees and Tapers

All valves, tees and tapers shall be standard flanged cast iron, complying with BS 2035.

4.5 Sluice Valves

Sluice valves shall comply with BS 5163 Class 1 and shall close when turned clockwise.

4.6 Hydrants

Fire Hydrants shall comply with BS 750 and the outlet shall be to the relevant local authority Standard pattern. The top of the spindle shall be located not more than 300 mm below the surface level, and where necessary extension pieces shall be used.

Approved marker plates shall be provided and fixed to denote the positions of valves and hydrants.

4.7 Laying of Pipes

Trenches shall be excavated in straight and even lines :

a) Minimum width - the nominal internal diameter of the pipe plus 300 mm provided that no trench shall have a width less than 450 mm.

b) Maximum width 600 mm greater than pipe diameter except in very particular cases where greater widths may be allowed.

Whatever the width of the pipe trenches within the specified limits, sufficient excavation shall be made at the position of the pipe points to enable the pipe jointer to complete the jointing operations satisfactorily.

4.8 Concrete Casing to Pipes

Where required by the Engineer or shown on the drawings the pipe shall be bedded and haunched or completely encased in Grade 20 concrete.

## 4.9 Bed and Surround to Pipes

Bedding to the pipes to be granular material, 20 mm size for A.C. and Ductile iron pipes, thoroughly compacted before laying pipes. Surround to the pipes to be granular material thoroughly compacted by hand in 75 mm layers.

## 4.10 Concrete Anchor Blocks

Anchor blocks of Grade 20 concrete shall be placed around the pipes at both sides of all sluice valve chambers and also at bends of greater curvature than 22½°. The blocks shall be taken 150 mm below the pipe invert for the full width of trench and shall encase the pipes to 150 mm over the top of the barrel. The minimum length of anchor block shall be 600 mm unless indicated otherwise on drawings.

## 4.11 Indicator Plates and Posts

The positions of valves and hydrants shall be indicated by a metal plate secured to a precast concrete post of approved type or secured to the wall of an adjacent building. The plate shall comply with BS 3251 : 1976 and shall be raised "V" for valve and "H" for hydrant together with the valve size and distance from the marker post. Where marker posts are used they shall be concrete complying with IS 162.

## 4.12 Testing of Watermains

All watermains shall be tested in lengths as directed by the Engineer. Before the test is made, all pipes and bends shall be suitably supported against movement by partial backfilling or other approved means and cap ends shall be securely strutted. The mains shall be tested hydraulically to 1½ times the maximum working pressure specified by the manufacturer for the particular class of pipe, or as directed by the Engineer. The test pressure shall be maintained without loss for a period of one hour.

The Contractor shall supply all labour, materials and plant necessary for testing and the cost of such tests shall be deemed to be included in the rates for pipelaying in the Bill of Quantities - CP 2010 makes recommendations regarding the test pressures to be applied to pipelines of ductile iron and A.C.

## 4.13 Chambers for Sluice Valves, Air Valves, Hydrants, Stopcocks

Chambers for sluice valves, air valves, hydrants and stopcocks shall be concrete blockwork as shown on drawings. Chambers for stopcocks shall comply with BS 5834. Precast concrete or in situ concrete chambers may also be used subject to approval.

## 4.14 Surface Boxes

Hydrant, Sluice valve and Air valve chambers shall be provided with cast iron surface boxes complying with IS 261. Surface boxes shall be bedded in mortar on the chamber walls and where the chamber is located other than on a footpath, driveway or carriageway shall be surrounded by 150 mm concrete.

## 4.15 Sterilisation

When the whole of the mains have been tested, and approved by the Engineer, they shall be cleaned out and sterilised as follows, BEFORE connection is made to the existing Main.

1. The mains shall be flushed through until clean water is observed to flow from every hydrant and site connection.

2. The main is then to be charged with heavily chlorinated water (50mg/litre) and allowed to stand for at least 24 hours. After which it is to be flushed out until all traces of chlorinated water have been removed.

3. The main is then to be left full of fresh water for a further period of 24 hours. Samples of the water used are to be taken at the commencement and completion of the 24 hour period for testing at an approved laboratory. On receipt of satisfactory results, the final connection may be made to the Local Authority Main.

## 4.16 Connections to Existing Watermain

Connections to existing watermain shall be carried out under the supervision of the Engineer.

# SECTION 2

# DUBLIN COUNTY COUNCIL

## ELECTRICAL SECTION

## SPECIFICATION FOR PUBLIC LIGHTING INSTALLATIONS IN RESIDENTIAL AND INDUSTRIAL DEVELOPMENTS

### GENERAL

It is important to make clear that in all developments in the County, the developer is responsible for ensuring that all aspects of the public lighting installation are complete to the Council's Electrical Section's satisfaction. This includes cabling and ducting as well as column erection and fitting out. Although work may be contracted out to the E.S.B. or other agents, the developer remains ultimately responsible to the Council.

### GENERAL PROCEDURE

On receipt of planning permission the developer shall provide three copies of the site layout (minimum scale 1 : 1000) to The Electrical Section, Dublin County Council, Parnell House, 13 Parnell Square, Dublin 1.

Two copies will be returned showing the requirements for public lighting. In general, these requirements will include the height of column and lantern type to be used, the underground supply circuits and the column locations.

Any alterations to the public lighting design must be agreed in advance with the Electrical Section of Dublin County Council. The installation will not be accepted if it is not installed according to the design.

It will then be the developer's responsibility to arrange with the E.S.B. convenient supply points where public lighting mini pillars can be erected by the developer. The public lighting columns will be cabled from these mini pillars in groups as shown on the public lighting design. Please note that only the E.S.B. may lay the supply cable to the public lighting mini pillar but the developer may himself arrange cabling of the columns independent of the E.S.B. if he so chooses.

If there is any doubt as to the exact location of columns or if there are any changes in the site plan, the Electrical Section of Dublin County Council must be consulted before columns are erected or cables are laid.

Once all the mini pillars and columns on a circuit have been erected, fitted out and cabled, an ETCI Completion Certificate shall be sent to the Electrical Section of Dublin County Council who will inspect the installation. The Council will report any faults to the developer who will have them repaired. The Council will request estimated E.S.B. connection fees from the developer once the installation has been approved. The Council will then arrange for the E.S.B. to connect supply in the E.S.B. mini pillar.

## COLUMNS AND BRACKET ARMS

All columns shall be of tapered octagonal or tubular construction, of minimum wall thickness 3 mm. Octagonal columns shall be fabricated with longitudinal welding only.

No circumferential butt welding shall be permitted in column construction.

Each column shall be basically protected against corrosion by hot dip galvanising after manufacture. The planted portion of the outside of all columns shall be protected by a bituminous coating.

The hot dip galvanising shall be carried out in accordance with B.S. 729:1971. Column construction shall comply with B.S. 5649 "Specification for Lighting Columns".

Columns shall have fitted compartment doors at a height of 1.5 metres to centre of opening above ground level. The door opening shall have a welded-in-frame with all around weather strip. A flat steel door secured by 2 triangular head screws shall be fitted. A baseboard shall be fitted in each column. The clearance between baseboard and inside face of door when secured shall be not less than 100 mm. Drawing Number PL 1/2 Rev. 2A enclosed with this Specification gives details of the door and frame.

Columns shall be wired internaly with 2.5 sq. mm. PVC/PVC single core cable with stranded copper conductors.

The removable bracket arms for the columns shall be of tubular steel construction and basically protected against corrosion by hot dip galvanising. Bracket arms shall incorporate an uplift of 5 degrees.

Bracket arms shall be of the sleeve fitting type and secured by eight unobtrusive socket screws.

Bracket arms and column shafts shall be fitted with devices to prevent rotation of the brackets in service.

Each column shall be identified with a black painted stencilled number 75 mm. high two metres above ground level facing the road. The numbering sequence shall be decided by the Electrical Section.

Cable entry slots (150 mm. x 75 mm.) shall be provided in the column root - 300 mm. below ground level and in line with the door opening.

## INSTALLATION OF COLUMNS

Columns shall be erected according to the table below. The hole shall be 0.6 m. in diameter at the bottom and filled with concrete around the base of the column up to the bottom of the service cable entry slot. The concrete used shall be in accordance with the Department of the Environment Specification for Road Works, Clause 1502, Concrete for Ancillary Purposes (Class E). Holes shall be pumped free of any water before being filled with the concrete. Columns shall be erected exactly vertical in a safe and workmanlike fashion using a crane or suitable hoist. The final one metre of incoming and outgoing cables shall be protected by Hydrodare piping or equivalent extending 300 mm. into the column. The cables shall be kept level with the bottom of the entry slot to avoid cable damage due to column settlement.

COLUMNS SHALL BE ERECTED SUCH THAT CENTRE OF OPENING OF COLUMN DOOR IS 1.5 METRES ABOVE FINISHED GROUND LEVEL.

| MOUNTING HEIGHT | PLANTING DEPTH | OUTREACH BRACKET | SETBACK FROM KERB |
|---|---|---|---|
| 6 m. | 1 m. | 1 m. | 1 m. |
| 8 m. | 1.22 m. | 1.5 m. | 2 m. |

MINI PILLARS

Mini pillars shall be of 3 mm. thick sheet steel construction in accordance with Drawing Number PL 1/3 enclosed with this Specification.

A block board baseplate approximately 20 mm. thick shall be fitted in each pillar. On this baseboard shall be fitted four 63 Amp link blocks and a 25 Amp DZ II type fuse unit.

Wiring between fuse units and link blocks shall be in 2.5 sq. mm. PVC insulated single core stranded copper conductors.

The enclosed drawings show the internal arrangements of the mini pillar and column base.

EARTH ELECTRODE

A bare copper or hot dip galvanised iron earth rod 12 mm. in diameter and 1,200 mm. long shall be sunk adjacent to each mini pillar. A 10 sq. mm. copper conductor shall be connected between the pillar and the earth rod. Earth rods shall be installed either within the mini pillar or with suitable inspection traps to facilitate the inspection of the earth wire connection to the rod.

FUSES

Main circuit fuses shall comply with B.S. 1361. They shall be of the 30 Ampere HRC type mounted in the mini pillars.

LINKS

Neutral blocks or looping-in blocks shall be BICC 63 Amp type, or equivalent. They shal have serrated inner surfaces on the cable terminal blocks to provide adequate gripping of the conductors. The metal terminal block shall be fixed to the back of the plastic housing to prevent it falling out when the cover is removed. They shall be fully insulated and solidly mounted on the mini pillar baseboard.

COLUMN BASEBOARD FITTINGS

Incoming and outgoing supply cables in columns shall be terminated in a single phase SMK cut-out with integral 6 Amp miniature circuit breaker or equivalent. Neutral links shall not be used for terminating supply cables. The cut-out shall be solidly mounted on the column baseboard.

Where SWA supply cables are used, the steel armouring shall be clamped onto the brass collars at the bottom of the cut-out using jubilee clips. A 10 sq. mm. earth lead shall bond this collar to the earth lug on the door frame.

Where NYCY supply cables are used, the copper screen shall be terminated on the door frame earth stud. The earth terminal on the cut out shall also be bonded to the door frame earth stud. In both cases a crimped lug shall be used to terminate on the frame stud.

## LANTERNS

Lanterns shall have built-in lamp control gear and shall be of the enclosed low profile canopy and bowl type designed to minimise exposed cross sectional area and thus reduce the potential for damage by vandalism. The auxiliary lamp control to be housed in lantern compartment separate from lamp enclosure. Light control to be by injection moulded refractor bowl with high quality interior prisms or internal reflectors. The bowl shall be a vandal resistant plastic.

All lanterns to comply with the requirements of B.S. 4533 - Section 2.7 "Specification for Road Lighting Lanterns".

Each lantern shall be bonded to the earth lug on the column door frame by a 2.5 sq. mm. PVC insulated single core stranded copper conductor.

## CONTROL

Control of each light to be by individual solid state photo-control unit incorporating a photo-transistor as the light sensor; e.g. SELC 84 by Solar Enterprises Ltd., or equivalent. A 5 Amp test switch to be provided in the base compartment of the lighting columns for day time testing by short-circuiting the photo-electric cell. All internal column wiring shall be in 2.5 sq. mm. PVC insulated single core stranded copper conductors.

## CABLING

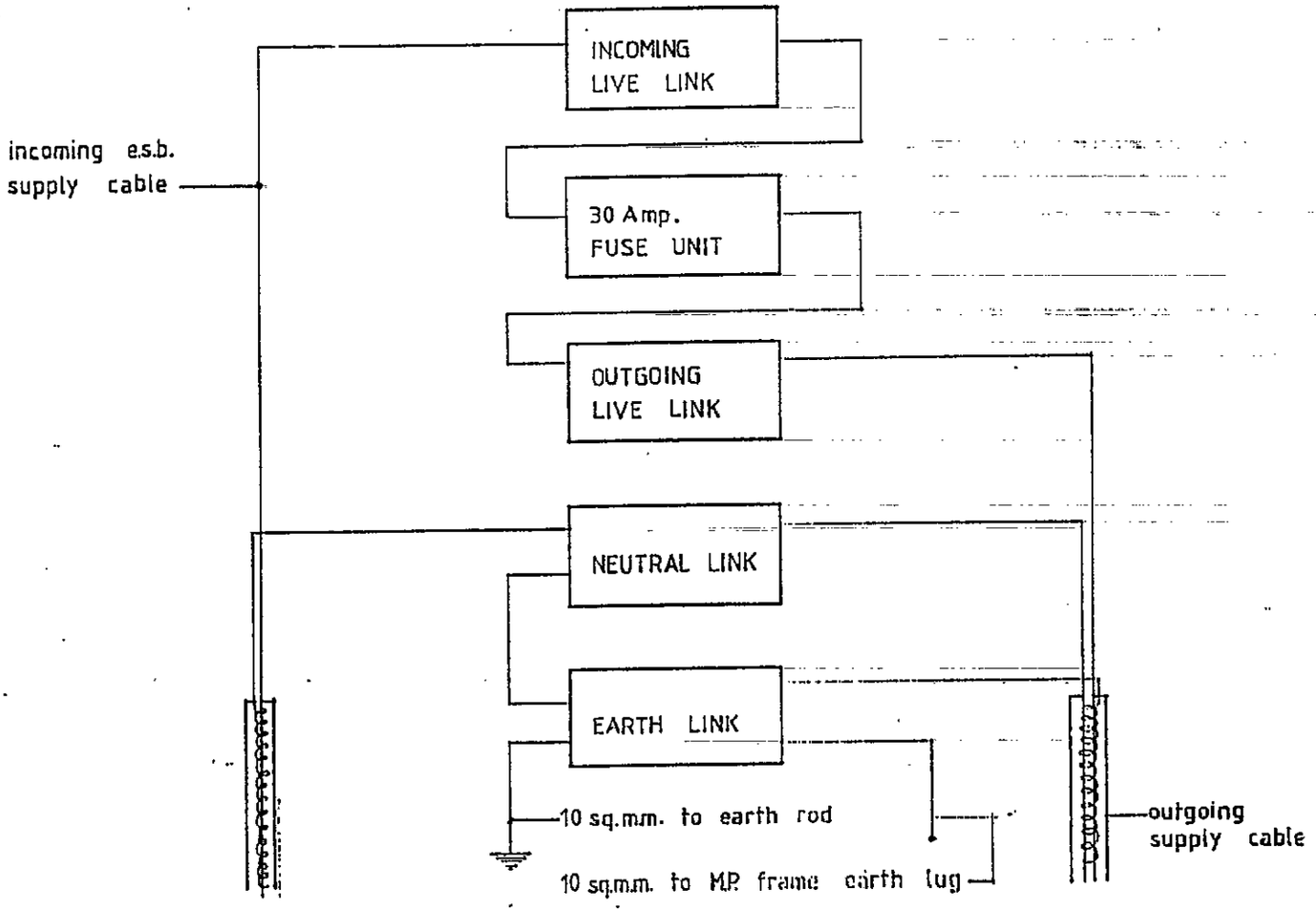
Each cable shall be run in 100 mm. diameter PVC ducting at road crossings and in 50 mm. diameter PVC ducting beneath driveway aprons or footpaths. A spare 50 mm. duct shall be laid across all aprons. In general cables shall be looped from column to column on their appropriate circuits and be terminated in the base of each column. The cable is to be run underground at a depth of 0.6 metres from finished ground level. The public lighting columns shall be bonded to the protective metallic screens of the underground cable via the door frame earth lug.

In general for single phase circuits, cables shall be either 2 x 6 sq. mm. NYCY type to VDE Specification 0271/5 or 2 x 6 sq. mm. PVC/SWA/PVC type to B.S. 6364 for underground installation 600 Volts to 1,000 Volts grade.

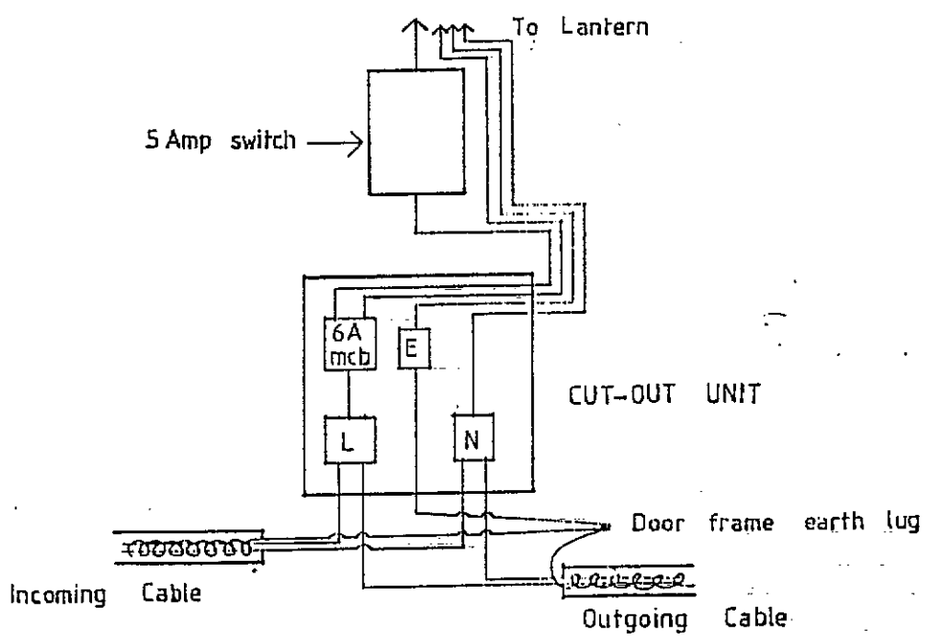
In some cases alternative cable types may be specified but this will be incorporated in the original layout prepared by the Electrical Section.

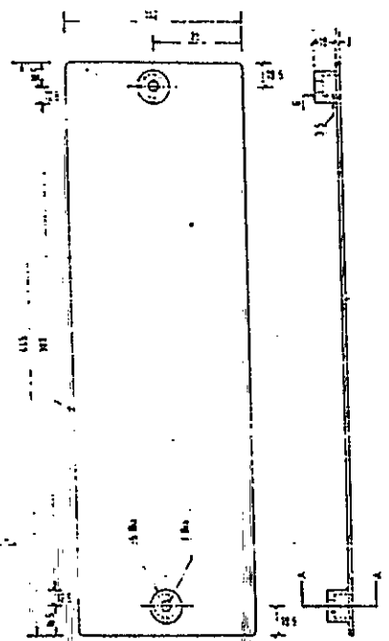
Details not covered in this Specification shall be in accordance with the latest edition of the Electro-Technical Council of Ireland's National Rules for Electrical Installations especially part 2.3, Particular Requirements for Public Lighting Installations and the Code of Practice for the Erection of Street Lighting Equipment issued by the Association of Street Lighting Contractors.

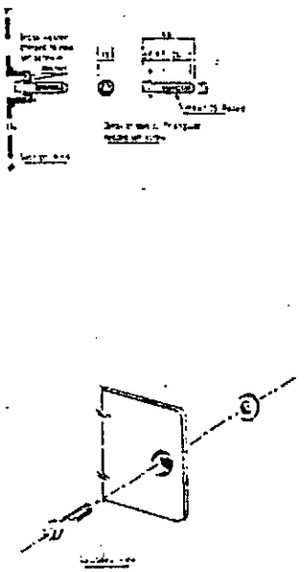
## PUBLIC LIGHTING MINIPILLAR : Internal Arrangement




## PUBLIC LIGHTING COLUMN BASE : Internal Arrangement



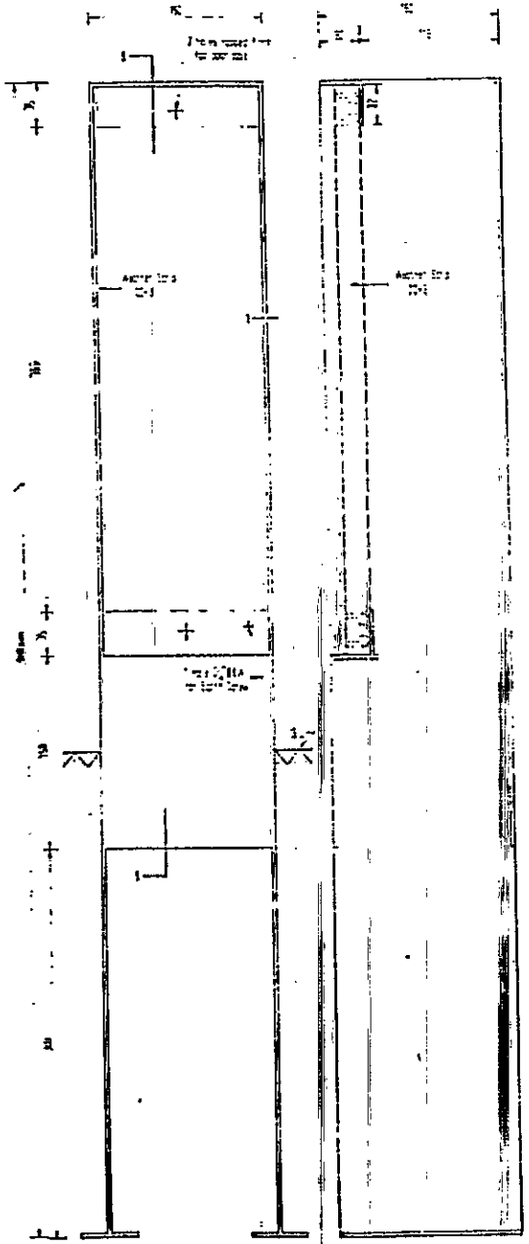




Materials
Cover plate mild steel galvanised
Set screw stainless steel
Retaining washer brass

Finished dimensions of door shall include galvanised coating or equivalent

Bottom 375mm of pillar to be bitumen coated



Front Elevation of Supply Pillar

Section B-B

## NOTES

GENERAL

1. ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE STATED.
2. FIGURED DIMENSIONS ONLY—DO NOT SCALE
3. THIS DRAWING TO BE READ IN CONJUNCTION WITH
4. ALL LEVELS REFER TO POOLBEG DATUM UNLESS OTHERWISE STATED
5. ALL DIMENSIONS AND LEVELS TO BE CHECKED ON SITE PRIOR TO COMMENCEMENT OF WORK. ANY DISCREPANCIES TO BE REPORTED TO THIS OFFICE IN WRITING

| No. | Description | Date |
|---|---|---|
| | | |

DUBLIN COUNTY COUNCIL
ELECTRICAL SECTION,
PARNELL HOUSE,
PARNELL SQ. EAST,
DUBLIN 1. PH 727777

JOB TITLE

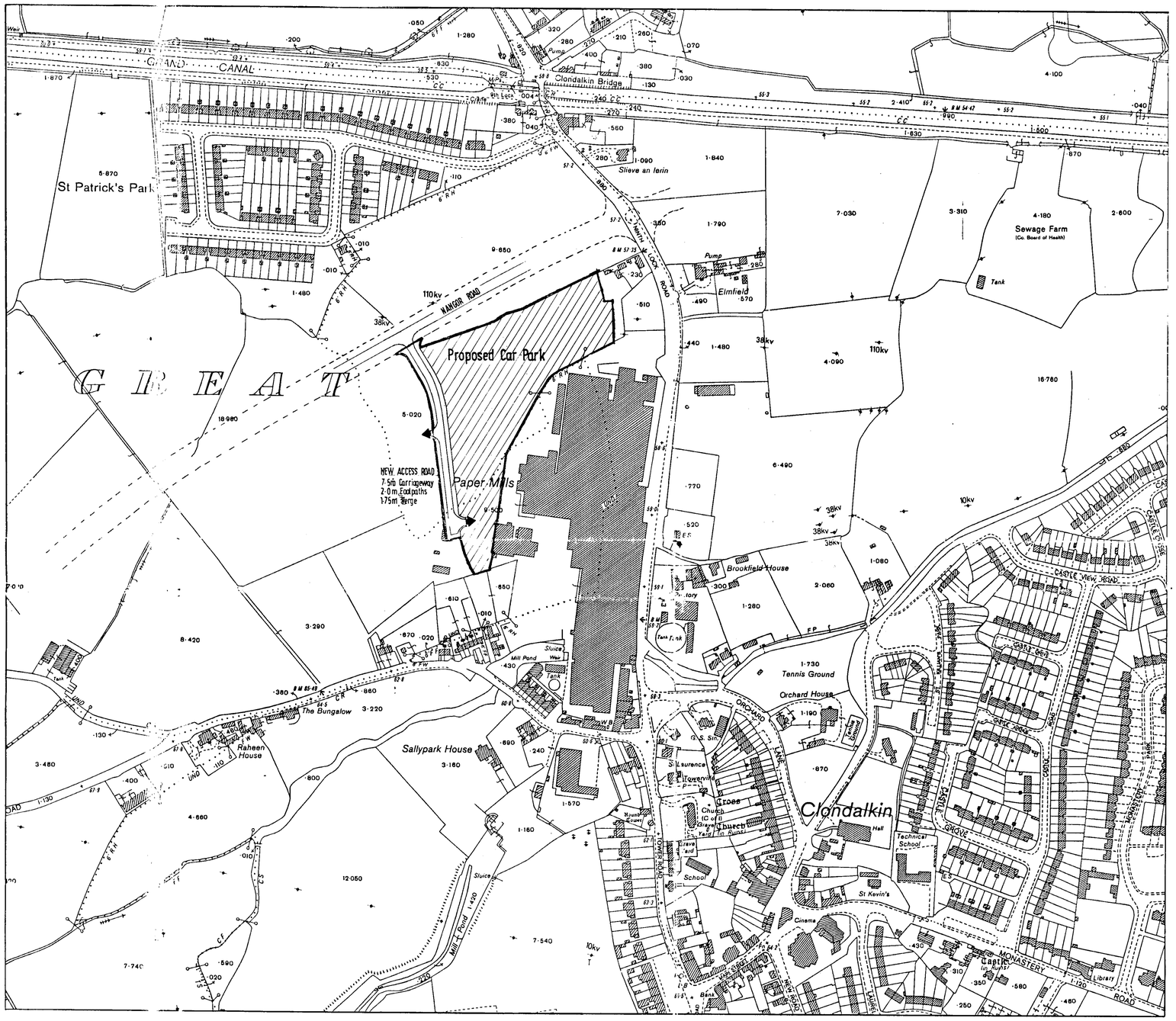
PUBLIC LIGHTING SUPPLY PILLAR:

| Drawn by | Checked | Schedule No. |
|---|---|---|
| J DELANEY | K [illegible] | |
| Designed | Issued | Date |
| [illegible] | | JAN 88 |

Kevin Cleary B.E., M.I.E.I.
Senior Engineer.

J.F. Vaughan B.E., C.Eng., M.I.E.I., F.I.P.T.A.
County County Engineer.

Drg. No. PL 1/3




DUBLIN COUNTY COUNCIL
Planning Dept. Registry Section
APPLICATION RECEIVED
18 NOV 1991
REG No.
APPLICATION TYPE

| Mark | Date | By | Rev |
|---|---|---|---|

Client
J MANSFIELD ESQ

Drawing Status
PLANNING APPLICATION

Job Title
PROPOSED ACCESS ROADWAY AND SURFACE CARPARK AT CLONDALKIN CO. DUBLIN

Drawing Title
LOCATION AND SITE LAYOUT PLAN

Ove Arup & Partners Ireland
Consulting Engineers
Dublin : Cork : Limerick

Scales 1:2500
Drn P.L Date 11/91 Chd Passed
Job No. D91/072 Drawing No. PL 10 Rev

ARUP