Larkfield Hospital PFI Project

Volume 1

PA

Larkfield Hospital PFI
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Project Parties

Trust	Argyll and Clyde Acute Hospitals National Health Service Trust
Service Provider	LH Project Limited
Constructor	Melville Dundas Limited
Uberior	Uberior Holdings plc
Bank	The Governor and Company of the Bank of Scotland
WS	Wylie Shanks
McLC	McLay Collier
RLF	Robinson Low Francis
D&M	Davie & McCulloch

PROJECT AGREEMENT

for the Design, Build, Finance and Operate Project for a Facility for the provision of Services for the Elderly and Young Physically Disabled in Inverclyde

between

THE ARGYLL AND CLYDE ACUTE HOSPITALS NATIONAL HEALTH SERVICE TRUST

and

LH PROJECT LIMITED

McGRIGOR DONALD
SOLICITORS

Pacific House
70 Wellington Street
GLASGOW
G2 6SB

Telephone: 0141 248 6677
Facsimile: 0141 204 1351 / 221 1390
E-Mail: enquiries@mcgrigors.com
Web Site: http://www.mcgrigors.com

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FAS 4833
25 May 1999

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AN AGREEMENT

between

(1) **THE ARGYLL AND CLYDE ACUTE HOSPITALS NATIONAL HEALTH SERVICE TRUST**, a body corporate established by an order (S.I. 1998 No. 2716 (S.143)) as amended by an amendment order (S.I. 1999 No. 1115 (S.88)) as made by the Secretary of State under Section 12A of the National Health Service (Scotland) Act 1978 (the **"Trust"**, which term shall include its successors); and

(2) **LH PROJECT LIMITED**, an incorporated company registered in Scotland under No. 193460 and having its registered office at 8 Charlotte Square, Edinburgh EH2 4DR (**"SPV"**)

RECITALS

(A) The Trust has the functions conferred on it by the Statutory Instruments mentioned in the preamble.

(B) In implementation of those functions, the Trust wishes to procure through the United Kingdom Government's Private Finance Initiative the provision of a new facility Larkfield Hospital, Inverclyde for the provision of services for the elderly and young physically disabled and of certain services in relation to that facility.

(C) SPV is willing to enter into this Agreement with the Trust, the terms of which will secure the required facility and services for the Trust.

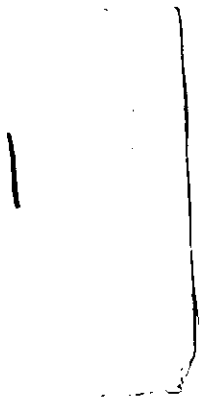
BY WHICH IT IS AGREED:-

PART 1 - GENERAL

1. **Definitions and interpretation**

1.1 In this Agreement, including its Recitals the following words or expressions shall have the following meanings:-

Abandonment	means that SPV has ceased carrying out its obligations under this Agreement or any other DBFO Contract



Absolute Weighting Factor	means the weighting designed as such applicable to Zone Type as set out in the table forming Table 2 to Part H of the Schedule
Access Failure	means the prevention of access to the Hospital as a consequence of (i) an instruction to evacuate or not enter the Hospital by an Emergency Service Organisation unless the reason for the instruction is an act or omission of SPV, (ii) damage to any roads serving the Hospital or blockage of any roads serving the Hospital (with no reasonable alternative means of access to the Hospital being available) unless such event occurs as a consequence of a breach by SPV of the Output Specification or (iii) a lock-out, sit-in, demonstration or picketing by Trust Staff
Accommodation Schedule	means the document so entitled and forming part of the Trust's Requirements and a copy of which Accommodation Schedule is annexed as Appendix A to Part E of the Schedule
Act	means the National Health Service (Scotland) Act 1978
Applicable Laws	means, as the context requires: (i) all or any laws, statutes, statutory instruments, orders, rules of court, proclamations, by-laws, or other enforceable legislation and (ii) any directly applicable directives, regulation, rules, decision or other legislation of the European Union (or its predecessor organisation) having the force of law in Scotland from time to time and which in any way affect or impact on any of the matters referred to in or to be done under any one or more of the Project Documents provided that any guidance or practice issued from NHSME after Financial Closing (including without limitation Health Technical Memoranda Hospital Building Notes and Scottish Health Building Notes) shall not be binding on SPV

	unless instructed as a Change in accordance with Sections 1 to 6 of Part K of the Schedule
Applicable Standards	means the reference information set down in Section D of Part I of the Schedule;
Appointment	means, in relation to each Consultant, a document appointing such Consultant in a form approved by the Trust (such approval not to be unreasonably withheld or delayed) to be entered into between such Consultant and SPV or the Contractor as the case may be and Executed
Approved Debt	means the amount of Senior Debt as shown in the Financial Model as at Financial Closing including, without limitation, principal and interest outstanding at the date the calculation requires to be made in accordance with Clauses 58.3.4 or Clause 60.5.2 of the Project Agreement as the case may be together with any further monies advanced by the Senior Lenders to SPV and notified to, and approved by, the Trust in accordance with Clause 9.2 of the Financier Direct Agreement
Architect	means Iain MacLaren trading as Wylie Shanks of 20a Royal Crescent, Glasgow, G3 7SL and/or such other architect as the Contractor may from time to time appoint in addition thereto or in substitution therefor in relation to the Works in each case with the prior approval of the Trust and in accordance with Part 4 of this Agreement
Associated Company/ Subsidiary	means, in respect of any company, a company which is a subsidiary or a holding company of such company or which is a subsidiary of any holding company of such company and, in the case of SPV, shall include (without limitation) each of the Promoters
Authorised Person	has the precise meaning given to it in any statutory regulation or Health Technical Memorandum including any explanation given in respect of associated roles and duties

Available	means not Unavailable and includes deemed to be Available and **Availability** shall be construed accordingly
Availability Deduction	has the meaning set out in Part H of the Schedule
Availability Regime	means the regime agreed between SPV and the Trust governing Availability, as set out in Part H of the Schedule
Break Charges	means all costs (other than Hedging costs) associated with the early repayment of sums due under the Finance Facilities Agreements, including interest and prepayment charges and the reasonable costs of SPV and its sub-contractors in terminating contracts (including contracts of employment) relating to the Project
Building Contract	means the contract for the carrying out of the Works in the Agreed Form to be made between SPV and the Contractor
Business Day	means a week day (other than a Saturday) on which banks are open for domestic business in Edinburgh and London
CCN	means a change control note submitted pursuant to Sections 1, 2 and 6 of Part K of the Schedule
CDM Regulations	means the Construction (Design and Management) Regulations 1994
Certificate of Practical Completion	means a certificate indicating that Contractual Practical Completion has occurred issued in accordance with the Practical Completion Procedure
Certified Copy	means, in relation to any document, a true and complete copy thereof and certified as such by a director or the company secretary of SPV or the Trust as the case may be and the context so requires
Change	means a Works Change, a Services Change, a Trust Procedures Change or a Necessary Change pursuant to Sections 1 to 6 inclusive of Part K of the Schedule and Changes means Works Changes, Services Changes, Trust Procedures Changes or Necessary Changes and shall, for the avoidance of doubt,

	include any such arising as a result of the Review Procedure, but shall not include any other changes to the terms of the Project Documents or the circumstances of or affecting the parties
Change Capital Costs	means the reasonable non recurring costs (including any construction and/or associated costs) incurred by SPV together with the reasonable amount of any legal, accounting and other professional fees, funders or arrangers or other such fees, design and/or technical adviser fees, administrative costs and out of pocket expenses incurred in connection with the Change and any rolled up interest under the Finance Facilities Agreement arising as a result of the Change and any interest on the financing arranged to implement and finance the Change (in each case without double counting any Change Financing Cost)
Change Capital Saving	means the reasonable non recurring savings (including any construction and/or associated savings) and any rolled up interest under the Finance Facilities Agreement avoidable by SPV, less the reasonable amount of any legal, accounting or other professional fees, funders or arrangers or other such fees, design and/or technical adviser fees, administrative costs and out of pocket expenses incurred in connection with the Change arising as a result of the Change
Change Control Procedure	means the procedure set out in Section 6 of Part K of the Schedule
Change Cost	means (i) the aggregate sum of the Change Capital Cost, the Change Financing Cost and the Change Operational Cost less (ii) the aggregate sum of any Change Capital Savings and Change Operational Savings
Change Financing Cost	means the costs to be incurred by SPV of servicing the funds required for financing the Change Capital Cost which shall be the lowest cost reasonably available to SPV from reputable bankers and the cost of servicing new equity and/or subordinated debt at the Equity Rate of Return;

Change Limit	means the aggregate sum of £1 million RPI Indexed during any period of 5 years, in respect of Change Capital Cost
Change Notice	means a notice in writing from the Trust to SPV requiring SPV to implement a Change and setting out details of the Change required
Change Operational Costs	means the reasonable extra costs (other than Change Capital Costs) necessarily incurred by SPV or the Service Provider (without any double counting) in providing any Service as a consequence of any Change calculated on the basis that the SPV and the Service Provider be entitled to the profit margin obtained on the provision of the Services as at the time of the Execution Date
Change Operational Savings	means the costs (other than Change Capital Savings) reasonably avoidable by SPV or the Service Provider in providing any Service as a consequence of any Change calculated on the basis that the SPV and the Service Provider be entitled to the profit margin obtained on the provision of the Services as at the time of the Execution Date
Change Procedures	means the procedures agreed between SPV and the Trust governing Change as set down in Sections 1 to 6 inclusive of Part K of the Schedule
Claims	means any claim, demand, proceeding or action made or brought by or against any party to this Agreement or any SPV Staff (but shall not include any claim for consequential loss, loss of profit or loss of revenue except in respect of any claim from any individual in respect of employment or personal injury or death)
Collateral Warranties	means the collateral warranties in a form to be approved by the Trust (such approval not to be unreasonably withheld or delayed) in favour of the Trust Executed by the Contractor and each of the Consultants and delivered to the Trust under Clause 3.1.1 of the Project Agreement

Commissioning Procedure means the procedure set out in the Commissioning Check List forming Part F of the Schedule for the purpose of confirming that the Hospital is complete and the Services Commencement Date may occur

Compensation Interest Rate means the aggregate of:-

$$a + b$$

where

a (subject to Clause 58.5.3B) is LIBOR (as defined in the Senior Facility) (on the assumption of an Interest Period (as defined in the Senior Facilty) of 6 months) as at the date of termination of this Agreement and as notified to the Trust by the Senior Lenders at six monthly intervals thereafter; and

b is 1.25 per centum per annum

Compensation Payment Date means in the case of (i) the Trust Default Compensation and the Force Majeure Compensation and (ii) compensation payable under (a) Clause 58.3.3 and (b) Clause 58.3.4 where the Trust opts to make payment of such compensation by a single lump sum payment the day falling 14 days after (but including) the date of the Termination Notice

Competent Person has the meaning given to it in any statutory regulation or Health Technical Memorandum including any explanation given in respect of associated roles and duties

Completion means the date, determined under the Practical Completion Procedure on which practical completion of the Works occurs in accordance with Part 4 of this Agreement

Completion Date means 31 January 2001 or such later date as may apply as a result of Excusable Delay

Confidential Information means all information of a commercial or proprietary nature disclosed (whether in writing, verbally or by any other means and whether directly or indirectly) by the Disclosing Party to the

	Receiving Party whether before or after the Execution Date including in particular any information relating to the Disclosing Party's know-how, trade secrets and financial or business affairs
Construction Backstop Date	means the date which is 6 months after the Completion Date
Construction Value	means £10,300,000 exclusive of VAT
Consultants	means the Architect, the Structural Engineer, the M & E Engineer the Quantity Surveyor and the Planning Supervisor
Contract Month	means a Month in any Contract Year
Contract Officer	means either the Trust Contract Officer or the SPV Contract Officer as the case may be and the context so requires
Contract Year	means in any year the period from 1st April to 31st March following
Contractor	means Melville Dundas Limited of Cameron Court, Hillington, Glasgow, G52 4JX or, such other reputable and substantial building contractor or contractors as SPV may from time to time appoint in addition or in substitution to carry out the Works in each case with the prior approval of the Trust in accordance with Clauses 14.9.2 and 14.9.3 of Part 4 of this Agreement
Contractual Practical Completion	means the date, determined under the Practical Completion Procedure, on which practical completion of the Works occurs in accordance with Part 4 of this Agreement
DBFO Contracts	means this Agreement, the Head Lease and the Sub-Lease
Day	means any calendar day, commencing at 00.00 hours
Defects Liability Period	means the defects liability period in terms of the Building Contract

Deleterious Materials	any materials used in the Project in a manner inconsistent with the guidance contained in the publication "Good Practice in Selection of Construction Materials (1997: Ove Arup & Partners)" together with other substances or materials which at the time of specification do not accord with British Standards and Codes of Practice or which are generally known to be deleterious to health and safety or to durability in the particular circumstances in which they are used and without prejudice to the foregoing generality asbestos and asbestos containing products of whatever nature
Development	means the development on the Site of the Hospital and all attendant facilities pursuant to the execution of the Works required by this Agreement
Direct Agreement(s)	means any direct agreement between the Trust, SPV and a third party, contemplated by this Agreement
Disclosing Party	means the party disclosing Confidential Information
Dispute	means a difference or dispute of whatever nature between the Trust of the one part and SPV of the other part arising under, out of or in connection with any of the DBFO Contracts (including, without limitation, any question of interpretation of any of the DBFO Contracts)
Dispute Resolution Procedure	means the procedure referred to in Clause 72 of this Agreement and set out in Part M of the Schedule
Emergency	means any unforeseen event affecting the Hospital or the Development which causes or has the potential to cause disruption to the Trust's business or a threat to health and safety
Emergency Maintenance	means maintenance or repair which results from a breach of SPV's obligations under this Agreement and which, in the Trust's reasonable opinion, must be carried out immediately in order to prevent or end disruption to the Trust's business or a threat to health or safety

Emergency Service Organisation	means any body being part of the National Health Service, a police force, fire services or other emergency services or any other governmental or quasi-governmental body having the power and authority to require evacuation of or prevention of access to the Hospital or part of the Hospital
Employees	means those persons whose employment transfers from the Trust to SPV or the Service Provider at the Services Commencement Date
Encode	means the HMSO publication of that name endorsed by NHSME and containing best practice guidelines for efficient use of energy within National Health Service buildings issued in 1993 and contained in two volumes, namely Encode 1 and Encode 2
Equipment	means any equipment to be provided by SPV in terms of the Specification
Equity Investment	means the initial paid up subscription price of all the shares in the share capital of SPV (being at Financial Closing £100,000 and increased by the subscription price of additional shares issued by SPV with the consent of the Trust (such consent not to be unreasonably withheld or delayed) providing that in each case such amounts shall have been expended solely for the purposes of fulfilling SPV's obligations under this Agreement
Equity Rate of Return	means the rate of return on Total Equity agreed for the purpose of this Agreement as being 14.6% real (irrespective of the actual rate of return from time to time)
Estatecode	means the NHS Estates publication of that name issued in 1993 and contained in 2 volumes
Estatecode B	has the meaning ascribed to it in Estatecode
Excusable Delay	means a delay caused by matters referred to and as set out in Clause 14.2 of this Agreement
Executed	means, in relation to the execution of any document by any person, that the document is presumed under Section 3 of the Requirements of Writing (Scotland) Act 1995 to have been granted by that person

	subscribing to it and cognate expressions shall be construed accordingly and the expression Execute shall be construed accordingly
Execution Date	means the date on which this Agreement is Executed and delivered by the parties
Expedited Interim Finding Procedure	means the interim dispute resolution procedure set out in paragraph 6 of Section 2 of Part M of the Schedule
Expert	means any person appointed as such from time to time under and subject to the provisions of Part M of the Schedule
Facilities Management Agreement	means the agreement in the Agreed Form made between SPV and Melville Dundas Limited, a company incorporated under the Companies Acts with Company Number SC141799 and registered office at Cameron Court, Hillington, Glasgow, G52 4SX by which SPV appoints the said Melville Dundas Limited to provide the Services
Final Certificate	means the certificate of making good of defects to be issued in respect of the Works pursuant to Part C of the Schedule
Finance Facilities Agreements	means the agreements between SPV and certain providers of finance to be used by SPV exclusively in connection with the Project (including any agreements relating to the prospective or actual Financial Indebtedness of SPV in the form of inter-creditor agreements) all of which are in the Agreed Form, including (if appropriate) any agreements in the Agreed Form supplementary to or substituted for those Agreed Form Finance Facilities Agreements which (for the avoidance of doubt) shall include any agreement or amendment made after Completion, and to which the Trust has given its consent, which consent shall not be unreasonably withheld or delayed

Financial Closing means the date upon which the last of the conditions precedent specified in Clause 3.1 of this Agreement has been satisfied or waived in accordance with the provisions of Clause 3.1

Financial Indebtedness means any indebtedness in respect of:

(a) monies borrowed or raised;

(b) any liability under any debenture, bond, note, loan stock, documentary credit or acceptance or other security;

(c) the amount payable in respect of any asset acquired by a person where such payment is deferred for more than 90 days after the date on which the person obtained possession of the asset concerned;

(d) a liability arising under any interest or currency exchange agreement, forward interest rate or forward currency exchange rate agreement or other hedging instrument;

(e) any guarantee, indemnity or similar deed or agreement relating to financial loss of any person arising in respect of any of the matters described above and within this definition; and

(f) liabilities under leases categorised as finance leases under applicable UK accounting standards

Financial Model means the financial model relating to the Project entitled "Project Financial Model - Initial Base Case" two copies of which in computer readable form have been delivered to the Trust and one copy to SPV and which financial model establishes the financial projections of SPV

Financier means any person satisfying one or more of the following descriptions:

(a) any bank or financial institution which has at the relevant time agreed to provide financing facilities to SPV or to any person nominated by SPV including as at Financial Closing The Governor and Company of the Bank of

Scotland (as a Bank and the Working Capital Bank all as defined in the Senior Facility)

(b) any bank or financial institution which from time to time serves as a security agent and/or trustee for one or more financial institutions falling within (a) above which (for the avoidance of doubt) shall include any additional or substitute bank or financial institution appointed after the Execution Date and to which appointment and creation of the relevant security and participation in relevant Direct Agreement, the Trust has given its consent, which consent where required shall not be unreasonably withheld or delayed

Financier Direct Agreement means the direct agreement so entitled between the Trust, each Financier and SPV and in the Agreed Form, and any substitue direct agreement entered into purusuant to Clause 12.15.3

Force Majeure means any of the events referred to in Clause 60.1 of this Agreement

Force Majeure Compensation has the meaning given to it in Clause 58.3.2 of this Agreement

Fully Serviceable Condition means fully operational (in so far as the express responsibility of SPV in terms of this Agreement) and in a state of repair consistent with Estatecode B

Good Industry Practice means the exercise of such degree of skill, diligence, prudence and foresight as would reasonably and ordinarily be expected from a skilled and experienced person seeking to comply with its contractual obligations and seeking to avoid liability arising under any duty of care that might reasonably apply to or be expected from that person, complying with all applicable laws and engaged in the same type of undertaking and under the same or similar circumstances (including the time) and conditions as that in which the relevant matter arises

Government Authority	means any body falling within one or more of the descriptions set out below: (a) any government body of the United Kingdom or any political sub-division of the United Kingdom or having any form of local jurisdiction in the United Kingdom; (b) any governmental authority established by virtue of the treaties of European Union which operates or has jurisdiction directly or indirectly within the United Kingdom having statutory, legal, fiscal, monetary or administrative affect upon the affairs of the United Kingdom; (c) any body having governmental functions of any of the above however constituted; and/or (d) any federation or other co-operative organisation of which any of the above is a member or to whose jurisdiction any of the above is subject or in whose activities any of the above is a participant
Head Lease	means the lease of the Site to be granted to SPV by the Trust in the Agreed Form under Part 4 of this Agreement
Health Service Body	has the meaning ascribed to it by Section 4 of the National Health Service & Community Care Act 1990
Health Technical Memorandum	means any health technical memorandum referred to in Section D2 of Part I of the Schedule
Hedging Agreement	means the agreement dated on or about the date hereof entered into between the Hedging Counterparty and SPV relating to the hedging of SPV's liabilities in respect of interest under certain of the Finance Facilities Agreements
Hedging Costs	means the net amount (if any) payable to or by the Hedging Counter party under the Hedging Agreement on early termination of the same
Hedging Counterparty	means Bank of Scotland Treasury Services PLC a Company registered in England and Wales under Company Number 269280 and having its head office

	at Bishopsgate Exchange, 7th Floor, 155 Bishopsgate, London, EC2M 3UB in its capacity as hedging counterparty under the Hedging Agreement
Hospital	means the facility to be constructed pursuant to this Agreement and thereafter operated by or on behalf of the Trust as a National Health Service facility at the Site and forming the subject matter of the Project
Hospital Day	means the period from 0000 to 2400 hours each day of the year
Hospital Hours	means all the hours the Hospital is open, being 24 hours per day, 365 days per year (366 days in a leap year)
IDC	means all amounts of interest accrued and/or due and payable by SPV under the Finance Facilities Agreements during the period commencing on the date an event of Force Majeure first occurs and ending on the earliest to occur of (i) the date upon which such event of Force Majeure first ceases to have effect and (ii) the termination of this Agreement as a result of such event of Force Majeure in terms of Clause 60.8 of this Agreement
Indemnity Amount	means any sum which is immediately due and payable by SPV to the Trust pursuant to (a) any express indemnity given under this Agreement or (b) subject to the terms of this Agreement, any award of damages awarded in favour of the Trust against the SPV by any competent court or pursuant to Clause 72 of this Agreement and Part M of the Schedule and of which sum the Trust has given notice to SPV and which is deductible from the Basic Monthly Sum pursuant to paragraph 2.1.2 (e) of Part H of the Schedule
Indexed	means in respect of any relevant period, an amount calculated in accordance with the following formula:- $$\frac{b \times c}{a}$$ where

	"a" equals the relevant index at the start of the relevant period; "b" equals the relevant index at the end of the relevant period; and "c" means the relevant amount to be indexed
Industry Standards	means the rules and regulations and codes of practice and conduct in force from time to time relating to the Services, including in particular those produced by or under the authority of the Trust and NHSME
Insurances	means all policies and contracts of insurance which are brought into effect in relation to the Insured Risks under the Project in terms of Part T of the Schedule and, where necessary or expedient, references to insurances shall include all the benefits arising from those policies and contracts of insurance.
Insured Risks	means the risks specified in paragraph 1 of Part T of the Schedule
Intellectual Property	means, as the context requires, current and/or future interests in copyright and rights in the nature of copyright, design rights, patents, trade and service marks (whether registered or unregistered) and all know-how and confidential information
Interest Rate	4% per annum above the base rate for the time being of The Governor and Company of the Bank of Scotland
Legislative Change	means the introduction, amendment, modification or repeal of any Applicable Law or Necessary Consent having effect on or after Financial Closing
Lender Services Direct Agreement	means the agreement so entitled among SPV, the Bank and the Service Provider in the Agreed Form
Lenders' Termination Sum	has the meaning ascribed to it in Clause 58.5 of this Agreement
Liaison Procedures	means any of the procedures set out in Part P of the Schedule or to be developed pursuant to this Agreement

Loan Stock Instrument	means the agreement among the Promoters and the SPV in the Agreed Form
Losses	means any liabilities, damages, losses, awards, penalties, fines, costs and/or expenses (including reasonable legal expenses calculated on a client/ solicitor basis) incurred by a party to this Agreement but not consequential loss, loss of profit or loss of revenue
M & E Engineer	means Davie & McCulloch of 17 Lynedoch Street, Glasgow, G3 6EF and/or such other M & E Engineer as the Contractor may from time to time appoint in addition thereto or in substitution therefor in relation to the Works in each case with the prior approval of the Trust (such approval not to be unreasonably withheld or delayed) and in accordance with Part 4 of this Agreement
Monitoring Procedure	means the procedure to be followed in relation to the monitoring of the Works in accordance with Part A of the Schedule
Monitoring Reports	means the reports listed in Part J of the Schedule
Month	means any calendar month commencing on the first day of that month and ending on the last day of that month
National Strike	means a strike, (official or unofficial), go-slow, lock-out or other dispute generally affecting the building maintenance or facilities management industry or a significant sector thereof
Necessary Consents	means all permissions, consents, licences, certificates, authorisations and other approvals and relaxations issued under or as required by the Statutory Requirements or any other applicable legally binding requirement relating to the Works
Necessary Change	means a Works Change or a Services Change arising as a consequence of a Legislative Change
NHSiS	means the National Health Service in Scotland
NHSME	means the National Health Service Management Executive in Scotland

Normal Working Hours	shall, in relation to the Services be the hours of operation in respect of the Services as specified in the Output Specification
Notice of Unavailability	means the notice referred to in Paragraph 1.2.1 of Part H of the Schedule
NPV	means the net present value of any stream of cashflows calculated at a given date by discounting any such cashflows arising after the given date by the Weighted Average Cost of Capital
Office Day	means the period from 0800 to 1800 hours Monday to Friday all year including public holidays
Office Hours	means 0800 to 1800 hours Monday to Friday all year including public holidays
Operational Instruction	means a request from the Trust to SPV for Unplanned Maintenance or Emergency Maintenance made orally, in writing or by computer terminal in accordance with Clause 32 of this Agreement
Output Specification	means the document entitled "Larkfield Hospital Project Services Specification" showing the levels and standards to which the Services will be provided by SPV as set down in Part I of the Schedule as amended from time to time in accordance with this Agreement and which shall form part of this Agreement
Patient	means any patient at the Hospital
Patients' Charter	means the standards in relation to patient care published by the Trust from time to time
Patient Information	means all information held by the Trust and SPV relating to Patients who are, or have been at any time, or who will be Patients
Patient Risk	means any act or omission by Patients which results in loss or damage to or destruction of the Hospital or Related Materials or which would result in the occurrence of any Availability Deduction or Performance Deduction or the occurrence of a SPV Event of Default, or result in an increase in the cost of provision of the Services, which risk is accepted by the Trust (as between the Trust and SPV) to the

	extent that the aggregate costs incurred by SPV associated with all such loss or damage in a Contract Year exceed any recoveries actually made from insurance against the Insured Risks
Performance Monitoring Report	means the report produced, for the purposes of Clause 3 of Part J of the Schedule by SPV on a monthly basis which details the results of service provision monitoring for any particular month using the Performance Monitoring System
Performance Monitoring System	means the system outlined in Part J of the Schedule which is operated by SPV and is used by the Trust to measure the performance of SPV under the Performance Regime
Performance Regime	means the regime agreed between the parties governing performance of Services, as set down and included within Parts H and I of the Schedule
Period for Remedy	has the meaning given to it in Part H of the Schedule
Permitted Deduction	means:- (i) any sum which may be due for payment to SPV hereunder, but entitlement to which is in good faith disputed by the Trust, and of which dispute the Trust has given notice to SPV pursuant to paragraph 3.4 of Part H of the Schedule before making a deduction or withholding such sum including, for the avoidance of doubt, an Availability Deduction or Service Shortfall Deduction; (ii) any Indemnity Amount; and (iii) those sums so described in Clauses 43.2.2, and paragraph 4.1 of Part T of the Schedule
Permitted Sub-Contractor	any third party service provider appointed by the Service Provider in accordance with Clause 40 of this Agreement to provide any of the Services
Planned Maintenance	means a full periodic maintenance and replacement service (including regular and irregular periodic maintenance and replacement), including inspection

	servicing and testing, as referred to in the Output Specification
Planned Maintenance Statements	means the planned maintenance statements referred to in Section A3.9 of the Output Specification, which shall be in the Agreed Form
Planning Supervisor	means Robinson Low Francis a partnership formed under the Laws of England and having a place of business at Claremont House, 20 North Claremont Street, Glasgow G3 7LE and/or such other planning supervisor as the Contractor may from time to time appoint in addition thereto or in substitution therefor in relation to the Works in each case with the prior approval of the Trust and in accordance with Part 4 of this Agreement
Practical Completion Procedure	means the procedure to be followed in relation to the certification of Contractual Practical Completion in accordance with Part B of the Schedule
Project	means the undertaking of the detailed design, financing, construction, fitting out, commissioning and subsequent operation of certain facilities comprised in the Development and the provision of the Services for the Hospital all in accordance with the Project Documents
Project Documents	means the DBFO Contracts, the Sub-Contracts, the Finance Facilities Agreements, the Direct Agreements and the Appointments
Promoter	means each of the companies identified in Section 1 of Part S of the Schedule to this Agreement and any company which is an Associated Company of any such company
Proposal	means any request by the Trust or SPV which is to be dealt with under the Review Procedure
Qualifying Legislative Change	means a Legislative Change which has any of the following effects: (i) discriminates against the Project, SPV, the Trust, a Promoter, a Sub-Contractor, or a Financier (provided that no Qualifying Legislative Change shall occur solely on the

basis that its effect on SPV, the Trust, a Promoter, a Sub-Contractor, or a Financier (as the case may be) is greater than its effect on other companies or companies generally)

(ii) discriminates generally against projects procured under the UK government's 'Private Finance Initiative' or a substantial proportion, class or sector of projects procured under the UK Government's 'Private Finance Initiative'

(iii) relates directly to hospitals or the provision of health care generally

(iv) requires capital expenditure on the Hospital but only where the introduction, amendment, modification or repeal of the Applicable Law or Necessary Consent in question occurs following (and including) Services Commencement Date

(v) relates to the recoverability of VAT by the Trust

Qualifying Service Interruption Event means (i) a Utility Failure, (ii) an Access Failure (iii) a Statutory Service Failure or (iv) a National Strike unless that Utility Failure, Access Failure, Statutory Service Failure or National Strike is also an Insured Risk or a Force Majeure event

Quantity Surveyor means Robinson Low Francis, a partnership formed under the Laws of England and having a place of business at Claremont House, 20 North Claremont Street, Glasgow, G3 7LE and/or such other quantity surveyor as the Contractor may from time to time appoint in addition thereto or in substitution therefor in relation to the Works in each case with the prior approval of the Trust and in accordance with Part 4 of this Agreement

Receiving Party means the party receiving Confidential Information

Rectification Costs means:

(a) in the case of termination pursuant to Clause 56.4 of this Agreement (SPV Default) having effect prior to Services Commencement Date

the anticipated cost to the Trust (if any) of completing the Hospital to the standard and stage of completion to which it should have been completed had SPV properly performed its obligations under Part 4 of this Agreement; and

(b) in the case of termination pursuant to Clause 56.4 of the Project Agreement (SPV Default) having effect on or after Services Commencement Date, (i) the actual cost to the Trust of restoring the Hospital to the standard to which it should have been maintained as at the Termination Date had the Maintenance Services been performed in accordance with the Output Specification less any insurance proceeds which may be freely applied by the Trust against such costs (ii) a sum equal to the excess of the NPV of the costs to the Trust of obtaining the Services in accordance with the Output Specification for the period ("the Protected Period") from the Termination Date to the originally anticipated expiry date over the NPV of the costs which would have been incurred by SPV in providing the Services in accordance with the Output Specification for the Protected Period and (iii) all reasonable costs, including professional fees, incurred by the Trust as a result of the SPV Event of Default

Related Materials has the meaning given in Clause 26 of this Agreement

Relevant Hours means, in respect of Zones used in day care treatment, Trust administration and uses ancillary thereto, Office Hours, and in respect of all other Zones, Hospital Hours

Relevant Days means, in respect of Zones used in day care treatment, Trust administration and uses ancillary thereto, Office Days; and in respect of all other Zones, Hospital Days

Relevant Professional means the Consultant responsible for certification under the Building Contract

Relevant Supplier	means, in relation to any supply of goods or services to the Trust, the party who is at the relevant time contractually or as a matter of law obliged to supply the relevant goods or services to the Trust
Relief Event	means (i) a strike by the Trust or its employees or (ii) a blockade or embargo of the Site or the Hospital (except a blockade or embargo by SPV, SPV Staff or any Service Provider) but only to the extent that the same shall materially and adversely affect, or increase the cost of, the performance by SPV of its obligations pursuant to this Agreement, and such material and adverse effect could not have been overcome by the exercise of reasonable diligence and reasonable care
Required Handback Condition	means that the Hospital (including the building and fabric and services and equipment) is in a condition consistent with Estatecode B
Review Procedure	means the procedure set out in Part R of the Schedule
RPI	means the retail price index in respect of all items excluding mortgage interest payments, known as RPIX, published by or on behalf of HM Government, or if that index ceases to be published, such alternative index as the Parties may agree or as shall be determined pursuant to the Dispute Resolution Procedure as being a comparable index for the purposes of this Agreement
RPI Indexed	means Indexed using RPI as the relevant index
Safety Plans	means the arrangements relating to the health and safety at work obligations of the parties to be agreed between the parties in accordance with the Review Procedure
Schedule	the Schedule to this Agreement
Secretary of State	means the Secretary of State for Scotland or following the transfer of his functions to (a) Scottish Minister(s) in terms of the Scotland Act 1998, the relevant Scottish Minister(s)

Security Documents means the floating charge, share pledge, assignations, standard security and other security from time to time granted by SPV or the Promoters to the Senior Lenders in order to secure the liabilities of SPV to the Senior Lenders

Senior Debt means the aggregate of:-

(a) all outstanding amounts of principal owing by SPV to the Senior Lenders under the Finance Facilities Agreements at the relevant date of termination (whether due for payment then or later);

(b) all interest accrued up to and including the relevant date of termination, and all breakage costs (if any) payable by SPV in respect of the relevant outstanding amounts of principal;

(c) (without double counting) Hedging Costs;

(d) all other amounts payable by SPV to the Senior Lenders under the Finance Facilities Agreements

in each case in accordance with the terms of the Finance Facilities Agreements,

but less, in relation to the principal amounts referred to in (a) and (b) above;

(e) any credit balances held on account of SPV charged in favour of the Senior Lenders under the Finance Facilities Agreements or otherwise available to the Senior Lenders in satisfaction of such principal;

(f) any amount of insurance proceeds received by the Senior Lenders which are available to be applied in satisfaction of such principal all in accordance with the terms of the Financier Direct Agreement;

(g) any amounts payable by the Senior Lenders to SPV under the Finance Facilities Agreements; and

	(h) any amount of unpaid Senior Debt not notified to, and approved by, the Trust in accordance with Clause 9.2 of the Financier Direct Agreement
Senior Facility	means the Senior Facility Agreement in the Agreed Form entered into or about to be entered into on or about the Execution Date between SPV and The Governor and Company of the Bank of Scotland (as Bank and the Working Capital Bank)
Senior Lenders	means The Governor and Company of the Bank of Scotland (as Bank and Working Capital Bank) and (subject to the terms of the Financier Direct Agreement) all other parties named as Banks from time to time in Part 1 of the Schedule to the Senior Facility
Serious Breach	means a breach of Clause 63.3 and/or 63.4 of this Agreement where (i) a forbidden act results in a material financial loss to the Trust which cannot be recovered in full or (ii) the forbidden act results in a loss of confidence by the Trust in the management of SPV in that SPV knew of the corrupt act and did not immediately act to prevent it and inform the Trust; in all other cases the occurrence of a forbidden act shall not be sufficiently serious to entitle the Trust to terminate this Agreement
Service Provider	means, in relation to the Services, any person who is appointed by SPV (and not by any sub-contractor to SPV) to be a provider of the relevant Services in accordance with this Agreement
Services	means the services to be provided by the SPV in terms of the Output Specification
Services Change	means, in relation to any Service, a change in the Output Specification applicable to that Service which requires a change to the Service and which is effected pursuant to Sections 1 to 6 inclusive of Part K of the Schedule
Services Commencement Date	means the date to be determined in accordance with Clause 18.2 of this Agreement

Site	means the site at Larkfield Hospital, Inverclyde owned by the Trust on which the Development will be situated as described in the Head Lease
Specification	means the building specification entitled "Larkfield Hospital, Greenock - Building Specification" in the Agreed Form together with those drawings listed in Part D of the Schedule
SPV Contract Officer	means, in respect of any Service, the person or persons (as nominated from time to time by SPV) who shall manage that Service and its provision on behalf of SPV
SPV Default Compensation	has the meaning given to it in Clause 58.3.4 of this Agreement
SPV Default Notice	means a notice given by the Trust pursuant to Clause 56.2.2 of this Agreement
SPV Event of Default	means any of the events specified in Clause 56.1 of this Agreement
SPV Infection Risk	means the existence of an infection or medical condition affecting Patients, Trust Staff, SPV Staff or third parties who have entered the Hospital, the occurrence of which is a result of a breach by SPV of any requirement of the Output Specification
SPV's Representations	means the representations and warranties set out in Clause 3.4 and Part 4 of this Agreement
SPV's Solicitors	means McClure Naismith, 49 Queen Street, Edinburgh EH2 3NH
SPV Staff	means the employees, consultants, independent contractors and agents of SPV, the Contractor and the Service Provider and includes the employees, contractors, agents and independent contractors of Permitted Sub-contractors
Statutory and Mandatory Inspection and Testing	means work, including inspection, testing and maintenance, required by Applicable Laws, Statutory Requirements, British Standards Regulations or Industry Standards

Statutory Service Failure	means a failure by a Government Authority or quasi-governmental body or a statutory undertaker to provide services required by any Applicable Laws
Statutory Requirements	means the requirements of or arising or imposed under any Applicable Law
Structural Engineer	means McLay Collier & Partners of 7 Park Circus Place, Glasgow, G3 6AH and/or such other civil and structural engineer as the Contractor may from time to time appoint in addition or in substitution in relation to the Works in each case with the prior approval of the Trust (not to be unreasonably withheld or delayed)
Sub-Contracts	means all agreements made between SPV and any Contractor, any Service Provider and **"Sub-Contract"** means any one of them according to context
Sub-Lease	means the sub-lease to be granted by SPV to the Trust in the Agreed Form under Clause 20 of this Agreement
Subordinated Debt	means the outstanding subordinated debt invested in SPV in accordance with the Loan Stock Instrument together with any further subordinated debt advanced to SPV with the approval of the Trust pursuant to any Change or Trust Event of Default or Force Majeure Event; during the period prior to Services Commencement Date, the aggregate of Senior Debt and Subordinated Debt shall be the amount expended or incurred by SPV and/or the Contractor in connection with the Project consistent with the Financial Model
Surplus Land	has the meaning ascribed to it in the Tripartite Agreement
Taxes	means all present and future taxes, charges, imposts, duties or levies of any kind whatever payable at the instance of or imposed by any Government Authority together with any penalties, additions, fines, surcharges or interest and **"Tax"** and **"Taxation"** shall be construed accordingly
Technical Records	means all data and records and other documents relating to the Development which, either pursuant

	to an express obligation in this Agreement or otherwise as a matter of Good Industry Practice, are for the time being required to be maintained by or have been maintained by SPV in relation to the Development
Temporary Service Solution	means a plan to work around a Qualifying Service Interruption Event the purpose of which is to enable the Trust to continue to operate and provide healthcare services at the Hospital
Tender List	means the list of proposed tenderers to be prepared by SPV as amended pursuant to Clause 40.2 of this Agreement
Term	means a period of 25 years commencing on the Services Commencement Date
Termination Date	means the date of early termination of this Agreement in accordance with the terms of (i) Clause 56.6 of this Agreement (ii) Clause 60.8 of the Agreement and (iii) paragraph 6 of Schedule Part T
Termination Notice	means a notice given by the Trust in terms of Clause 56.2 or 56.4 of this Agreement or by SPV in terms of Clause 56.9 of this Agreement as the case may be and the context so requires
Titles	means at any time the title deeds (including servitude or burdens writs) relating to the Site at that time
Total Equity	means the aggregate of Equity Investment and the Subordinated Debt
Tripartite Agreement	means the agreement in the Agreed Form made between the Trust, SPV and the said Melville Dundas Limited
Trust Consents	means such consents as may require to be maintained by the Trust in terms of the legislation, regulations and others specified in Part Q of the Schedule
Trust Contract Officer	means, in respect of any Service, the person or persons (as nominated from time to time by the

	Trust) who will supervise on behalf of the Trust the performance of that Service by SPV
Trust Event of Default	means any of the events specified in Clause 56.9 of this Agreement
Trust Default Compensation	has the meaning given to it in Clause 58.3.1 of this Agreement
Trust Procedures	means any procedures or policies of the Trust as may be in force and any of its standing orders or standing financial instructions as may be in force as set out or referred to in Part N of the Schedule (as at the Execution Date) subject to the list of dispensations prepared by the SPV being in the Agreed Form and provided always that any amendment to Trust Procedures from those applying at the Execution Date shall only be binding on SPV to the extent implemented through a Change in accordance with the Change Procedures
Trust Procedures Change	means a change in the Trust Procedures requested by the Trust in accordance with Section 1 of Part K of the Schedule to this Agreement
Trust Representations	means the representations and warranties set out in Clause 8.2 of this Agreement
Trust Staff	means the employees, consultants, independent contractors, and agents of the Trust and includes the employees, consultants, agents and independent contractors of such subcontractors
Trust's Auditor	means PriceWaterhouseCoopers of 1 Embankment Place, London WC2N 6NN and any successor
Trust's Board	means the board of directors of the Trust as constituted from time to time
Trust's Energy and Utility Policy	means the policy or policies in relation to the efficient use of energy and utilities incorporated in Encode
Trust's Representative	means Douglas Vallance of Dykebar Hospital, Grahamston Road, Paisley PA2 7DE or such other representative as the Trust shall from time to time

	appoint for the purposes of this Agreement and upon whose instructions SPV will be entitled to rely and whose instructions and representations will for the purposes of this Agreement be deemed to be instructions and representations by the Trust
Trust's Requirements	means the requirements of the Trust as set down in the documents specified in Part E of the Schedule
Trust's Solicitors	means McGrigor Donald of Pacific House, 70 Wellington Street, Glasgow G2 6SB
TUPE	means the Transfer of Undertakings (Protection of Employment) Regulations 1981 as amended from time to time or other laws or regulations which comply with or implement or are intended to comply with or implement the Acquired Rights Directive (EC77/187) as amended from time to time, whether enacted before or after the said Directive
Unavailable	has the meaning given to it in Part H of the Schedule
Unitary Payment	means the sum defined as "Basic Annual Sum" in Part H of the Schedule
Unplanned Liability	means at any time any cost, charge or liability (including professional fees) which SPV has incurred prior to that time or which, on the basis of information available to SPV at that time, it is likely to incur at a future date, whether in connection with the Project or otherwise and which will not be capable of being paid in the ordinary course from funds that are capable of being made available under the Finance Facilities Agreements or from other cash resources of SPV (including the Subordinated Debt)
Unplanned Maintenance	means maintenance and repair work which is not planned in advance which is required in order to return all Related Materials and the Hospital to Fully Serviceable Condition
Utility Failure	means (i) an interruption to the supply of gas or electricity to the Hospital as a consequence of an event occurring outside the Hospital or (ii) an interruption to the supply of water to the Hospital or the supply of water failing to meet the standards required by the Output Specification, as a

consequence of an event occurring outside the Hospital other than, in either case, a breach by SPV of any contract for the supply of gas, electricity or water (as the case may be)

VAT means Value Added Tax as provided for in the Value Added Tax Act 1994 and any Applicable Laws amending or replacing the same

Visitor means any person entering the Hospital other than SPV Staff, Trust Staff or Patients

Visitor Risk means any act or omission by Visitors which results in loss or damage to or destruction of the Hospital or Related Materials or which would result in the occurrence of any Availability Deduction or Performance Deduction or the occurrence of a SPV Event of Default, which risk is accepted by the Trust (as between the Trust and SPV) to the extent that the aggregate costs incurred by SPV associated with all such loss or damage in a Contract Year exceed any recoveries actually made from insurance against the Insured Risks

Weighted Average Cost of Capital means the figure calculated by using the following formula:-

$$A = b\left(\frac{c}{d}\right) + e\left(\frac{f}{d}\right)$$

where

A is the Weighted Average Cost of Capital
b is the Equity Rate of Return
c is the Total Equity
d is the sum of the maximum amount of Senior debt and the Total Equity
e is the Senior Debt Financing Costs calculated by reference to the Financial Model; and
f is the maximum amount of Senior Debt

Works means the works to design, construct, fit out and commission the Development to be carried out by or at the direction of SPV under and in accordance with Part 4 of this Agreement

Works Change	means a change to the Works or the Hospital (as the case may be) made pursuant to Part K of the Schedule
Zone	means each area of the Hospital as such is shown separately in the Accommodation Schedule

1.2 In interpreting this Agreement:

1.2.1 the Schedule to this Agreement is an integral part of this Agreement and any reference to this Agreement includes a reference to the Schedule;

1.2.2 references to clauses, schedules, recitals and annexures in this Agreement are to clauses of and schedules, recitals and annexures to this Agreement unless stated otherwise and references in this Agreement to a numbered Provision shall be references to clauses of this Agreement bearing that number;

1.2.3 words and expressions defined in the Act shall (unless the contrary is stated) have the same meaning when used in this Agreement as in the Act;

1.2.4 any reference in this Agreement to a document **"in the Agreed Form"** is a reference to a document approved by the parties hereto a copy of which has been or shall have been signed for the purpose of identification by or on behalf of each of the parties;

1.2.5 any reference to a statutory provision includes a reference to all enactments amendments and modifications relating to that provision and any subsequent legislation made from time to time under it (and in each case whether before or after the entering into of this Agreement);

1.2.6 references to the singular include the plural and vice versa and references to any gender include the other genders;

1.2.7 references to a **"person"** include any individual firm unincorporated association or body corporate including any Governmental Authority;

1.2.8 any reference to a public organisation shall be deemed to include a reference to any successor to that public organisation or any organisation or entity which has taken over the functions or responsibilities of that public organisation;

1.2.9 headings and indices shall be ignored for the purpose of construing this Agreement;

1.2.10 general words introduced by the word "other" shall not be given a restrictive meaning because they are preceded by words indicating a particular class of acts, matters or things or because they are followed by particular examples intended to be embraced by general words;

1.2.11 any references to an agreement or other document includes (subject to all relevant approvals) a reference to that agreement or document as amended, supplemented, substituted, novated or assigned;

1.2.12 the words **"herein"**, **"hereto"** and **"hereunder"** refer to this Agreement as a whole and not to the particular clause, schedule, part, section, paragraph or annex in which that word may be used;

1.2.13 reference to a **"subsidiary"** or **"holding company"** shall be construed according to Section 736 of the Companies Act 1985 (as amended) and to a **"subsidiary undertaking"** shall be construed according to Section 258 of that Act (as amended);

1.2.14 the documents forming the DBFO Contracts are to be taken as mutually explanatory of one another. If there is any ambiguity or discrepancy among the documents, the priority of the documents shall be:-

(i) this Agreement
(ii) the Head Lease
(iiii) the Sub Lease

and if there is any ambiguity or discrepancy in a document, the body of the document shall have priority over any schedule or annexation

1.2.15 reference to any party to this Agreement, or any other person referred to herein, or any other agreement, includes any assignee or successor in title permitted by such agreement (or agreed by the parties thereto) save where the context otherwise requires

1.2.16 reference to any obligation by SPV shall permit the carrying out of such obligation by SPV, a Service Provider or any Permitted Sub-Contractor (to the extent this Agreement does not prohibit carrying out of such obligation by such person) and a reference to any breach by SPV includes a breach by a Service Provider or any Permitted Sub Contractor.

1.2.17 reference to any Part is to a Part of this Agreement as so described

2. **Agreements**

2.1 The Trust:

(a) relying on SPV's Representations;

(b) in consideration of the obligations and duties assumed by SPV under this Agreement and the other Project Documents to which it is a party; and

(c) on and subject to the terms and conditions of the DBFO Contracts,

appoints SPV exclusively to undertake, on SPV's own behalf and in SPV's own name, all works necessary to cause the Development to be designed, constructed, fitted out and commissioned in accordance with the terms set out in Part 4 of this Agreement and thereafter throughout the Term (but subject to Clauses 56, 58 and 60) to provide Services in accordance with this Agreement .

2.2 The Trust and SPV shall enter into the other DBFO Contracts on the Execution Date.

2.3 SPV

2.3.1 relying on the Trust Representations

2.3.2 in consideration of the obligations and duties assumed by the Trust under this Agreement and the other DBFO Contracts

2.3.3 on and subject to the terms and conditions of the DBFO Contracts

accepts the appointment made under Clause 2.1, and undertakes exclusively to undertake on SPV's own behalf and in SPV's own name, all works necessary to cause the Development to be designed, constructed, fitted out and commissioned in accordance with the terms set out in this Agreement and thereafter throughout the Term (but subject to Clauses 56, 58 and 60) to provide the Services in accordance with this Agreement.

3. **Conditions**

3.1 **Conditions Precedent**

This Agreement, with the exception of Clause 2 (Agreements), the obligations in Clause 3.2, the representations and warranties in Clauses 3.4, 8.2 and Clause 47 (Confidentiality), shall not come into effect until:-

3.1.1 the parties to them Execute and deliver:-

(a) the DBFO Contracts;

(b) the Building Contract;

(c) the Facilities Management Agreement;

(d) the Finance Facilities Agreements;

(e) the Tripartite Agreement;

(f) the Financier Direct Agreement;

(g) the Appointments;

(h) Collateral Warranties duly executed by each of the Contractor and the Consultants

and a copy of each of the documents listed in this Clause 3.1.1 to which the Trust is not a party, duly certified as a true complete and up-to-date copy by a director of SPV has been delivered to the Trust.

3.1.2 the Trust has received evidence satisfactory to it:

(a) that all conditions precedent to the availability of debt funding for SPV under the Finance Facilities Agreements and availability of Subordinated Debt have been fulfilled or waived other than any that will be fulfilled

(i) by the execution of the DBFO Contracts by the Trust and/or this Agreement coming into force; and

(ii) by completion of the Development pursuant to the Building Contract.

(b) of the ultimate beneficial ownership of each Promoter;

3.1.3 SPV has delivered to the Trust, in form and substance acceptable to the Trust:

(a) a copy, certified as a true copy by its company secretary, of the minutes of a meeting of its board of directors, duly convened and held, authorising SPV to undertake the Project and to execute and deliver the Project Documents;

(b) copies, certified as true copies by its company secretary of SPV's certificate of incorporation and memorandum and articles of association in the Agreed Form; and

(c) a certificate, dated the date on which the Conditions in this Clause 3.1 (other than this sub-Clause 3.1.3(c)) are fulfilled, executed by two directors of SPV, confirming that SPV's Representations are to the best of their knowledge and belief having made due enquiry true, correct and not misleading as at that date.

3.1.4 SPV has received evidence satisfactory to it of (a) written approval of the Secretary of State for Scotland of the Trust's full business case for the Project and (b) the issue of a certificate of the Secretary of State for Scotland pursuant to the National Health Service (Private Finance) Act 1997; (c) a resolution of the Trust authorising the Trust to enter into the Project and to execute and deliver the Project Documents to which it is a party; (d) a certificate, dated the day on which the last conditions precedent in Clause 3.1 (other than this condition) are fulfilled or waived, signed by the Trust confirming that the Trust Representations are to the best of its knowledge and belief true, correct and not misleading as at that date; and (e) a copy of the standing orders and standing financial instructions of the Trust.

3.2 **Fulfilment of Conditions Precedent**

Each party shall use all reasonable endeavours to procure that the conditions set out in Clause 3.1 for which it is responsible are satisfied as soon as possible after the Execution Date. If any of those conditions are not satisfied by noon of the fifth day following the Execution Date (unless in relation only to Clause 3.1.3 waived by the Trust in writing at its absolute discretion), this Agreement and the other DBFO Contracts shall cease to have effect from that date.

3.3 **Further Conditions**

SPV shall procure the fulfilment of any condition temporarily waived by the Trust under Clause 3.1.3 within such time as may be specified in the relevant waiver and, in any event, promptly to the Trust's satisfaction.

The determination of the Services Commencement Date will be made in accordance with Clause 18.2 of this Agreement.

3.4 **Representations and warranties**

SPV represents and warrants to the Trust that:-

3.4.1 SPV:

(a) is validly incorporated;

(b) has the power and capacity to execute the Project Documents to which it is a party and perform its obligations and exercise its rights under them; and

(c) has not traded at any time since its incorporation other than for the purposes of the Project and the Project Documents;

3.4.2 except for liabilities that have arisen from SPV preparing to enter and/or entering into this Agreement and the other Project Documents and arrangements ancillary thereto, SPV has no material obligations;

3.4.3 the information on SPV in Section 1 of Part S of the Schedule is true and accurate and (with the exception of any interest of any Financier under the Finance Facilities Agreements) no offer or other arrangement is outstanding by which any person is at the Execution Date entitled to or obliged to subscribe for or take, by means of transfer or by conversion of any other form of instrument or bond, any interest in any share capital in SPV (including any such entitlement or obligation that may arise in exercise of an option exercisable by or against SPV or any Promoter);

3.4.4 the information on the board of directors of SPV in Section 2 of Part S of the Schedule is true and accurate and that no offer or other arrangement by which any alteration to the constitution of the board of directors of SPV may take effect is outstanding;

3.4.5 the copy of the Memorandum of Association and Articles of Association of SPV certified by the company secretary of SPV and delivered to the Trust under Clause 3.1.3 immediately prior to the Execution Date is true and accurate and that no proposals are outstanding to amend those documents;

3.4.6 all material information supplied to the Trust in writing (whether by SPV or the Promoters) prior to the Execution Date is so far as SPV is aware true, complete, accurate and not misleading;

3.4.7 SPV has or will, when required, have a valid perpetual non exclusive licence of, or is or will be, when required, the absolute and

unencumbered proprietor of all Intellectual Property described in Clause 54.2,

3.4.8 SPV is not as far as SPV is aware after due and diligent enquiry in breach of any of the material terms of this Agreement or any other DBFO Contract and will not by entering into or performing its obligations or exercising its rights under the Project Documents be in breach of or cause to be breached any restriction (whether arising in contract or otherwise) binding on SPV or any Promoter or any of their respective assets or undertakings;

3.4.9 to the best of SPV's knowledge, based on diligent enquiry, none of the authorised share capital (issued or unissued) of SPV is subject to any encumbrance or security interest of the kind described in Clause 12.15.3; and

3.4.9 SPV has no subsidiaries or subsidiary undertakings.

Each of the representations and warranties in this Clause 3.4 shall be continuing and (with the exception of the representation and warranties in Clauses 3.4.1, 3.4.2, 3.4.3, 3.4.4, 3.4.5 and 3.4.8) shall be deemed to be repeated on each day during the Term.

4. Duration

This Agreement shall, subject to Clause 3.1 (Conditions Precedent), commence on the Execution Date and shall subsist until the last day of the Term, but subject to the lawful exercise of any early termination rights set out or referred to in this Agreement.

PART 2 - FUNDING ARRANGEMENTS

5. Responsibility for funding

5.1 All financial obligations arising in the performance of SPV's obligations under this Agreement and the other Project Documents shall be the sole responsibility of SPV, except as expressly stated to the contrary in any of the Project Documents.

5.2 Except where expressly authorised in writing by the Trust or by the terms of any of the DBFO Contracts, SPV shall not hold itself out as the agent of the Trust and shall have no power to bind the Trust, pledge the credit of the Trust or otherwise have any dealings on behalf of the Trust.

6. **Effect of an Unplanned Liability**

6.1 If an Unplanned Liability shall arise prior to Services Commencement Date, SPV shall keep the Trust fully advised of the circumstances that led to the Unplanned Liability and the steps being taken by or on behalf of SPV to resolve it. Without limiting this Clause 6.1, SPV shall take all steps within its power to remove or mitigate to the fullest extent possible any Unplanned Liability.

6.2 The obligation in Clause 6.1 shall continue until SPV gives notice to the Trust, signed by a director of SPV, confirming that the circumstances under which the Unplanned Liability arose have been resolved. That notice shall set out in reasonable detail the manner in which and terms on which the Unplanned Liability was resolved.

7 **Not Used**

PART 3 - GENERAL OBLIGATIONS OF THE PARTIES

8. **Trust's Obligations**

8.1 During the Term the Trust shall use all reasonable endeavours to:-

8.1.1 satisfy its obligations to the purchasers of health care services from the Trust all in accordance with contracts made from time to time with such purchasers;

8.1.2 take such steps as the Trust, acting reasonably and in accordance with the normal practice of the Trust, may decide to market the facilities and services of the Trust by making the same available to potential purchasers within the NHSiS and seeking to secure efficient utilisation of the Hospital; and

8.1.3 apply and monitor the application of quality control and risk management practices of the highest standard reasonably practicable, having regard to the resources that the Trust has available to it.

8.1.4 ensure that the Trust, and the Trust Staff co-operate in good faith with SPV and SPV Staff, the Contractor or any Service Provider to enable the parties to carry out their respective obligations in terms of this Agreement and the other DBFO Contracts to which they are a party.

8.1.5 ensure that the Trust and the Trust Staff shall not (whether by act or omission) obstruct or prevent SPV, SPV Staff, the Contractor or any Service Provider from carrying out any of their obligations under this Agreement or any DBFO Contract to which they are a party.

8.2 The Trust warrants to SPV that:-

8.2.1 the Trust has obtained all necessary consents and approvals to enter into this Agreement and the Project Documents to which it is a party and no limitation of its powers or functions will be exceeded as a result of the performance of the transactions contemplated by such documents

8.2.2 the Trust has the power and capacity to Execute each of the Project Documents to which it is a party, and each such document, and the Trust's signatory thereto, have been duly approved in accordance with all relevant constitutional and regulatory requirements

8.2.3 The Trust is validly established as an NHS Trust (as defined in the Act) pursuant to S.I 1998 No 2716 (S.148)) as amended by S.I. 1999 No. 1115 (S.88) ("the Order")) and, pursuant to paragraph 2 of the Order is called The Argyll and Clyde Acute Hospitals National Health Service Trust.

8.2.4 The Project Documents to which the Trust is a party , and any other document or instrument Executed or delivered or to be Executed or delivered by the Trust thereunder constitute or, as the case may be, will constitute valid and legally binding obligations of the Trust

8.2.5 The Execution and delivery of each of the Project Documents and any other document or instrument Executed or delivered or to be Executed or delivered thereunder by the Trust and the performance of its obligations thereunder or compliance with their respective provisions will not:

8.2.5.1 contravene any existing Applicable Laws, to which the Trust is subject, conflict with, or result in any breach of any of the terms of, or constitute a default under, any agreement or instrument to which the Trust is expressed to be a party or is subject to or by which it or any of its property is bound in a manner which is reasonably likely to result in any liability on the part of SPV or the Financiers (or any of them) to any third party by reason of any such conflict

8.2.5.2 contravene or conflict with any provision of the Order referred to in Clause 8.2.3

8.2.6 [Not Used]

8.2.7 To the best of the Trust's knowledge all financial and other information provided in writing by, or on behalf of, the Trust in connection with this Agreement or any of the other Project Documents

prior to the date of this Agreement was true and accurate in all material respects when given and there are no other facts or matters, the admission of which would have made any such information provided misleading or a materially inaccurate representation of the situation described therein and all opinions, projections and forecasts given or made have been honestly made and based upon reasonable assumptions

8.2.8 No proceedings have been taken and not discharged or to the best of the Trust's knowledge, information and belief threatened for its winding-up or dissolution

8.2.9 The copy of the standing orders and standing financial instructions of the Trust delivered to SPV pursuant to Clause 3.1.4 (e) is true, complete and accurate and not misleading and no proposals are outstanding to amend either of those documents which would have an effect on the Trust's powers and obligations to enter into or carry out or any of its obligations under this Agreement or any of the other Project Documents to which it is expressed to be a party

8.2.10 All necessary action has been taken or will be taken to authorise the execution, delivery and performance of each of the Project Documents to which it is expressed to be a party and no limitation of its powers will be exceeded as a result of the performance of the transactions contemplated by such documents

8.3 The Trust shall maintain in force during the Term all necessary Trust Consents.

9. The Trust's Payment Obligations

9.1 In consideration of the provision of the Services by or on behalf of SPV the Trust shall, in respect of the Services make payments to SPV in accordance with Part H of the Schedule (as such payments may be adjusted from time to time in accordance with Part H and Part K of the Schedule).

10. Changes to the Requirements of the Trust

10.1 Unless specifically stated otherwise in Part 5 of this Agreement, no guarantee is given by the Trust in respect of the levels of demand, or value to SPV, of the Services which the Trust will require during the Services Term or any period during the Services Term.

10.2 All Changes shall be dealt with in accordance with Sections 1-6 of Part K of the Schedule to this Agreement.

10.3 Without limiting Clause 27.2 of Part 5 of this Agreement, where the Trust is aware that a temporary requirement for an increase in Services may be required by the Trust, the Trust shall, if practicable in all the circumstances, endeavour to consult with SPV with a view to giving advance notice of the potential increase to SPV although nothing in this Clause 10.3 shall place the Trust under any obligation to give advance notice to SPV of any increase in Services.

10.4 SPV acknowledge that in respect of each Service there may be a need for the relevant members of SPV Staff to work outside of the normal working hours specified in the Output Specification, in the event of an Emergency and agrees that it will use its reasonable efforts to make arrangements to provide out of hours emergency cover. When an Emergency occurs during the working hours provided for by this Agreement, SPV Staff should be diverted from their normal duties to deal with it for a period of up to 48 hours from the occurrence of the Emergency and, unless such Emergency arises through the act or omission of SPV or SPV Staff, SPV will not be considered to be in breach of its obligations under this Agreement for the purposes of the Performance Regime and Availability Regime as a result of such redeployment of staff. This service forms part of each of the Services to be provided pursuant to this Agreement and, for a period of 48 hours shall be provided at no extra cost to the Trust; thereafter continuance of such emergency arrangement, unless such Emergency arises through the act or omission of SPV or SPV Staff, shall be subject to the Trust issuing a Change Notice pursuant to Paragraph 3 of Section 1, of Part K of the Schedule (Service Changes).

10.5 **Service Interruptions**

10.5.1 Subject to Clause 10.5.2 if a Qualifying Service Interruption Event affecting the provision of the Services occurs then SPV shall use all reasonable endeavours (having regard to the cost of implementing any proposals and the likely efficacy of any such proposals) to implement a Temporary Service Solution

10.5.2 SPV shall be under no obligation to implement a Temporary Service Solution if it would not be reasonably practicable so to do.

10.5.3 The Trust acknowledges that a Temporary Service Solution agreed to be implemented by the Trust may not provide the level of service otherwise required by the Output Specification and this Agreement.

10.5.4 Where the Qualifying Service Interruption Event continues for a period of three months the Trust and SPV shall negotiate in good faith any changes which may be required to this Agreement

10.5.5 If within a further period of 14 days the parties have failed to reach agreement on the changes required to this Agreement then SPV shall cease to be under an obligation to implement a Temporary Service Solution

10.5.6 The costs incurred by SPV in implementing a Temporary Service Solution shall be borne equally by SPV and the Trust.

11. No Restriction on the Trust's Discretions and Responsibilities

SPV acknowledges that, in entering into the DBFO Contracts, the Trust is subject to and its powers are derived from the Act (and other Applicable Laws) and that, as a body regulated by public law, the Trust must perform its statutory functions, notwithstanding the rights and obligations upon it under this Agreement or any other DBFO Contract.

12. SPV's Obligations

12.1 SPV shall, to the extent relevant for the performance of this Agreement

12.1.1 without prejudice and subject to Section 3 of Part K of the Schedule comply at all times with all Applicable Laws and Statutory Requirements and all current and relevant permits which are applicable to the provision of the Services;

12.1.2 comply at all times with (i) Good Industry Practice and (ii) subject as aftermentioned) Scottish Office and NHSME Guidelines including (but not limited to) the Patient's Charter and (iii) subject as aftermentioned and save in respect of the specific exceptions identified in the list of dispensations prepared by SPV in the Agreed Form, the Trust Procedures provided that (a) unless a Change Notice is issued in accordance with paragraph (d) below where there is any conflict between the aforementioned Guidelines or Trust Procedures and the Specification or the Output Specification (as the case may be) the Specification and/or the Output Specification (as the case may be) will prevail (b) prior to the Services Commencement Date the obligations in respect of compliance with the aforementioned Guidelines and Trust Procedures shall be limited to taking into consideration, applying Good Industry Practice, the relevant Guidelines and Trust Procedures (c) following the Services Commencement Date SPV will comply with the aforementioned Guidelines and Trust Procedures save to the extent that it is prevented from doing so by the then existing design and construction of the Hospital (on the basis that there has been no breach by SPV of this Agreement in relation to such design and construction) and (d) compliance with any Guidelines or Trust Procedures issued after Financial Closing shall be subject to the Trust serving a Change Notice pursuant to Paragraphs 3 or 4, as the case may be, of Section 1 of Part K of the Schedule (Trust Changes);

12.1.3 use reasonable endeavours to ensure that the Trust are kept fully aware at all times of all matters affecting, or which may affect, in any material way its performance of the Services;

12.1.4 forthwith notify the Trust of any claim brought against SPV arising out of or relating to SPV's performance of the Services.

12.2 SPV shall at all times, whether before or after termination of this Agreement or any of the DBFO Contracts, and shall procure that all Service Providers and Permitted Sub-Contractors and SPV Staff shall, keep as confidential all information relating to all Patients, not use or disclose any of that information and make every effort to prevent the use or disclosure of any of that information by such third party, and comply with all Trust Procedures from time to time in relation to patient confidentiality.

12.3 SPV shall promptly inform the Trust in writing of:-

12.3.1 any material breach or default under any Sub-Contracts; and

12.3.2 any event described in Clause 56.1 giving reasonable details of the circumstances and the steps being taken to remedy or mitigate their effect.

12.4 Without prejudice to Clause 56, SPV shall and (where appropriate) shall procure that the relevant Promoter shall

12.4.1 inform the Trust by at least 30 days prior notice in writing, of any proposed transfer under Clause 12.5 (a);

12.4.2 inform the Trust in writing within 30 days of any transfer under Clause 12.5 (b).

12.5 SPV shall in any event procure that no interest in any shares in SPV or any immediate holding company of SPV as the case may be shall be transferred by any Promoter (a) prior to the expiry of a period of fifteen months following the date of Contractual Practical Completion unless notice has been given under Clause 12.4.1 and the consent of the Trust obtained such consent not to be unreasonably withheld or a decision thereon delayed (save that a Promoter may at any time following the date of Contractual Practical Completion and without the consent of the Trust, but subject to the obligation to give notice under Clause 12.4.2 transfer shares in SPV provided such Promoter retains after such transfer not less than 19% of the issued share capital of SPV or any immediate holding company of SPV as the case may be) or (b) at any time after the expiry of such period of fifteen months as appropriate without notice having been given to the Trust in accordance with Clause 12.4.2. Declaring for the avoidance of doubt that there shall be no restriction on any transfer of shares in SPV or any immediate holding company of SPV as the case may be at any time otherwise than by a Promoter but subject always to compliance with Clause 12.4.2; and

12.6 SPV shall procure that Insurances satisfying the Insured Risks are effected and maintained in accordance with the requirements of Part T of the Schedule to this Agreement subject always to the terms of Part T of the Schedule.

12.7 Not used.

12.8 Not used.

12.9 If (a) an amendment is made to the Facilities Management Agreement, (b) SPV grants a waiver or release of any of the obligations of another party under any Facilitites Management Agreement, or (c) any agreement is made which would materially affect the interpretation or application of any Facilities Management Agreement, then SPV shall deliver to the Trust a conformed copy of each amendment, release, waiver or agreement or (so far as it is not in writing) a true and complete record in writing within 15 Business Days of the date of its creation, certified as a true copy by an officer of SPV.

12.10 In relation to any amendment made or any waiver or release of any obligations under the Facilities Management Agreement or entering into any agreement as referred to in Clause 12.9, SPV shall (in so far as applicable) procure due compliance with the provisions of the Restrictive Trade Practices Act 1976 (as amended), and the Competition Act 1998.

12.11 SPV shall be solely responsible for securing the grant and all subsequent renewals, extensions and modifications of any permits licences, consents and authorisations (including, but not limited to, Necessary Consents but excluding the Trust Consents), necessary to carry out the Project and shall ensure that, as far as is legally possible, those permits are obtained in SPV's name.

12.12 Without derogating from SPV's obligations in Clause 12.11, where the Trust is, prior to Services Commencement Date the holder of any relevant permit which is capable of transfer to SPV and which the Trust is reasonably satisfied would be necessary or desirable for SPV to perform its obligations under the DBFO Contracts, the Trust shall at the request of SPV use its reasonable endeavours, to secure that transfer and shall provide all assistance reasonably required by SPV, to secure the issue of any required permit. The costs of securing such transfer shall be borne equally by SPV and the Trust.

12.13 If any permit identified by SPV under Clauses 12.11 or 12.12 above cannot legally be obtained in SPV's name and must identify the Trust, SPV shall, in the event of any query, breach, prosecution or other dealing in respect of such permit, give the Trust all necessary assistance and information to enable the Trust to respond to the matter.

12.14 Not used

12.15 SPV shall:

12.15.1 not used.

12.15.2 not engage in any business, other than entering into the Project Documents and the performance of its obligations in respect of each of them and any related and consequential transactions;

12.15.3 not create or have outstanding any mortgage, pledge, lien, assignation, assignment, encumbrance, right of set-off, title transfer or retention arrangement (other than entered into in the ordinary course of business) security interest or other arrangement conferring a priority or preference over general creditors (other than (i) liens arising by operation of law, which shall be released by SPV promptly (ii) under or pursuant to the Finance Facilities Agreements and (iii) assignation and/or assignment of this Agreement with the Trust's consent) on the whole or any part of its undertaking or assets, present or future to secure any present or future obligations of SPV or of any other person; the Trust will at the request of the SPV enter into a Financier Direct Agreement with any substitute Financier in substantially the same form as the Financier Direct Agreement entered into at the Execution Date;

12.15.4 advise the Trust forthwith of any breaches of the Finance Facilities Agreements which would lead to accelerated payment or enforcement action to be taken thereunder;

12.15.5 not:

(a) incur any material Financial Indebtedness, other than its obligations under the Finance Facilities Agreements and any other Project Document or assume or guarantee any material Financial Indebtedness of any other person;

(b) form or acquire any subsidiary or subsidiary undertaking;

(c) consolidate or merge with or into any other entity or convey or transfer any of its undertaking or assets, either individually or substantially as an entirety, to any person;

(d) amend the objects clause of its Memorandum of Association;

in each case without the Trust's prior written consent provided that such consent may only be withheld where, in the Trust's reasonable opinion, the actions of SPV in (a) to (d) above will have a material and adverse effect on SPV or the provision of the Services.

The restrictions in this Clause 12.15 shall apply, making any necessary changes, to any subsidiary or subsidiary undertaking of SPV.

12.16 SPV shall ensure that SPV and SPV Staff shall at all times, whilst on the Site, comply with the Trust's Energy and Utility Policy and all shall take all reasonable and proper steps to avoid or minimise the inefficient use of energy and/or utilities, and shall comply with all reasonable requirements made by the Trust regarding energy/utilities saving and efficiency measures and SPV shall indemnify the Trust in respect of any loss suffered by the Trust as a consequence of a breach of this clause.

PART 4 - DEVELOPMENT PROVISIONS

13 Representations and Warranties

13.1 Without limiting any warranties implied by law, SPV warrants and represents to the Trust that:

13.1.1 the design of the Works will in all material respects comply with the Trust's Requirements and all other requirements of this Agreement;

13.1.2 the Works will comprise only materials and goods which will be of sound and satisfactory quality and all workmanship shall be in accordance with Good Industry Practice;

13.1.3 the Works, when constructed, will comply in all material respects with the Specification and all other requirements of this Agreement;

13.1.4 to the best of SPV's knowledge upon proper reasonable enquiry the persons carrying out any design and/or periodic inspection of the Development possess the skill, care and experience expected of a professionally qualified, skilled and competent person employed in the design and/or periodic inspection of projects of a size, scope and complexity similar to the Project; and

13.1.5 SPV accepts the Site as being sufficient in all respects for the purposes of the Works;

13.1.6 it has exercised and will exercise reasonable skill and care to ensure that no equipment incorporated in the Works in relation to the construction of the Hospital, will fail to operate correctly as a result of failure to give due chronological recognition of calendar dates before, on or after 1st January 2000.

13.2 The representations and warranties in this Clause 13 are additional to representations and warranties in Clause 3.4 of this Agreement.

14. **The Works - SPV's obligations**

14.1 SPV undertakes at its own cost to design, construct, fit out and commission the Development in accordance with:

(a) this Agreement including Clause 12.1.2;

(b) the Specification;

(c) the Necessary Consents; and

in a good and workmanlike manner, in accordance with Good Industry Practice and in compliance with all Applicable Laws, using only materials and goods which are of sound and satisfactory quality within the timescales specified in this Agreement.

14.2 SPV shall procure that Contractual Practical Completion occurs by the Completion Date provided that if the Works are delayed by any of the following events, (each of which shall be referred to as an "Excusable Delay"):-

14.2.1 any event of Force Majeure; or

14.2.2 any breach by the Trust or its servants or agents of any of the Trust's obligations under this Agreement; or

14.2.3 a strike by the Trust or its servants whether or not constituting a Relief Event; or

14.2.4 the instigation and implementation of any Works Change in accordance with this Agreement.

14.2.5 the Site is or becomes an area of archeological interest or contains fossils, antiquities or other objects of interest or value

14.2.6 the occurrence of an event in respect of which insurance has been effected by the SPV in accordance with this Agreement

then to the extent (if any) to which it is appropriate to do so the Completion Date shall be extended by such period as the SPV and the Trust's Representative shall agree and certify is fair and reasonable in relation to the Excusable Delay.

14.3 In the event that the SPV and the Trust's Representative cannot agree on the appropriate period of extension of time to be granted under Clause 14.2 within 14 days of receipt by the Trust's Representative of the application by SPV for the relevant extension the matter will be determined by the Dispute Resolution Procedure pursuant to Clause 72 of this Agreement.

14.4 Where the provisions of Clause 14.2.5 apply, SPV shall be entitled to its additional costs arising (including, for the avoidance of doubt the cost to SPV of interest on borrowing) as determined as if it were a Change pursuant to the Change Control Procedure and where the provisions of Clauses 14.2.2 or 14.2.3 apply and the liabilities of SPV (SPV being obliged to take, and have taken, all reasonable and proper steps to minimise the costs of the relevant Excusable Delay) prior to the Services Commencement Date exceed funds available to or capable of being drawn down by SPV prior to the Services Commencement Date) the Trust will on demand pay to the SPV the lesser of (i) the relevant funding shortfall and (ii) the increased interest accrued and/or due and payable by the SPV under the Finance Facilities Agreement attributable to the period equivalent to the period by which the Completion Date is delayed due to the relevant Excusable Delays.

14.5 Subject to the provisions of Clause 14.2, if the Services Commencement Date has not occurred by the Construction Backstop Date, the Trust shall be entitled to terminate the Project Agreement in accordance with the provisions of Clause 56.1.8.

14.6 SPV will ensure that no material amendments or variations are made to the Specification otherwise than (a) in accordance with a Works Change which will be implemented in accordance with the provisions of Part K of the Schedule or (b) otherwise with the prior written consent of the Trust's Representative such consent not to be unreasonably withheld or delayed to the proposed amendment or variation as shown on plans, specification and other details which SPV will submit to it with a notice seeking to amend or vary the Specification.

14.7 SPV shall take all proper steps to procure that no Deleterious Materials at the time of use will be utilised in the Works.

14.8.1 SPV shall

14.8.1.1 be responsible for and shall obtain at its cost the Necessary Consents other than Trust Consents, in so far as and to the extent not already obtained as at the Execution Date, by such date as will enable SPV to proceed with the Development to ensure compliance with the provisions of Clause 14.2;

14.8.1.2 from the Execution Date, take all reasonable steps to keep the Trust informed of all steps taken in obtaining the Necessary Consents other than Trust Consents and shall provide the Trust with copies of any relevant documentation from the Execution Date and in particular give the Trust reasonable opportunity to consider every application and proposed condition to be attached to the Necessary Consents.

14.8.2 The Trust shall be responsible for and undertakes to SPV to apply for diligently pursue and obtain at its own cost all Trust Consents as requested in writing by SPV to enable SPV to proceed with and complete the Development and SPV will

consult with the Trust's Representative in good faith with a view to appraising him of SPV's proposals for future completion of the Development on or before the Completion Date.

14.8.3 The Trust shall provide SPV with such information, data and assistance as SPV may reasonably require in relation to the Necessary Consents, to the extent that such assistance does not incur significant cost to the Trust.

14.9.1 SPV shall use all reasonable endeavours to ensure that the Contractor performs its obligations under the Building Contract and any Appointments in respect of which it is the employer but the Trust will not be entitled to terminate this Agreement for a breach of this Clause 14.9.1 without prejudice to any other right of termination available to the Trust.

14.9.2 SPV will not:

(a) vary, alter or terminate the Building Contract or any Appointments in respect of which it is the employer except with the prior written consent of the Trust (such consent not to be unreasonably withheld or delayed); or

(b) permit the Contractor to terminate, vary or alter the Building Contract or any of the Appointments in respect of which it is the employer or permit any of the Consultants to terminate its respective Appointment except with the prior written consent of the Trust (such consent not to be unreasonably withheld or delayed).

14.9.3 If the Building Contract or any of the Appointments shall be terminated then (without prejudice to the Trust's rights under Clause 56.1.7 of this Agreement) SPV will ensure that without unavoidable delay which would or may lead to Completion occurring after the Completion Date. a new Building Contract or Appointment (as the case may be) shall be entered into in a form previously approved in writing by the Trust such approval not to be unreasonably withheld or delayed and with a party previously approved in writing by the Trust such approval not to be unreasonably withheld or delayed and in each case a further Collateral Warranty (in a form previously approved in writing by the Trust such approval not to be unreasonably withheld or delayed) in favour of the Trust shall be executed by the new party who has been appointed and shall be delivered to the Trust within 10 Business Days after the Building Contract or Appointment shall have been entered into.

14.10 Notwithstanding any reports, data or opinions made available to it, or used by it for any purpose, SPV shall be deemed to have:

14.10.1 satisfied itself as to the suitability of the Site for the Works and the nature and extent of the risk assumed by it in relation to this Agreement; and

14.10.2 gathered all information necessary to discharge its obligations under this Agreement including information as to the nature, location and condition of the Site (including hydrological, geological, geotechnical and sub-surface conditions), areas of scientific or natural interest, local conditions and facilities and obligations to be assumed as a result of the Necessary Consents and Statutory Requirements.

14.11 SPV shall not be relieved from any obligation under this Agreement relating to the Works should any information or documentation whether obtained from the Trust or otherwise (including information or documentation made available by the Trust) be incorrect or insufficient (whether or not contained in the Invitation to Tender) and shall make its own enquiries as to the accuracy and adequacy of such information and without prejudice to the generality of the foregoing, SPV will be fully responsible for the design of the Development.

14.12 SPV shall perform its obligations under this Agreement at its own risk and without recourse to the Trust, now and in the future, except as expressly provided in this Agreement.

14.13.1 Without prejudice to SPV's obligations to carry out and complete the Development so as to comply with the Statutory Requirements and the Necessary Consents SPV shall comply with all requirements of the CDM Regulations and with the approved Code of Practice relating to the CDM Regulations on the basis that it is the client for the purposes of the CDM Regulations in relation to the Works.

14.13.2 The Trust does not believe that the CDM Regulations should apply to it as a client under the CDM Regulations since:

14.13.2.1 it is not a client for whom a project involving construction work is being carried out, on the basis that it will grant SPV the Head Lease of the Site and SPV will provide the Services;

14.13.2.2 the "construction work" within the meaning of the CDM Regulations is to be carried out by SPV and not by the Trust; and

14.13.2.3 to the extent that the Trust gives design information to SPV, SPV has discretion as to whether such design information is used.

14.14 SPV will:

14.14.1 procure that all roads, footpaths and access ways with the lighting and markings pertaining thereto, drains, sewers, pipes, wires, cables and other service transmission media to be constructed as part of the Works shall be of such a type and shall be constructed in such a manner as to comply with the rules and regulations for the time being in force of the relevant statutory, public or local authorities, public

service company and bodies and where these are of a nature capable of being publicly adopted, to the adoptable standard;

14.14.2 pay and satisfy in full, with the intent that the Trust shall accordingly be freed and relieved from, all proper claims for fees, charges, fines, penalties, taxes, outgoings and other payments whatsoever which may become payable or be properly or lawfully demanded by any competent authority or public service company in respect of completing the Development and that no matter when such fees and the like are rendered;

14.14.3 within three Business Days from receipt thereof by SPV or the Contractor, transmit to the Trust's Representative a copy of any notice, consent, approval, certificate, decision, or other document received by SPV or the Contractor from any public authority in respect of the Development or the Site or any part thereof and if any such document contains a requirement that something be done or not done in connection with the Development or any part thereof then forthwith comply fully with the same and to continue so to comply excepting always any such notice etc which may relate to a Trust Consent;

14.14.4 comply with and so free and relieve the Trust of the costs of complying with all notices required by any Statutory Requirements or public service company or authority which has jurisdiction with regard to the Development and/or the Site or with whose system the Development and/or the Site are or will be connected excepting always any such notice etc which may relate to a Trust Consent;

14.14.5 make good any damage to the road(s) giving access to the Site and if applicable the footpaths and any services therein, arising out of or in the course of or by reason of the execution of the Works or any part thereof and to reinstate and, if necessary, renew such road, footpath or services to the reasonable satisfaction of the Trust's Representative where the affected area is within the Site and otherwise where appropriate the competent Local Authority; and

14.14.6 comply with any title conditions affecting the Site disclosed in the title deeds of the Site at the Execution Date or as are subsequently validly created with the written consent of the SPV.

14.15.1 Notwithstanding that Contractual Practical Completion may have occurred, SPV will carry out all (if any) such additional works as may be required to ensure that all Equipment relative to the Development which SPV is obliged to instal and commission in terms of the Specification shall have been properly installed and be fully commissioned and operational at the Services Commencement Date.

14.15.2 SPV will carry out all such works whether of a maintenance reinstatement remediation or other nature to ensure that at all times prior to and at the Services Commencement Date the Development is in at least as good a condition as it was at Contractual Practical Completion.

14.16 During the course of carrying out the Works SPV will consult with the Trust and take due cognisance of the requirements of the Trust in relation to the choice of finishes/fitments, the colour scheme for the Hospital and all landscaping proposals in relation to the Site.

15. Works Changes

The Trust will be entitled to instruct and SPV may recommend a Works Changes which will be initiated, notified and implemented as described in Sections 1-6 inclusive of Part K of the Schedule.

16. Communication and Inspection

The Parties will comply at all times with the Monitoring Procedures and their respective obligations pursuant to Part A of the Schedule.

17. Contractual Practical Completion

17.1 SPV will procure that Contractual Practical Completion occurs on or prior to the Completion Date.

17.2 The Certificate of Contractual Practical Completion will be issued in accordance with the Practical Completion Procedure and the parties hereto will comply with their respective obligations under the provisions of Part B of the Schedule.

18. Services Commencement Date

18.1 SPV will procure that the Services Commencement Date occurs on or prior to the Completion Date provided always that if there is delay which is attributable to Excusable Delay then the Completion Date will be extended by such period as in case of a delay (a) prior to Contractual Practical Completion as agreed or determined pursuant to Clauses 14.2 and 14.3 and (b) after that date as the SPV and the Trust's Representative agree is fair and reasonable in relation to the Excusable Delay.

18.2 The Services Commencement Date will occur upon the sixth Business Day after the latest of the following:-

18.2.1 the date of Contractual Practical Completion in accordance with the Practical Completion Procedure; and

18.2.2 the date upon which the Commissioning Procedure has been completed.

18.3 SPV will give 20 Business Days prior notice to the Trust of the date upon which it considers that the Services Commencement Date will occur and SPV will provide the Trust with such information, assistance and facilities as it reasonably requires to determine whether the Services Commencement Date has occurred. Subject to Clause 18.2, when the Trust and SPV agree that the Services Commencement Date has occurred they will jointly certify to that effect.

19. **Defects Liability, etc**

19.1 Without prejudice to the obligations of SPV under this Agreement and notwithstanding the issue of the Certificate of Contractual Practical Completion, the SPV shall procure that any defects which arise in the Works and which are the responsibility of the Contractor under the Building Contract before the expiry of the Defects Liability Period are made good by the Contractor in accordance with the Building Contract so that a notice of completion of making good defects could be properly issued all in accordance with the provisions of the Building Contract taking into account the provisions of Part C of the Schedule.

19.2 The issue of the Certificate of Contractual Practical Completion and the rights (whether or not exercised) of the Trust's Representative under this Agreement or any other approval or comment made by the Trust's Representative shall in no way affect or diminish the obligations of SPV pursuant to this Agreement and the Trust's Representative shall owe no duty of care to SPV.

20. **Title, Head Lease and Sub-Lease**

20.1 SPV acknowledges that prior to the Execution Date it has examined the Titles and that SPV is satisfied as to the validity and marketability of the Trust's title to the Site. At or prior to the Execution Date there shall be exhibited to the extent this has not already been done:

20.1.1 a valid marketable prescriptive progress of titles in respect of the Trust's heritable title to the Site

20.1.2 Form P16 Report, Form 10 Report, search in the Sasine Register and Personal Register for the full prescriptive periods in respect of the Site brought down as close as is practicable to the Execution Date.

20.1.3 searches in the Register of Charges and Companies File against any limited company having an interest in the Site within the Prescriptive Period brought down as close as is practicable to the Execution Date.

20.1.4 executed Discharges or deeds of release of all existing securities

20.1.5 up to date Local Authority Property Enquiry Certificates;

disclosing no matter prejudicial to the interest of SPV in the Head Lease to be granted

20.2 The rateable value of the Site is as shown on the valuation roll and all outgoings shall be apportioned at the date of Financial Closing (hereinafter referred to as "the Date of Entry").

20.3 The risk of damage to or destruction of the Site shall pass to SPV at the Date of Entry. In the event that the Site is destroyed or damaged prior to the Date of Entry both parties shall be entitled to terminate this Agreement and all of the other DBFO Contracts without liability.

20.4 The Trust will grant and SPV will accept the Head Lease on and with effect from the Date of Entry.

20.4A The Trust is not aware of any servitudes, rights of way, wayleaves, overriding interests (as that term is defined in the Land Registration (Scotland) Act 1979) or rights in favour of third parties over the Site not disclosed in the title deeds exhibited to SPV prior to Financial Closing but does not warrant the position.

20.4B Both parties shall co-operate to ensure that SPV's interest in the Head Lease and the Trust's interest in the Sub-Lease are registered in the Land Register of Scotland at the same time as they are registered in the Books of Council and Session. The Trust undertakes to clear the Land Register of any deed, decree or diligence (other than as created by or against SPV) in the property or personal registers that may have been created in the period from the dates to which the aforementioned searches were brought down prior to Financial Closing to the earlier of (i) the date of registration of the Head Lease in the Land Register and (ii) the date falling 14 days after Financial Closing.

20.5 Thereafter SPV will arrange for the Head Lease to be stamped and registered in the Books of Council and Session and the Land Register of Scotland and SPV will provide an extract of the registered Head Lease to the Trust as soon as practicable thereafter.

20.6 SPV will grant and the Trust will accept the Sub-Lease on and with effect from the Date of Entry.

20.7 Thereafter the Trust will arrange for the Sub-Lease to be stamped and registered in the Books of Council and Session and (if applicable) Land Register of Scotland and the Trust will provide an extract of the registered Sub-Lease to SPV as soon as practicable thereafter.

20.8 SPV will pay the stamp duty and registration costs of the Head Lease. The Trust will pay the stamp duty and registration costs of the Sub-Lease.

20.9 Except for any Security Documents and any floating charge to be granted in favour of a person who may at any time subscribe for and be allotted not less than one third of the equity of SPV, in which case such person shall be obliged to release such floating charge forthwith upon ceasing to be a holder of not less than one third of such equity, SPV undertakes not at any time to create any fixed or floating charge or other security over its interest in the Head Lease except such as has been expressly approved in writing by the Trust such approval not to be unreasonably withheld or delayed.

20.10 Notwithstanding the terms of the Head Lease and the Sub-Lease the Trust and SPV acknowledge that the Operational Period (as defined in the Head Lease) and the Sub-Lease are respectively to endure from the date of Financial Closing to the expiry of the Term and, if called upon to do so by either party serving on the other written notice to that effect, the Trust and SPV shall each as soon as practicable thereafter validly execute and enter into Deeds of Variation of the Head Lease and the Sub-lease which shall provide for (i) in the case of the Head Lease, expiry of the Operational Period coincident with expiry of the Term and (ii) in the case of the Sub-Lease expiry of the Sub-Lease as a whole equating to the expiry of the Term. If the Term is subsequently extended in accordance with the terms of this Agreement then further Deeds of Variation of both the Head Lease and the Sub-Lease shall be validly executed and entered into by SPV and the Trust to reflect such increase in an equivalent increase to the Operational Period under the Head Lease and the duration of the Sub-Lease respectively. SPV will meet the stamp duty and registration costs of each of the Deeds of Variation of the Head Lease and the Trust will meet the stamp duty and registration costs of each of the Deeds of Variation of the Sub-Lease. The Trust and SPV shall co-operate to ensure that the parties' interests in the Deed(s) of Variation of the Head Lease and Deed(s) of Variation of the Sub-Lease are registered in the Land Register of Scotland and contemporaneously in the Books of Council and Session. Notwithstanding that the Deed(s) of Variation are not executed and delivered the Operational Period of the Head Lease will endure for the Term and the Sub-Lease will endure as aforesaid subject to all relevant provisions of this Agreement.

20.11 The Head Lease and the Sub-Lease shall have effect subject to the terms of this Agreement and in the case of any ambiguity, inconsistency, discrepancy or conflict the terms of this Agreement shall prevail.

20.12 The Trust will not without the consent of SPV (not to be unreasonably withheld or delayed) in the period between the date of Financial Closing and the date upon which SPV is no longer entitled to exercise its rights in terms of Clause 59.4.3.

20.12.1 sell, dispose or otherwise in any way deal with or transfer any part or the whole of its heritable interest in the Site other than in respect of a transfer of its whole interest in the Site to a party to whom it has

simultaneously transferred its interest in this Agreement in accordance with the terms of the Agreement

20.12.2 grant any interposed head lease in respect of the subjects let by the Head Lease

20.12.3 assign or transfer its interest in the Sub-Lease other than an assignation or transfer of its whole interest in the Sub-Lease to a party to whom it has simultaneously transferred its interest in this Agreement in accordance with the terms of this Agreement

and in the case of breach of any of the said restrictions such breach shall constitute a fundamental breach of the Trust's obligations under this Agreement in accordance with Clause 56.9.4 of this Agreement.

21. Licence to Enter

21.1 During the period from the Execution Date until the Services Commencement Date and whilst this Agreement is in force but subject to Clause 21.2 the Trust hereby grants to SPV, the Contractor and the Consultants and their servants, agents, employees, licensees and invitees with or without vehicles, plant and equipment, exclusive possession of the Site to enable SPV to discharge its obligations under this Agreement and to the Financier (and the Financier's consultants and advisers) the right to enter the Site to enable or monitor discharge of SPV's obligations under the Finance Facilities Agreements. SPV will and will procure that the Financier will exercise the foregoing rights in such manner as to cause as little damage and disturbance as in all the circumstances is reasonably possible and shall make good any damage to the Site and SPV shall indemnify the Trust in respect of all claims and demands against the Trust arising from the exercise of the foregoing rights.

21.2 SPV acknowledges that the Trust and their staff and invitees will be entitled to access to and egress from the Development (i) at all times to enable the Trust to exercise the Monitoring Procedure and to comply with their obligations pursuant to Part A of the Schedule and (ii) upon reasonable notice, at reasonable times and in accordance with SPV's and the Contractor's reasonable requirements in the period after the date which is estimated by the Trust's Representative to be three months prior to the date of Contractual Practical Completion for the purpose of staff training and familiarisation and other purposes considered appropriate or necessary by the Trust so as to allow the Trust to commence operation of the Hospital on the Services Commencement Date provided that the Trust and their staff and invitees shall not disrupt the Works and provided that the Trust shall indemnify and hold SPV harmless (and to fully and effectually free and relieve) SPV in respect of any and all costs incurred and losses suffered by SPV as a consequence of any damage caused by the Trust, the Trust Representative its staff or invitees or delay in completion of the Works resulting from the exercise of the foregoing access rights.

22. **Not Used**

23. **Not Used**

PART 5 - PROVISION OF SERVICES

24. **Not Used**

25. **The Services**

During the Term SPV shall provide, or procure the provision of, the Services in accordance with the Output Specification.

26. **Related Materials**

26.1 SPV shall provide at its own expense all equipment, materials, consumables and other things whatsoever required for the provision of the Services in accordance with the Output Specification, (**"Related Materials"**).

26.2 SPV shall ensure that all Related Materials are used in the provision of the Services in accordance with the Output Specification.

26.3 SPV shall, at its own expense, and where relevant, keep all Related Materials in a serviceable and clean condition and properly maintained and shall repair or replace any Related Materials damaged or made unserviceable (whether by the wrongful act or omission of SPV, through normal wear or tear or obsolescence or otherwise) at its own cost in order to provide the Services at all times in accordance with the Output Specification. The Trust shall refund to SPV on demand any costs incurred in repairing or replacing any Related Materials damaged or made unserviceable through Patient Risk and Visitor Risk and through any act or omission of the Trust Representative, the Trust Contract Officer or Trust Staff.

27. **Obligations of SPV**

During the Term SPV shall:

27.1 seek appropriate professional advice and assistance when a prudent supplier of the Services with the knowledge and experience of SPV would seek such professional advice, to ensure compliance at all times with the Output Specification (provided that the Trust will have no right to terminate this Agreement as a result of a breach of this Clause

where the Services are being provided in accordance with the Output Specification notwithstanding such breach);

27.2 monitor the demand for each Service comprising the Services in consultation with the Trust in order to provide the Services to meet such demand in accordance with this Agreement;

27.3 inform the Trust Contract Officer if in the opinion of SPV any act or omission or proposed act or omission of the Trust of which SPV is aware will, or may, prevent, hinder or affect the provision of the Services by SPV in accordance with this Agreement, immediately upon becoming so aware, although nothing in this Clause 27.3 shall release, diminish or in any way affect the obligations of SPV or the Trust under this Agreement;

27.4 procure that the SPV Contract Officer consults the Trust Contract Officer on a regular basis and as often as is necessary to ensure the efficient provision of the Services in accordance with this Agreement;

27.5 provide all reasonable assistance and advice to the Trust on any matters relating to the provision of the Services or otherwise in connection with this Agreement whether of a technical or non-technical nature to ensure the efficient provision of the Services in accordance with this Agreement;

27.6 carry out the Services at all times in accordance with the Output Specification and this Agreement.

27.7 ensure compliance with all reasonable instructions given by the Trust in relation to dangers and safety on the Site;

27.8 deal with all health and safety information which relates to the Site and the Hospital which is the responsibility of SPV in terms of this Agreement and ensure that all such information is current and up to date;

27.9 subject always to the Change provisions of this Agreement ensure compliance with all Trust Procedures relevant to the Hospital;

27.10 carry out Planned Maintenance, Unplanned Maintenance, Emergency Maintenance and Statutory and Mandatory Inspection and Testing in accordance with the Output Specification and this Agreement and without prejudice to the foregoing generality shall rectify any failure in relation to the provision of any element of any Service within the Period for Remedy appropriate to such element.

28. **Approved Service Providers and Permitted Sub-Contractors**

SPV may procure the provision to the Trust of all or any part of the Services and any of the obligations of SPV under this Agreement by any one or more Service Providers or Permitted Sub-Contractors in accordance with this Agreement. The appointment of any Service Provider or Permitted Sub-Contractor and the provision of Services by any Service Provider or Permitted Sub-Contractor will not diminish, release or in any way affect the obligations of SPV under this Agreement.

29. **Output Specification**

29.1 The Trust or SPV may request changes to be made to the Output Specification at any time after the Execution Date and any such changes shall be dealt with in accordance with the relevant Change Procedure set out in Sections 1 to 6 inclusive of Part K of the Schedule.

29.2 Not Used

29.3 If there is any inconsistency between the Output Specification and this Agreement, the Output Specification shall prevail.

29.4 Not Used

30. **Scheduled Estates Maintenance Services**

In accordance with the Output Specification throughout the Term SPV shall:

30.1 carry out Planned Maintenance in accordance with the Output Specification and the Planned Maintenance Statements in the Agreed Form and in accordance with the manufacturers' stipulations/recommendations where appropriate;

30.2 carry out Statutory and Mandatory Inspection and Testing in accordance where appropriate with the appropriate statutory or regulatory requirements;

30.3 advise the Trust Contract Officer one month before any Planned Maintenance or Statutory and Mandatory Inspection and Testing is due to be carried out and agree with the Trust a time and place to carry it out to minimise disruption and liaise with the relevant Service Provider in this respect;

30.4 immediately upon carrying out Planned Maintenance or Statutory and Mandatory Inspection and Testing advise the Trust Contract Officer of:

30.4.1 any preventative maintenance which SPV reasonably considers necessary to avoid Unplanned Maintenance; and

30.4.2 any part of the Hospital or any Equipment of which it is aware which requires Unplanned Maintenance or Emergency Maintenance;

30.5 record and make available to the Trust at all reasonable times in writing or on computer disc all Planned Maintenance and Statutory and Mandatory Inspection and Testing which has been carried out and provide reasonable access to such records to the Trust;

30.6 retain the records referred to in Clause 30.5 for a minimum of seven years or such longer period as may be required by law, regulation or NHSME Guidelines; and

30.7 remove from the Site all debris resulting from the carrying out of all Planned Maintenance and Statutory and Mandatory Inspection and Testing.

31. Unplanned and Emergency Maintenance

In accordance with the Output Specification throughout the Term SPV shall:

31.1 make available Unplanned Maintenance and Emergency Maintenance for 24 hours each day and for 365 or (in a leap year) 366 days each year;

31.2 not undertake Unplanned Maintenance without first liaising with the Trust in accordance with the Output Specification;

31.3 after carrying out any Emergency Maintenance and Unplanned Maintenance perform such repairs as may be necessary to return the Related Materials and the Hospital to Fully Serviceable Condition as soon as is reasonably practicable;

31.4 at the end of each month provide the Trust Contract Officer with such written record of the work performed pursuant to this Agreement as the Trust shall reasonably require and any certificate required under Industry Standards or statute, regulation or NHSME Guideline;

31.5 retain the records referred to in Clause 31.4 for a minimum of seven years or such longer period as may be required by law, regulation of NHSME Guideline;

31.6 provide reasonable access to the records referred to in Clause 31.4 to the Trust;

31.7 remove from the Site all debris resulting from the carrying out of the Unplanned Maintenance and Emergency Maintenance.

32. **Operational Instructions**

In relation to the Services throughout the Term SPV shall:

32.1 comply with all Operational Instructions as soon as is reasonably practicable;

32.2 provide a dedicated telephone manned during Normal Working Hours (and with an answerphone service provided outside these hours) solely for receiving the Trust's oral Operational Instructions; and

32.3 record and make available to the Trust at all times all Operational Instructions in writing or on computer disc indicating the date and time of receipt, brief details of action taken and advice given and whether or not an Emergency was involved and the identity of the person at the Trust who gave the Operational Instruction and the person on behalf of SPV who received the Operational Instruction (or confirmation that the Operational Instruction was received by the answerphone service).

33. **Obligations of the Trust**

33.1 Throughout the Term the Trust shall:

33.1.1 provide access to SPV, any Service Provider and any Permitted Sub-Contractor to the Site and the Hospital at all reasonable times to enable SPV to perform or procure the performance of its obligations under this Agreement; and

33.1.2 advise SPV of any unusual risks to health and safety at the Site which are reasonably foreseeable and of which it is aware.

33.2 If materials of the required standard to perform the obligations of SPV under this Agreement in accordance with this Agreement are unavailable, SPV may request that the Trust shall approve an alternative of at least equal quality and performance. Any such approval shall not relieve SPV of its obligations under this Agreement

except to the extent that such approval amends the Output Specification.

34. **Not Used**

35. **Liaison**

SPV shall and undertakes to procure that the Service Provider and Permitted Sub Contractor will comply at all times with, and co-operate in the operation of, the Liaison Procedures set out in Part P of the Schedule.

36. **Inspections**

36.1 The Trust Contract Officer and any other person so authorised by the Trust shall be entitled on reasonable notice during Normal Working Hours during the Term to inspect the premises, equipment, materials and information used by SPV, the Service Provider and any Permitted Sub Contractor in the provision of the Services provided however that inspection shall be carried out in accordance with SPV'S reasonable requirements and not obstruct or prevent SPV from carrying out any of its obligations under this Agreement

36.2 SPV shall co-operate with the Trust Contract Officer and any person so authorised by the Trust and shall provide all reasonable assistance in order to facilitate the carrying out of the inspections.

36.3 SPV shall procure that the Service Provider and each Permitted Sub Contractor shall provide all reasonable assistance to the Trust to facilitate the carrying out of the inspections described in Clause 37.

37. **Trust auditing**

In addition to the monitoring provisions set out in this Agreement, SPV shall be subject to the auditing procedure of the Trust as set out in Clause 41.4 of this Agreement.

38. **Alteration in nature or scope of Services**

38.1 The Trust shall be entitled at any time during the Term to request an alteration in the provision of Services by SPV including, without limitation, increase in Services, additional services (which are not Services) or an alteration to the Output Specification and such request

shall be dealt with in accordance with the Change Procedure set out in Sections 1 to 6 of Part K of the Schedule.

38.2 Nothing in this Agreement shall prevent the Trust from entering into arrangements with third parties for the provision of services which are not Services, and the Trust is not obliged to offer the provision of such services to SPV first.

39. Service Providers

39.1 SPV may appoint Service Provider(s) to carry out any or all of the Services on such terms as SPV thinks fit and consistent with the terms of this Agreement and the other DBFO Contracts.

39.2 The Trust in considering whether to approve a substitute Service Provider to be appointed after the Execution Date may, without limitation, take into account:

39.2.1 the financial standing of the prospective Service Provider;

39.2.2 the technical and managerial experience and ability of the prospective Service Provider;

39.2.3 the experience of the prospective Service Provider and its customer references; and

39.2.4 the experience and skills of the individuals who will be providing the Service and the arrangements for their supervision and management.

39.3 Subject to Clause 39.4, any proposal by SPV to change the identity of the Service Provider or the terms of any contract with the Service Provider shall not other than in respect of a termination of the Facilities Management Agreement be implemented unless and until approved in writing by the Trust such approval not to be unreasonably withheld or a decision thereon delayed.

39.4 Not used.

39.5 Notwithstanding the appointment of any Service Provider SPV shall remain liable under this Agreement for the provision of the Services, and SPV shall be responsible for the actions of, and defaults by, any Service Provider as if they were the actions of and defaults by SPV.

40. **Permitted Sub-Contractors**

40.1 Subject to the provisions of Clause 40.2 the provision of elements of the Services may be sub-contracted.

40.2 Where the Service Provider proposes to subcontract substantially all of the Services SPV will ensure that:-

40.2.1 it shall first submit a Tender List to the Trust for approval, such approval not to be unreasonably withheld or a decision thereon delayed. The Trust shall be entitled to object to any contractor listed on the Tender List where the Trust can (or could, given the opportunity) show that the proposed contractor is in objective terms demonstrably unsuitable or that its business or interests are inconsistent with the objectives of the Trust or the operation by the Trust of health services.

40.2.2 The Trust shall notify SPV if it objects to the inclusion of any party on the Tender List and give reasons in detail within 14 days of receipt of the Tender List failing which the Trust shall be deemed to have approved the Tender List. Either party shall be entitled to refer any dispute arising under this Clause 40 for resolution under the Dispute Resolution Procedure.

40.2.3 Where the Trust notifies SPV of its objection under Clause 40.2.2 and such objection is not referred by SPV for resolution under the Dispute Resolution Procedure within a further 14 days, or where the Dispute Resolution Procedure resolves that the objection of the Trust was properly made SPV shall delete the relevant sub-contractor from the Tender List and provide the Trust with a further copy of the Tender List amended accordingly.

40.3 Except in respect of the obligations on the Trust to make payments to SPV the Trust shall be entitled to sub-contract any of its obligations under this Agreement but before doing so shall give written notice to SPV with reasonable particulars of the sub-contracting proposed provided that no such subcontracting will affect the obligations of the Trust in terms of this Agreement.

41. **Monitoring Obligations**

41.1 SPV shall procure the monitoring with all due care and skill performance of the Services.

41.2 Without prejudice to Clause 41.1, SPV shall procure the monitoring of the performance of each Service Provider in accordance with the Performance Regime and procure rectification of any default in the provision of the Services identified in consequence of such monitoring in accordance with this Agreement.

41.3 SPV's obligations under Clauses 41.1 and 41.2 shall be performed in accordance with a system (the "Monitoring System") to be supplied by or on behalf of SPV in consultation with the Trust and to be approved by the Trust no later than 3 months prior to the Services Commencement Date.

41.4 To enable the Trust to consider whether SPV is (i) performing the Services in accordance with this Agreement and the Output Specification; and (ii) fulfilling its obligations under Clauses 41.1 and 41.2. SPV shall procure that there is provided to the Trust reports ("Monitoring Reports") a list of which reports are sent down in Part J of the Schedule to this Agreement and at the intervals specified therein and that all supporting data ("Monitoring Data") is supplied at those intervals to the Trust on computer disk.

41.5 Upon the Trust giving reasonable notice to SPV and without unnecessarily disrupting the performance of the Services, SPV shall give the Trust the Trust Staff and the Trust's agents or representatives all reasonable access required by the Trust to any premises, employees, agents and representatives of SPV, and the Service Providers for the purposes of, and shall cooperate fully with, monitoring the performance of the provision of Services and compliance with the Output Specification, and Good Industry Practice.

41.6 The Trust is entitled to audit through its own inspection the monitoring procedure of SPV and SPV shall submit to, and shall provide all reasonable assistance to the Trust in its performance of such auditing procedure provided that the same does not unnecessarily disrupt the performance of the Services or unreasonably increase SPV's operational costs.

41.7 Any disputes arising as a result of or in connection with the monitoring and auditing procedures mentioned in this Clause 41 may be referred by either party to the Dispute Resolution Procedure.

42. Not Used

43. Liability

43.1 SPV undertakes to the Trust, and shall ensure at all times, that:

43.1.1 the obligations of SPV under this Agreement will be performed by appropriately qualified and trained personnel in accordance with Good Industry Practice;

43.1.2 all material representations and statements made by SPV to the Trust in connection with the provision of the Services and all documents issued by or on behalf of SPV to the Trust in connection with the provision of the Services are to the best of SPV's knowledge and belief accurate in all material respects; and

43.1.3 all goods supplied by SPV in connection with performance of the Services are or will be of satisfactory quality sufficient for provision of the Services and free from defects in design, material and workmanship

and SPV acknowledges that the Trust is entering into this Agreement in reliance on the undertakings mentioned in this Clause 43.1 and on the skill, expertise and experience of SPV and the Promoters.

43.2 Without prejudice to any other remedy, if any part of the Services is not performed in accordance with this Agreement then the Trust shall be entitled to:

43.2.1 require SPV by its own action or that of the Service Provider to rectify the relevant failure within the relevant Period for Remedy without additional charge to the Trust; or

43.2.2 if, in the reasonable opinion of the Trust, it is necessary for the proper and efficient functioning of the Hospital insofar as it relates to the delivery of healthcare services or the health and wellbeing of Patients, that any breach or non performance by SPV of its obligations under this Agreement be remedied immediately and if such immediate remedy is not forthcoming on notice to SPV of that requirement, to remedy such breach or non performance, provided always that in carrying out such remedy the Trust shall take all reasonable steps to limit disruption of the business and operation of SPV and (i) in circumstances where SPV is in breach of its obligations and the actions of the Trust are justified in accordance with this Clause 43.2.2 (any dispute to be settled in accordance with the Dispute Resolution Procedure) and Clause 60 (Force Majeure) does not apply, recover Intervention Costs in accordance with paragraph 2 of Part H of the Schedule and (ii) SPV shall not seek to prevent the Trust effecting such necessary remedy and in particular, shall not seek any interdict or interim interdict or judicial relief;

43.3 All property of SPV (and that of the Service Provider) whilst on the Trust's premises shall be there at the risk of SPV or the Service Provider and the Trust shall accept no liability for any loss or damage howsoever occurring to it unless caused by the wilful or negligent act or omission of the Trust, its servants, agents or those for whom it is responsible or in relation to Patient Risk or Visitor Risk.

43.4 SPV shall be responsible to the Trust for all acts and omissions of the Service Provider appointed by SPV and any act or omission of that Service Provider or any of its sub-contractors or those for whom it is or they are responsible shall be regarded for all purposes in a question with the Trust as an act or omission of SPV.

44. **SPV's Undertakings**

SPV undertakes that it shall throughout the Term:-

44.1 take all reasonable steps to ensure that no persons employed or engaged in the provision of the Services are claiming any benefit, where payment of that benefit is precluded due to earnings;

44.2 take all reasonable steps to ensure that all employees engaged in the provision of the Services who are not EU nationals are legally entitled to be resident in the United Kingdom and hold a valid work permit;

44.3 take all reasonable steps to satisfy itself that all employees engaged in the provision of the Services are suitable in all respects to perform the Services for which they are engaged, acknowledging the sensitive nature of the Trust's requirements and in particular the need to ensure patient confidentiality;

44.4 ensure that all employees engaged in the provision of the Services entering on to the Trust's premises comply with all security measures imposed by the Trust from time to time including, where relevant, the use of photo passes or other passes, and that passes are returned to the Trust when no longer required by the relevant employee for the purposes of this Agreement or otherwise upon request by the Trust;

44.5 report immediately to the Trust all accidents to the Service Provider's employees, servants or agents occurring at the Hospital which are ordinarily required to be reported in accordance with the Health and Safety at Work etc Act 1974 or any appropriate UK or EU laws;

44.6 only engage personnel in the provision of the Services who:

44.6.1 are adequately skilled and competent in respect of the Services they are to provide;

44.6.2 are appropriately trained and qualified in respect of the Services they are to provide;

44.6.3 are in good health and have a high standard of personal hygiene; and

44.6.4 are not showing active signs of, or are not under treatment for, any infectious or communicable disease or who are known carriers of such a disease, unless permitted by policies (forming part of the Trust's Procedures) of the Trust,

and the Trust reserves the right to exclude from the Hospital and surrounding area any such personnel who do not meet these criteria.

44.7 ensure that all personnel engaged in the provision of the Services immediately report to the Trust any communicable disease or infection suffered by them;

44.8 keep, and shall procure that all employees and persons engaged in the provision of the Services keep, as confidential all information relating to Patients, not use or disclose any of that information and make every effort to prevent the use or disclosure of any of that information by a third party, and comply with all Trust Procedures from time to time in relation to patient confidentiality.

PART 6 - ORGANISATION AND CO-OPERATION MATTERS, PAYMENTS

45. Co-operation Procedures

45.1 The Trust and SPV shall establish as soon as practicable and maintain throughout the Term suitable procedures to oversee the Trust's and SPV's operations in areas where their interests and responsibilities overlap, which shall include the establishment and monitoring of appropriate Liaison Procedures in terms of Part P of the Schedule.

46. Agreement Management

46.1 Each party shall procure that day-to-day management of this Agreement shall be carried out by that party's Contract Officer from time to time. The identity of each party's first Contract Officer shall be notified to the other party no later than 3 months prior to the Services Commencement Date.

46.2 If a party changes its Contract Officer it shall promptly notify the other party of the change. SPV shall consult generally with the Trust in relation to the appointment or removal of the SPV Contract Officer and shall not appoint any person as its Contract Officer without the Trust's prior written consent, not to be unreasonably withheld or delayed.

46.3 SPV shall, and shall procure that the Service Provider shall, promptly comply with all reasonable requests and directions of the Trust Contract Officer in respect of the provision of the Services to the extent that such requests and directions are consistent with the Output Specification.

46.4 SPV shall address any enquiries and notify any difficulties about procedural or contractual matters in writing to the Trust Contract Officer at such location and/or address as the Trust may from time to time specify.

47. **Confidentiality**

47.1 Each party shall treat all Confidential Information of the other party as confidential, except as may be necessary for the performance of any obligations under the Project Documents and use all reasonable endeavours to prevent its disclosure by their respective officers, employees, agents or sub-contractors, but so that the Trust shall be entitled to disclose any information reasonably required for the purposes of accountability to the Secretary of State to Parliament and to the Scottish Parliament. This Clause 47 shall survive any termination of this Agreement.

47.2 Clause 47.1 shall not apply to Confidential Information which:-

47.2.1 prior to its receipt by the Receiving Party was in the possession of the Receiving Party and at its free disposal;

47.2.2 is subsequently disclosed to the Receiving Party without any obligation of confidentiality by a third party who has not derived it directly or indirectly from the other;

47.2.3 is or becomes generally available to the public otherwise than through the act or default of the Receiving Party or its agent or employees; or

47.2.4 is required by applicable law or the order of any competent court to be disclosed or is required to be disclosed to the Land Register or required to be disclosed to any regulatory body.

47.3 Nothing in this Clause 47 shall prohibit SPV from disclosing information to its bankers, shareholders or, where reasonably necessary to enable any of the Project Documents to be duly performed, to the Service Provider, provided that any recipient of Confidential Information contemplated by this Clause 47.3 shall first agree in writing to be bound by the terms of this Clause 47.

47.4 Nothing in this Clause 47 shall prohibit SPV from disclosing relevant information which is required to be made available by SPV or by a receiver or administrative receiver or administrator to any person bona fide proposing to provide funding (whether by way of equity investment, loan or otherwise) to SPV for the purpose of performing its obligations under the Project Documents, provided that any recipient of Confidential Information contemplated by this Clause 47.4 has agreed in writing to be bound by the terms of this Clause 47.

48. **Provision of Management and Financial Information**

48.1 The Trust shall provide to SPV all information to be delivered under Section 1 of Part U of the Schedule with the frequency and delivery timing there stipulated.

48.2 SPV shall provide to the Trust all information to be delivered under Section 2 of Part U of the Schedule with the frequency and delivery timing there stipulated.

48.3 Each party shall exercise all due care and diligence in the preparation of information and documents referred to in this Clause 48 and shall ensure that at all times there shall be adequate security and retention arrangements for all such documents and information, which shall in all cases be retained by the relevant party for a period not less than the Retention Period stipulated in Part U of the Schedule.

49. **Payments**

49.1 Any sum payable under this Agreement not paid by the due date (or, where payable on demand, on that demand being made) shall bear interest at the Interest Rate, calculated on a daily basis with quarterly rests from the due date until the date of actual payment, after as well as before judgment or decree.

49.2 All payments stated to be made by either party to the other under this Agreement are expressed in amounts which are exclusive of VAT. The relevant party shall, on demand and against the delivery by the other party of a duly issued VAT invoice, pay to the other VAT at the rate then properly chargeable and referable to a supply made to it under this Agreement.

49.3.1 All sums payable by either party to the other in terms of this Agreement shall, subject to the rights of the Trust pursuant to paragraph 2 and 3 of Part H of the Schedule be paid free of all deductions or withholdings whatsoever in respect of taxation, save as may be required by law.

49.3.2 If the Trust is required by law to make any withholding or deduction in respect of (i) any interest payable at the Interest Rate (but not otherwise) or (ii) any payment, as a consequence of the matters specified in items (i), (ii) and (v) of the definition of Qualifying Legislative Change, the sum due from the Trust will be increased to the extent necessary to ensure that, after the making of such withholding or deduction, SPV receives a net sum equal to the amount which it would have received had no such deduction or withholding been made, and the Trust will promptly deliver to SPV any receipts, certificates or other proof evidencing the amounts (if any) paid or payable in respect of any deduction or withholding as referred to above.

49.3.3 If SPV receives the benefit of a tax credit or an allowance in relation to any withholding or deduction required to be made by the Trust and the Trust has made a payment to SPV in accordance with the provisions of Clause 49.3.2 SPV shall pay forthwith to the Trust the benefit or such part of that benefit as will leave SPV (after such

payment) in no more and no less favourable a position than it would have been in if no additional amount was required to be paid in terms of Clause 49.3.2; and

49.3.4 SPV shall use reasonable endeavours to obtain the benefit of any such tax credit or allowance provided that it can do so without prejudice to its tax affairs.

PART 7 - EMPLOYEE ARRANGEMENTS

49A TUPE

49A.1 Application of TUPE

SPV and the Trust acknowledge and agree their common understanding that TUPE does not apply to the arrangements contemplated by this Agreement in that the Services are not being provided to the Trust prior to the Services Commencement Date, and that there are no relevant contracts of employment with any employees of the Trust which will have effect on or after the Services Commencement Date as if originally made between SPV (or the Service Provider) and such employees; but the parties agree that the provisions of this Clause 49A shall apply irrespective of whether or not TUPE applies.

49A.2 The parties shall take reasonable steps to mitigate any liabilities for which the other may be responsible under this Clause 49A consistent with their obligations hereunder.

49A.3 Trust Employment Indemnities

49A.3.1 The Trust shall indemnify and hold harmless SPV and/or the Service Provider from and against all Losses (incurred by SPV or a Service Provider) arising or which have arisen, in connection with or as a result of any Claims by any Employee (against the SPV or a Service Provider) arising out of (i) any act, fault or omission of the Trust or any Trust Staff as the case may be (ii) any claim by an Employee in connection with the failure of that Employee to transfer employment to the SPV or Service Provider, or on the termination of that Employee's employment with the SPV or a Service Provider within six months of the Services Commencement Date, and in each case whether in respect of breach of contract, redundancy, unfair dismissal, sex, race or disability discrimination, or (iii) any other claim within the jurisdiction of an industrial tribunal or arising at common law, in delict or otherwise (in all cases whether arising under British or European law) before, on or after the Services Commencement Date.

49A.3.2 The Trust shall indemnify and hold harmless SPV from and against all Losses arising or which have arisen in connection with or as a result of any claim (including any entitlement of an Employee under or consequent on such claim) (against SPV or a Service Provider) by any trade union or staff association or Employee representative arising from or connected with any failure by the Trust to comply with any legal obligation to such trade union, staff association or other Employee representative and whether under Regulation 10 of TUPE or otherwise and whether any such claim arises or has its origin before, on or after the Services Commencement Date.

49.A.4 **Industrial Disputes**

If there is a continuing or threatened dispute in relation to Employees by any trade union or staff association representing Employees the Trust will, sufficiently early to enable SPV to manage the same, provide SPV with full details of that dispute and having made due inquiry, the Trust will confirm to SPV whether or not to the best of their belief there are circumstances which may result in any industrial dispute involving and relating to Employees (and if so, provide full details about its knowledge of the same).

PART 8 - VALUE FOR MONEY AND OPERATIONAL REQUIREMENTS

50. **Objectives of this Part 8**

SPV acknowledges that the Trust seeks continuously to secure value for money in its relationships with private sector suppliers.

51. **Information requirements**

51.1 SPV shall procure all reasonable assistance (including the provision to the Trust of all information the Trust reasonably requires) from the Service Provider to enable the Trust to satisfy any requests lawfully made by third parties, including (without limitation) the NHSME, any commissioning authority or GP Fundholder, any Health Council, HM Treasury, the Scottish Office, Parliament, the Scottish Parliament and the European Commission.

51.2 Without limiting Clause 51.1, SPV shall promptly provide to the Trust such assistance as the Trust shall reasonably require in connection with any requests properly made of the Trust by the Trust's Auditor (or its duly appointed representatives) for information associated with the giving of any audit certificate by that person or the undertaking of any value for money survey associated with the Trust and/or the Project subject to the Trust reimbursing the SPV's reasonable costs in complying with this Clause 51.

52. **Review Procedure**

If the Trust shall at any time become subject to any requirements (whether as a matter of law or internal NHS direction or guideline) with which the Trust's Board reasonably considers it must comply, the Trust may supply to SPV a full written statement of those requirements and an indication of the effect the requirements may have on:

52.1 the Trust's ability to perform this Agreement or any other DBFO Contract; and/or

52.2 the extent to which services (whether an increase or reduction in the Services or additional services) are in the future likely to be required of SPV,

and the requirements of the Trust shall thereafter (subject to the provisions of Section 4 of Part K of the Schedule to this Agreement (Limitations on Change)) become subject to the Review Procedure, any adjustment to the Trust's payment obligations to SPV being solely determined in accordance with Section 1 of Part K of the Schedule to this Agreement.

53. **Not Used**

PART 9 - NOT USED

PART 10 - INTELLECTUAL PROPERTY, ETC

54. **Licence of Intellectual Property**

54.1 SPV hereby grants (or will procure the grant from a third party) to the Trust a perpetual, non exclusive, royalty-free licence (carrying the right to grant sub-licences but being non-transferable without SPV's consent) to use for any purpose associated with this Agreement or in relation to the establishment of the Hospital (whether during or after the period of this Agreement) all Intellectual Property specified in Clause 54.2 and to make any alterations, adaptations or additions to any such Intellectual Property. The Trust shall be entitled to transfer the licence granted by this Clause only to a successor to it pursuant to Clause 76.2 or after termination or expiry of the Term (if the licence subsists) to any party.

54.2 The Intellectual Property licensed by or pursuant to this Clause 54 shall be all Intellectual Property (whether now in existence or coming into existence during the Term) relating to the design, construction, fitting out completion, commissioning or testing of the Hospital, the operation and maintenance of the Hospital (to the extent that SPV shall have responsibility for the same) and the conduct of any other operations or the carrying out by the Trust of any statutory functions at or from the Hospital which is or becomes vested in SPV but such

licence shall not extend to any changes to the Building Management System after expiry of the Term.

54.3 SPV shall procure for the benefit of the Trust (where any Intellectual Property of the kind described in Clause 54.2 is vested in any third party) the grant of a like licence to that described in Clause 54.1 to the Trust for any purpose and to make any alterations, adaptations or additions to any Intellectual Property so supplied.

54.4 To the extent that any of the Intellectual Property referred to in Clause 54.2 is generated by or maintained on a computer or in any other machine readable format, SPV shall procure, at no charge to the Trust, the grant of a licence or sub-licence for and (where such software or database is not readily available at reasonable cost) a copy of the relevant program and the grant of a licence or sub-licence for such software or database to enable the Trust or its nominee to access and otherwise use that data for the purposes set out in this Agreement or otherwise to assist the Trust in the discharge of its functions.

54.5 Within 60 days from the Execution Date, SPV shall submit to the Trust in accordance with the Review Procedure the procedures and practices which SPV proposes to adopt for maintaining security of data, materials and documents referred to in Clauses 30, 41 and 48, including arrangements for the backing up and subsequent recovery of information stored in electronically retrievable form. The Trust may only object and require alterations or additions to those procedures and practices which are adopted by SPV if in the Trust's reasonable opinion they do not accord with Good Industry Practice. SPV shall (and shall cause each of its sub-contractors to) comply with the above procedures and practices. SPV may change the above procedures and practices subject to compliance with the Review Procedure and if appropriate, the Dispute Resolution Procedure

54.6 SPV shall indemnify the Trust on demand and hold it harmless from and against all claims made or brought by any persons for or on account of actual infringement of any Intellectual Property to which this Clause 54 is relevant provided such right is properly used by the Trust in accordance with the terms of this Agreement.

54.7 SPV and the Trust shall at the request of the other execute all documents and do all such further acts which may be necessary or desirable to bring into effect or to confirm the terms of any licence created by or pursuant to this Clause 54.

54.8 Any licences of Intellectual Property created by or pursuant to this Clause 54 shall survive early termination but, at the option of SPV, not natural expiry of the Term.

55. **Not Used**

PART 11 - EARLY TERMINATION AND STEP-IN RIGHTS

56. **Events Entitling Early Termination of the DBFO Contracts**

56.1 Subject to Clauses 56.7 and 56.8 a SPV Event of Default shall occur if:-

56.1.1 SPV enters into voluntary or involuntary liquidation or dissolution (other than a solvent liquidation with the prior consent of the Trust for the purposes of amalgamation or reconstruction), or makes a composition or an arrangement with, or an assignment or assignation of, its creditors generally, or is the subject of a proposal for a voluntary arrangement for composition of debts or scheme of arrangement approved in accordance with the Insolvency Act 1986 or under the said Act there is an appointment of an administrator, or a receiver, or an administrator or administrative receiver (as defined in the said Act), or a trustee or liquidator is appointed in each case over any substantial part of the assets of SPV or any resolution is passed in connection with the dissolution or liquidation of SPV or any petition is filed or similar proceedings are commenced for the appointment of an administrator, receiver or administrative receiver, trustee or liquidator (save where the same are contested in good faith and discharged within 21 days).

56.1.2 there is any transfer of any interest in shares in SPV which does not comply with the requirements of Clause 12.5;

56.1.3 there is any assignation or purported assignation of the whole or any part of the DBFO Contracts by SPV which is not in accordance with the terms of Clause 76.1;

56.1.4 SPV abandons the Works and such abandonment subsists for a continuous period of 30 days such that there is no reasonable expectation of completing the Works by the Construction Backstop Date provided that the Trust shall have served notice in writing ("Abandonment Warning Notice") upon SPV at least 7 days prior to serving a Termination Notice and further provided that SPV will not be considered to have abandoned the Works where it is *bona fide* attempting to let a contract or contracts to a substitute building contractor to complete the Works prior to the Construction Backstop Date;

56.1.5 there is any fundamental breach of any of the terms of this Agreement by SPV such that there is a material and adverse affect upon the Trust or its clinical services;

56.1.6 at any time up to the Services Commencement Date (i) the Building Contract terminates for whatever reason and (ii) SPV is not taking

reasonable steps to enter into a replacement Building Contract pursuant to Clause 14.9.3 of this Agreement

56.1.7 the Services Commencement Date has not occurred on or before the Construction Backstop Date;

56.1.8 there is a breach of Clause 63.3 or Clause 63.4 by SPV itself which is a Serious Breach or a breach of Clause 63.4 by any subcontractor or employee of SPV without SPV terminating the employment of such sub contractor or employee and reporting the offence

56.1.9 SPV fails to submit a CCN timeously in accordance with the provisions of Section 6 of Part K of the Schedule to this Agreement.

56.2 Subject to Clauses 56.4 and 56.5 and without prejudice to any of its other rights or remedies, the Trust may:

56.2.1 upon the occurrence of a SPV Event of Default specified in Clauses 56.1.2, 56.1.3, 56.1.4, 56.1.6, 56.1.7 or 56.1.8 or any failure to remedy pursuant to Clause 56.2.2 terminate this Agreement and all (but not some of) the other DBFO Contracts by serving a Termination Notice upon SPV, in which case the terms of Clauses 58.1, 58.2, 58.4 and 58.5 (and the provisions of any affected DBFO Contract as to rights and obligations on termination) shall apply;

56.2.2 upon the occurrence of any other SPV Event of Default pursuant to Clause 56.1 serve a SPV Default Notice on SPV requiring SPV at the Trust's option either:-

(i) to remedy the breach(es) referred to in the SPV Default Notice continuing at the date of service of the notice within 30 days of that notice (or such longer period agreed in writing by the Trust in its absolute discretion); or

(ii) within 14 days of the date of service on SPV of the SPV Default Notice to put forward a reasonable programme to remedy the breach(es) continuing at the date of service of the SPV Default Notice, that programme to be in writing and specify the proposed remedy in reasonable detail and the latest date by which it is proposed that that remedy shall be completed, in which case the terms of Clause 56.3 shall apply.

56.3 Where SPV puts forward a programme following receipt of a SPV Default Notice, the Trust shall have 28 days in which to notify SPV in writing that it does not accept that programme as reasonable, failing which the Trust shall be deemed to have accepted that programme. Where the Trust notifies SPV that it does not accept that programme, the parties shall endeavour in the following seven days to

agree any necessary amendments to the programme put forward. In the absence of agreement in that seven day period, the question as to what constitutes a reasonable programme in the context of this Agreement and the obligations of the parties hereunder may be referred by either party to the Dispute Resolution Procedure.

56.4 Subject to Clause 56.5 if:-

56.4.1 the breach(es) specified in the SPV Default Notice is or are not remedied:-

(a) before the expiry of the period referred to in Clause 56.2.2 (i) (if applicable); or

(b) where SPV puts forward a programme pursuant to Clause 56.2.2 (ii) which has been accepted by the Trust in accordance with that programme; or

(c) where the Dispute Resolution Procedure has determined a reasonable programme, in accordance with that programme

then the Trust may (if the breach is continuing) terminate this Agreement and all (but not some of) the other DBFO Contracts, subject to Clause 56.7, by serving a Termination Notice on SPV, and the terms of Clauses 58.1, 58.2, 58.4 and 58.5 (and any provisions of any affected DBFO Contract as to rights and obligations on termination) shall apply.

56.5 The Trust shall not be entitled to serve a Termination Notice if:

56.5.1 the SPV Event of Default occurs as a consequence of Force Majeure

56.5.2 the SPV Event of Default occurs as a direct consequence of the act, default or negligence of the Trust or Trust Staff or any party for whom the Trust is legally responsible or as a result of a Trust breach of its obligations under this Agreement or as a result of Patient Risk or Visitor Risk

56.5.3 the SPV Event of Default occurs as a consequence of an Insured Risk, provided SPV is complying with its obligations under Part T of the Schedule

56.5.4 the breach has resulted from and/or SPV is unable diligently to pursue rectification of the breach as a result of the occurrence or continuation of a Qualifying Service Interruption Event provided SPV is complying with its obligations under Clause 10.5 (Service Interruptions)

56.5.5 the SPV Event of Default occurs as a consequence of a Relief Event

56.5.6 the SPV Event of Default occurs as a consequence of any industrial dispute in respect of an Employee the initial cause or threat of which arose prior to the Services Commencement Date which commences or continues, at any time within the first six weeks following the Services Commencement Date

56.5.7 the SPV Event of Default occurs as a consequence of any industrial dispute arising out of this Agreement the initial cause or threat of which arose prior to or immediately following Services Commencement Date, which commences or continues throughout the first three months following Services Commencement Date

56.6 This Agreement shall terminate on the day falling 14 days after (but including) the date of a Termination Notice.

56.7 The Trust's rights under this Clause 56 and under Clause 58 are in addition and without prejudice to any other express rights or express remedies the Trust may have, including (without limitation) any claim for the amount of any loss or damage suffered by the Trust on account of the acts or omissions of SPV, whether pursuant to any bond or guarantee given in accordance with the requirements of this Agreement or otherwise.

56.8 The Trust acknowledges that its rights of termination are subject to the terms of the Financier Direct Agreement and any proper and timely exercise by Financiers of their rights under the Financier Direct Agreement, but so that SPV shall have no rights deriving from the Financier Direct Agreement or from any action or steps taken by the parties to it in terms of the Financier Direct Agreement.

56.9 Subject to Clause 56.11 SPV may terminate this Agreement and all (but not some of) the other DBFO Contracts by serving a Termination Notice on the Trust and a copy thereof on NHSME and the provisions of Clause 58.3.1 shall apply where

56.9.1 the Trust shall be in persistent default of its payment obligations to SPV under any of the DBFO Contracts. The Trust shall be deemed to be in persistent default if (i) an undisputed amount of £60,000 or more remains due and payable to SPV by the Trust for a period of twenty one days or (ii) the undisputed Net Monthly Payment remains overdue for more than 10 days after the due date for payment thereof on three occasions in any twelve month period, provided that forthwith following the second occasion SPV shall have given to the Trust notice in writing to that effect and under threat of termination;

56.9.2 the Trust is dissolved or all or a substantial part of its functions in relation to the Hospital are effectively transferred to a third party unless (i) another Health Service Body becomes immediately responsible for discharging all or substantially all of the functions of

the Trust and the rights and liabilities under this Agreement and the Financier Direct Agreement are assigned to such Health Service Body, which becomes responsible to SPV for discharging the Trust's obligations under this Agreement and (ii) such Health Service Body has demonstrably adequate resources immediately available to it to meet its obligations under this Agreement and the Financier Direct Agreement and has the support of its purchaser; and

56.9.3 the assets of the Project are expropriated in whole or in part as a result of any action taken or implemented by the United Kingdom Government to the effect that such expropriation will have a material adverse effect on the ability of the Trust to comply with any of its material obligations under this Agreement;

56.9.4 the Trust commits a fundamental breach of its obligations under this Agreement or any of the other DBFO Contracts to which it is expressed to be a party or any part thereof and such breach has an adverse actual effect on SPV or the ability of SPV to perform its obligations under the Agreement or any part thereof that is material unless the breach gives rise to a claim for money under the terms of this Agreement whether by way of payment, damages or otherwise and such amount is paid within one month of the same becoming due

56.9.5 (a) any law, statute, statutory instrument, order, bye-law or other enforceable legislation

(b) any regulation, directly applicable directive, decision or other legislation of the European Union or its predecessor organisations having the force of law in Scotland from time to time or otherwise applying to the Trust, or

(c) any other legal provision, publicly proposed whether in any green paper, white paper, draft legislation, subordinate legislation, treaty, regulation, directive or decision

in each case published by HM Government and/or the European Commission which will have a material adverse effect on the ability of the Trust to comply with any of its material obligations including, for the avoidance of doubt, its payment obligations under this Agreement or any of the other DBFO Contracts to which it is expressed to be a party or which will remove or adversely amend the Secretary of State's powers over the Trust without reasonably acceptable alternative solutions being provided; it being declared that in relation to putative legislation and others no right to terminate under this Clause 56.9.5 shall arise until the relevant legislation shall have passed its Second Reading in the House of Commons or its equivalent stage in any Scottish Parliament or equivalent stage in any other relevant legislatory or regulatory process provided that SPV

shall have first served a notice of default on the Trust and a copy thereof to NHSME and a period of 25 days shall have elapsed without a remedy of the relevant breach.

56.10 If at any time any DBFO Contract is or becomes illegal or unenforceable in whole or in part, and the Trust and SPV shall have failed to achieve a restructuring of the Project Documents sufficient to overcome such illegality or enforceability within a period of 60 days of the same first becoming known then either party may terminate this Agreement and any other DBFO Contract upon 7 days notice in writing to the other party and the provisions of Clauses 58.3.2, 58.5, 58.6 and 58.7 shall apply *mutatis mutandis*.

56.11 **Limitation of Rights and Liabilities**

The parties acknowledge and agree that on and after the Services Commencement Date

56.11.1 neither party shall have any right or remedy against the other in respect of the design, standard and Availability of the Hospital or the standard or performance of Services (collectively hereinafter referred to as the "Limited Recourse Obligations") other than as expressly contained in the Availability Regime and the Performance Regime respectively (which regimes contain the entire rights and remedies of the parties applicable in respect thereof)

56.11.2 without prejudice to the generality of Clause 56.11.1, no rights or remedies shall arise in contract or in damages or at law or by way of indemnity or in respect of any misrepresentation or breach of warranty, in each case in respect of the Limited Recourse Obligations other than as expressly contained in the Availability Regime and Performance Regime respectively (and to the extent that any such rights or remedies would otherwise arise they are hereby waived);

56.11.3 until the expiry or earlier termination of the Term the Trust's rights and remedies to make recourse in respect of the Limited Recourse Obligations pursuant to any collateral warranty, or any guarantee, indemnity, bond or other surety provided by any third party in respect of the Limited Recourse Obligations shall be subject to the provisions of this Clause (as if the same were set out therein *mutatis mutandis*)

Provided always that nothing contained in this Clause 56.11 shall prejudice:

(a) the Trust's right to terminate this Agreement pursuant to Clause 56.1 for a SPV Event of Default or paragraph 6.4 of Part T of the Schedule or SPV's right to terminate this Agreement pursuant to Clause 56.9 for a Trust Event of Default or either party's right to terminate pursuant to Clause 56.10, Clause 57.1 or Clause 60

(b) the rights of the Trust or a Financier under the Financier Direct Agreement

(c) any insurances taken out by either party in respect of the Limited Recourse Obligations

(d) the rights of the Trust expressly set out in:

Clause 3.4 (SPV Warranties), Clause 10.4 (Emergency) and Clause 61.1 (SPV Indemnities) of this Agreement;

(e) the rights of SPV expressly set out in:

the Schedule Part T Clause 8.2 (Trust Warranties) Clause 61.2 (Trust Indemnities) of this Agreement

In the event of any conflict between the provisions of this Clause and any other provision in this Agreement or any other DBFO Contract the provisions of this Clause shall prevail.

57 **Relief Events**

On the occurrence of a Relief Event, the provisions of Clause 60 shall have effect, *mutatis mutandis* as if a Force Majeure event had occurred, save that:

57.1 if the Relief Event occurs prior to the Services Commencement Date, the Completion Date, subject as aftermentioned, shall be delayed for a period equal to the period of subsistence of the Relief Event and there shall be no opportunity to terminate (except where the Relief Event subsists for 250 days in aggregate at any time prior to the Services Commencement Date, in which case the parties shall have the opportunity to terminate by giving one month's notice in writing and, for the avoidance of doubt, the provisions of Clauses 58.3.2, 58.5, 58.6 and 58.7 shall apply, *mutatis mutandis*) and

57.2 if the Relief Event occurs on or after the Services Commencement Date, the Unitary Payment shall continue to be payable (unless payment would cease or reduce for any other reason pursuant hereto), Availability Deductions and Performance Deductions shall not apply (unless they would apply for any other reason pursuant hereto), and there shall be no opportunity to terminate pursuant to Clause 57.1.

58 **Consequences of Early Termination**

58.1 On any early termination of this Agreement however arising the following provisions shall apply:

58.1.1 SPV shall, on demand by the Trust, deliver to the Trust all materials, contracts, certificates, documents, records (including the Technical Records), computer programmes and related data contained on machine readable media (and for this purpose only title in the media on which such data is stored shall be deemed to pass to the Trust) the ownership of which is vested in SPV;

58.1.2 all licences of Intellectual Property from the Trust in favour of SPV shall be deemed to have terminated;

58.1.3 without prejudice to any other remedy under this Agreement the Trust may, at its option, but without relieving SPV of its obligations and liabilities accrued under this Agreement:

(a) enter the Site and expel SPV, and/or the Contractor (and/or any other sub-contractors of SPV or the Contractor or any other person acting on their instructions) as the Trust thinks fit;

(b) itself, or through any other contractor employed (directly or indirectly) by the Trust, complete the Development either in accordance with the terms of this Agreement and the Specification or in such other manner as the Trust shall consider appropriate;

(c) subject to the terms of the Financier Direct Agreement in exercise of its rights under the Collateral Warranties or otherwise, acquire SPV's rights under any one or more of the Building Contract or any sub-contracts relating to the Development, either in its own name or in that of or any person nominated by the Trust, but so that:

(i) no such transfer shall reduce or limit SPV's liability to the Trust for the termination event entitling the Trust to request that transfer; and

(ii) SPV shall remain liable to the relevant other party(ies) to the contract(s) concerned for all accrued but undischarged liabilities under that (those) contract(s) and shall indemnify the Trust and hold it harmless against those liabilities and the consequences of any antecedent breach of the relevant contract(s).

58.1.4 on early termination of this Agreement (or, subject to the terms of Clause 59, on handback):-

(a) the responsibility for the provision of the Services shall be transferred from SPV without any compensation to SPV except as provided in Clause 58.3 and shall vest in the Trust or whoever the Trust shall direct, and SPV shall have no further right or obligation to provide the Services;

(b) SPV shall use reasonable endeavours to procure the employment of any personnel employed at the Hospital by any Service Provider, SPV or any Permitted Sub-Contractor shall transfer from the relevant Service Provider, SPV or the Permitted Sub-Contractor, as the case may be to the Trust, or, if lawful to whoever the Trust shall direct or shall remain with the relevant Service Provider, SPV or the Permitted Sub-Contractor, at the Trust's option;

(c) the Trust may, at its option, require SPV to procure that the Service Provider or any Permitted Sub-Contractor transfers to the Trust (or to the person to whom the relevant personnel are to transfer pursuant to paragraph (b) above) any Related Materials relating to the provision of the relevant Services, at a price to be agreed between the Trust and the relevant transferor and, in default of agreement, as independently valued;

(d) the Trust may require SPV to terminate immediately (or within such period as the Trust may specify) any or all of the contracts it may have with any Service Provider for the provision of Services (and procure the termination of any such contract made with a Permitted Sub-Contractor) and the removal of all Related Materials and any other materials not belonging to the Trust from the Site;

(e) subject to Clause 49A (TUPE) SPV shall indemnify the Trust on demand and hold it harmless in relation to all losses, actions, claims, demands, costs, charges and expenses arising out of any action or claim by any person whose contract with SPV or a Service Provider or a Permitted Sub-Contractor is terminated as a result of the effect of this Clause 58.1.4; and

(f) the parties shall do all such other reasonable acts or things necessary or desirable to accomplish a smooth transition of the management of Services to the proposed assignee.

58.1.5 no indemnity given by the SPV, or obligation of it pursuant to this Clause 58.1, shall operate to reduce the amount of any compensation payable pursuant to Clauses 56.9 and 58.1.3 or 60.8.

58.2 Termination of this Agreement or any other DBFO Contract shall not affect any accrued rights, obligations and liabilities of either party under the DBFO Contracts as at the date of termination, and shall not affect the rights, obligations and liabilities arising from this Clause 58 or Clauses 47 (Confidentiality),54 (Licence of Intellectual Property),56.9 (SPV's right to terminate for (Trust Default) 59 (Handback),60 (Force Majeure),61 (Indemnities), 73 (Notices),74 (Law & Jurisdiction) and 76 (General) which shall remain in full force and effect.

58.3 On termination of this Agreement

58.3.1 pursuant to Clause 56.9 (Trust Default) the Trust shall pay to the Senior Lenders an amount equal to Senior Debt and shall pay to SPV compensation ("the Trust Default Compensation") calculated as the aggregate of:-

(i) an amount equal to the net present value, at a discount rate of 7.5% real, calculated as at the date of termination, of the cash flows providing the return to the holders of Total Equity which would have arisen between termination and the natural expiry of the originally anticipated Term, such cash flows being derived from the most recent version of the Financial Model supplied by SPV to the Banks under the Senior Facility;

(ii) the Market Value as hereinafter defined calculated as at the Termination Date but then discounted back from the natural date of expiry of the originally anticipated Term to the Termination Date at the Weighted Average Cost of Capital;

(iii) Break Charges other than such comprised within Senior Debt; and

(iv) any unpaid Unitary Payment or other sums due from the Trust to SPV pursuant to the DBFO Contracts

58.3.2 Pursuant to Clause 57.1 (Relief Events) Clause 60.8 (Force Majeure) or the Schedule Part T paragraph 6 or paragraph 6.1 of Section 5 of Part K of the Schedule the Trust shall pay to the Senior Lenders an amount equal to Senior Debt and shall pay to SPV compensation ("the Force Majeure Compensation") calculated as the aggregate of:-

(i) Subordinated Debt plus accrued interest;

(ii) Equity Investment; and

(iii) any unpaid Unitary Payment or other sums due by the Trust to SPV pursuant to the DBFO Contracts; and

(iv) unless termination has arisen as a result of the application of paragraph 6.1 of Part K of the Schedule or paragraph 6 of Part T of the Schedule, Break Charges other than such comprised within Senior Debt.

58.3.3 On termination of this Agreement pursuant to Clause 56.2.1 (SPV default) having effect prior to the Contractual Practical Completion the Trust shall pay to the Senior Lenders an amount equal to the lower of

(a) Senior Debt; and

(b) the Construction Value plus Hedging Costs less Rectification Costs;

58.3.4 On termination of this Agreement pursuant to Clause 56.2.1 (SPV Default) having effect on or after the Services Commencement Date the Trust shall pay (in the manner aftermentioned) to the Senior Lenders the lesser of (a) Senior Debt and (b) NPV of the maximum Unitary Payment which would have been payable throughout the remainder of the Term less NPV of the cost to the Trust of procuring the Services from a third party pursuant to this Agreement and less such other sums for which SPV is liable to the Trust pursuant to any indemnity given under this Agreement and in such case with the addition or subtraction as the case may be of the Hedging Costs

("the SPV Default Compensation")

58.4 Without prejudice to Clause 58.3.4, the Trust shall not be liable to make any payment to SPV on any termination of the DBFO Contracts by reason of any event listed in Clauses 56.1,56.2 or 56.4 or any event of default or breach by SPV in respect of any other DBFO Contract other than in respect of any Unitary Payment outstanding and payable to SPV by the Trust.

58.5 The provisions of this Clause 58.5 set out the terms on which the Trust shall (subject to the terms of the Financier Direct Agreement) pay to the Senior Lenders the amounts due in respect of Senior Debt in terms of Clauses 58.3.1 and 58.3.2 or the amount of compensation payable in terms of Clauses 58.3.3 and 58.3.4 (each such amount a "Lenders' Termination Sum").

58.5.1 The amount of each Lenders' Termination Sum shall be determined as soon as practicable after the Termination Date.

58.5.2 In the case of any Lenders' Termination Sum arising under Clauses 58.3.1, 58.3.2 or 58.3.3 such Lenders' Termination Sum shall be paid as a lump sum on the Compensation Payment Date as a debt due and payable by the Trust to the Senior Lenders. If the Trust fails to make such payment on or before the Compensation Payment Date then, notwithstanding the termination of this Agreement, the Head Lease and the Sub-lease shall continue in full force and take effect in accordance with their terms.

58.5.3 In the case of a Lenders' Termination Sum arising under Clause 58.3.4 the Trust will have the option of:-

(i) paying the Lenders' Termination Sum as a single lump sum payment and Clause 58.5.2 will apply; or

(ii) where the Lenders' Termination Sum arises under Clause 58.3.4(a) paying to the Senior Lenders the debt service and principal repayment elements of the Approved Debt as set out in the Financial Model and in the manner referred to in Clause 58.5.3A; or

(iii) where the Lenders' Termination Sum arises under Clause 58.3.4(b) paying (a) the Hedging Costs to the Senior Lenders in a single lump sum payment within 10 Business Days of the date on which such Hedging Costs are notified to the Trust (along with appropriate supporting evidence as to the calculation of such Hedging Costs) and (b) the balance of the Lenders' Termination Sum by equal monthly instalments (the first such instalment commencing 1 month after the date of termination of this Agreement) calculated so as to pay the whole of the balance of the Lenders' Termination Sum by the Final Repayment Date (as defined in the Senior Facility) together with in addition (as a debt due and payable by the Trust to the Senior Lenders) interest on the aggregate outstanding balance of the Lenders' Termination Sum at the then prevailing Compensation Interest Rate.

58.5.3A In the case of a Lenders' Termination Sum payable under Clause 58.5.3(ii) the Trust shall pay (i) interest computed thereon on the Interest Payment Dates (as defined in the Senior Facility) and (ii) principal computed thereon on the Repayment Dates (as defined in the Senior Facility) in each year, the first such instalment to be payable on the first of such Interest Payment Dates and Repayment Dates (respectively) occurring after the Termination Date, and the last such instalment to be payable on the Final Repayment Date (as defined in the Senior Facility).

58.5.3B The Trust will be entitled to require by fourteen days prior written notice before any date ("a Calculation Date") on which the Compensation Interest Rate is due to be reviewed to reflect movements in LIBOR that the Senior Lenders procure that SPV enters into a new hedging agreement in respect of all future repayments of outstanding capital to the Senior Lenders in terms of the Senior Facility in which case with effect from the succeeding Calculation Date there will be substituted for value "(a)" in the definition of Compensation Interest Rate the swap rate in terms of the said hedging agreement.

58.5.4 In the case of any Lenders' Termination Sum payable as a lump sum as provided in Clause 58.5.2 such lump sum shall bear interest from the Termination Date until payment of such Lenders' Termination Sum in full at the rate of interest per annum shown in the summary page of the Financial Model for the purposes of this Clause or such other rate as may be agreed by the Trust following any refinancing during the Term with the addition of 2% per annum from the later of (i) the date which is 30 days following the date of receipt by the Trust of a written demand in respect of such lump sum and (ii) the Compensation Payment Date. Such interest shall be payable in arrears on each Interest Payment Date (as defined in the Finance Facilities Agreement) and on acceleration under Clause 58.5.6, and if not paid shall be compounded quarterly.

58.5.5 The Senior Lenders shall be entitled, at any time after the Termination Date whilst any Lenders' Termination Sum due or payable by the Trust hereunder has not been paid in full or remains outstanding, to require by notice to the Trust that the amount of any outstanding Lenders' Termination Sum be converted into a loan drawn by the Trust from the Senior Lenders, and as soon as practicable after receipt of such notice the Trust will issue a mortgage or bond or similar instrument of borrowing, in form and substance satisfactory to the Senior Lenders, duly recording the terms of the outstanding loan as set out in this Agreement.

58.5.6 If:-

(a) the Trust fails to pay any lump sum payment or instalment of any Lenders' Termination Sum, or any interest thereon or other amount payable in respect thereof, when due and payable pursuant to this Agreement; or

(b) the Trust is dissolved or all or a substantial part of its functions are effectively transferred to a third party unless (i) another Health Service Body becomes immediately responsible for discharging all or substantially all of the functions of the Trust and the rights and liabilities under

this Agreement and the Financier Direct Agreement are assigned to such Health Service Body, which becomes responsible to the Senior Lenders for discharging the Trust's obligations under this Agreement and (ii) such Health Service Body has demonstrably adequate resources immediately available to it to meet its obligations under this Agreement and the Financier Direct Agreement and has the support of its purchaser; or

(c) the assets of the Trust are expropriated in whole or in part as a result of any action taken or implemented by the United Kingdom Government to the effect that such expropriation will have a material adverse effect on the ability of the Trust to comply with any of its material obligations under this Agreement or the Financier Direct Agreement;

(d) any of the following occurs or is passed, namely

(i) any law, statute, statutory instrument, order, bye-law or other enforceable legislation, or

(ii) any regulation, directly applicable directive, decision or other legislation of the European Union or its predecessor organisations having the force of law in Scotland from time to time or otherwise applying to the Trust, or

(iii) any other legal provision, publicly proposed whether in any green paper, white paper, draft legislation, subordinate legislation, treaty, regulation, directive or decision in each case published by HM Government and/or the European Commission passes its second reading in the Houses of Parliament or its equivalent stage in any Scottish Parliament or any law making body or forum of the European Union any of which will have a material adverse effect on the ability of the Trust to comply with any of its obligations under this Agreement and/or the Financier Direct Agreement in relation to a Lenders' Termination Sum or which will remove or adversely amend the Secretary of State's powers over the Trust without alternative solutions being provided to the satisfaction of the Senior Lenders, acting reasonably

then (i) the Senior Lenders shall (subject to the Financier Direct Agreement) have the right to accelerate all outstanding instalments which, upon notice to the Trust, shall immediately become due and payable, and (ii) interest at the greater rate specified in Clause 58.5.4 shall be payable on any amounts due but unpaid by the Trust and in accordance with Clause 58.5.4 of the Agreement and (iii) the Trust shall be liable to pay on demand, and shall indemnify the Senior Lenders against, all costs and expenses properly and necessarily incurred in respect of such acceleration and payment.

58.5.7 It is hereby agreed that the provisions of Clause 58.3 and this Clause 58.5 and the obligations of the Trust to make payment of each Lenders' Termination Sum, together with the other provisions of this Agreement referred to in, or related to, Clauses 58.3 and this Clause 58.5 shall survive the termination of this Agreement.

58.5.8 The whole provisions of Clause 58.3 and this Clause 58.5 together with the aforementioned other provisions of this Agreement, are hereby acknowledged and agreed by the Trust and SPV to be for the benefit of and enforceable by, the Senior Lenders.

58.6 Any part of the Trust Default Compensation and the Force Majeure Compensation payable by the Trust to SPV shall become due and payable by the later of (i) the Compensation Payment Date and (ii) the date which is 30 days following the date of receipt by the Trust of a valid invoice in respect of such compensation as a debt due and payable by the Trust to the SPV. If the Trust fails to make such payment on the due date then, notwithstanding the termination of this Agreement, the Head Lease and the Sublease shall continue in full force and effect in accordance with their terms and the Trust shall pay interest on such compensation at the Interest Rate from the Termination Date until paid in full.

58.7 **Gross-Up Provisions**

58.7.1 All amounts of compensation payable by the Trust in terms of this Clause 58 shall be paid free and clear of all deductions or withholdings whatsoever for or on account of taxation save only as required by law. If any such deduction or withholding is required by law, the Trust shall be obliged to pay to the Senior Lenders for so long as they are banks for the purpose of Section 840 of the Income and Corporation Taxes Act 1988 or SPV as the case may be such sums as would after such deduction or withholding has been made leave the Senior Lenders or SPV as the case may be with the same amount they

would have been entitled to receive in the absence of any such requirement to make a deduction or withholding.

58.7.2 If the Senior Lenders or SPV as the case may be have received a tax benefit by reason of any deduction or withholding in respect of which the Trust has made an increased payment under Clause 58 .7.1 the Senior Lenders or SPV as the case may be shall pay to the Trust such amount as will leave the Senior Lenders or SPV as the case may be in no worse position than they would have been in if the deduction or withholding had not been required, provided that:-

(a) the Senior Lenders or SPV as the case may be shall exercise proper and reasonable discretion as to the time at which it receives the tax benefit and shall not be obliged to arrange their business or their tax affairs in order to be eligible for any benefit;

(b) if the Senior Lenders or SPV as the case may be make any payment to the Trust on account of any tax benefit and it subsequently transpires that the Senior Lenders or SPV as the case may be did not receive that tax benefit, or received a lesser tax benefit, the Trust shall pay to the Senior Lenders or SPV as the case may be such sum as may be necessary to restore the Senior Lenders or SPV as the case may be to the position in which they would have been had no adjustment, or the appropriate adjustment, been made under this Clause 58.7.

PART 12 - HANDBACK

59 **Handback**

59.1 The Trust shall have an option, exercisable by the Trust giving written notice to SPV not less than 5 years prior to the expiry of the original period of the Term (" **the Primary Period**"), to extend the Term for a further period of 10 years (**"the Secondary Period"**)

59.2 If the Trust notifies SPV pursuant to Clause 59.1 that it wishes to extend the Term for the Secondary Period, the Trust and SPV will negotiate in good faith to agree the terms and conditions which shall apply during the Secondary Period (it being acknowledged that each of the parties will have absolute discretion as to whether and on what terms to negotiate).

59.3 If the Trust does not notify SPV pursuant to Clause 59.1 that it wishes to extend the Term for the Secondary Period, then the Trust will be entitled at the expiry of the Term either:

59.3.1 to vacate the Site; or

59.3.2 to elect to remain on the Site and require a re-tender of the Services;

59.4 If the Trust determines to vacate the Site on the expiry of the Term pursuant to Clause 59.3.1 the Trust shall notify SPV to that effect not less than two years prior to the expiry of the Primary Period and that determination shall be final and binding on the Trust. In such event the following provisions shall apply:

59.4.1 no later than eight weeks after expiry of the Term, the Trust shall:

(a) itself vacate and procure its employees, agents and contractors vacate the Site; and

(b) procure that all property and equipment belonging to or in the proper possession of the Trust, its employees, agents or contractors is uplifted and removed from the Site and that all damage thereby caused is made good in a manner consistent with the Trust's obligations under the other provisions of the DBFO Contracts;

59.4.2 the Sub-lease shall terminate and the Trust shall execute and deliver such documents as are necessary to demonstrate such termination;

59.4.3 SPV shall have an option to purchase the Site exercisable in terms of this Clause 59.4.3 ("the Option").

59.4.3.1 In this Clause 59.4.3 the following terms shall have the following meanings:

Market Value has the meaning ascribed to it in Clause 59.7 save that there shall be substituted reference to the Trust's heritable interest for reference to the interest of the SPV in the Head Lease. Such Market Value shall be as agreed between the Trust and SPV or ascertained, if the Trust and SPV cannot otherwise agree, pursuant to the Disputes Resolution Procedure

Transfer Date means the first day after the expiry of the Term

the Price means an amount equal to the Market Value of the Site

59.4.3.2 SPV shall be entitled to serve notice of its intention to exercise the Option at any time following service by the Trust of a notice in terms of this Clause 59.4 but not less than 6 months prior to expiry of the Term. In that event, at or prior to the Transfer Date, in exchange for the Price the Trust will deliver a validly executed Disposition ("the Disposition") so as to be self proving in favour of SPV or its nominees of the Site together with all necessary servitudes, rights and others for

the proper enjoyment thereof as such servitudes, rights and others are included in the subjects let to SPV in terms of the Head Lease and there will be delivered or exhibited a valid, marketable title to the Site the Trust undertakes to SPV that it will not divest itself of the subjects over which such servitudes, rights and others are granted without, on or before such divestment, creating such servitudes, rights and others as heritable and irredeemable for the benefit of the Site by means of a Deed of Conditions

59.4.3.2.1 a Land Certificate containing no exclusion of indemnity under Section 12(2) of the Conveyancing and Feudal Reform (Scotland) Act 1970 ("the Act") and all necessary links in title evidencing the Trust's exclusive ownership of the Site and a Form 12 Report incorporating a personal search against the Trust and any other parties having an interest in the Site within the prescriptive period brought down as near as practicable to the Transfer Date and showing subject as aforesaid no entries adverse to the Trust's interest. In addition, the Trust will furnish to SPV such documents and evidence as the Keeper may require to enable the interest of SPV to be registered in the Land Register without exclusion of indemnity under Section 12(2). The Land Certificate to be issued to SPV will, subject to the Head Lease, disclose no entry, deed, decree or diligence prejudicial to SPV's interest other than such as are created by or against SPV or have been disclosed to and accepted by SPV prior to the Transfer Date and subject as aforesaid, the Trust undertakes to clear the Register of any such entry, deed, decree or diligence forthwith after the issue of the Land Certificate to SPV

59.4.3.2.2 Searches in the Register of Charges and Companies File against any limited company having an interest in the Site within the prescriptive period disclosing no matter materially prejudicial to the interests of SPV in the Disposition

59.4.3.2.3 Discharges of any securities then outstanding over the Trust's heritable interest in the Site.

59.4.3.3 The Trust will not, without the consent of SPV, do nor allow anything to occur which may prejudice the validity or marketability of its title to the Site at the date of delivery of the Disposition and the Trust will not grant any incumbrance over it that will be outstanding at the date of registration of the Disposition or in the period from the date to which the Searches referred to in Clause 59.4.3.2.2 are brought down to the date of registration of the Disposition.

59.4.4 the vacation by the Trust, its employees, agents and contractors and the termination of the Sub-lease and/or Head Lease shall not prejudice the other provisions of the DBFO Contracts nor the rights of the Trust and SPV against each other in respect of any breaches thereof

including any such as relate to their respective rights and obligations relating to termination thereof.

59.5 If the Trust has not given notice to the SPV pursuant to Clause 59.4 by the date which is two years prior to the expiry of the Primary Period, the Trust shall have no further right to vacate the Site pursuant to Clause 59.1.1.

59.6 If the Trust has not given notice to vacate the Site on expiry of the Term pursuant to Clause 59.4 and SPV has not negotiated or been awarded a new contract to provide services to and/or works for the Trust on the Site pursuant to Clause 59.2 then without any further requirement:-

59.6.1 the Head Lease shall terminate on the date of expiry of the Term and SPV shall execute and deliver such documents as are necessary to demonstrate such termination;

59.6.2 in consideration for the termination of the Head Lease pursuant to Clause 59.6.1, the Trust shall pay to SPV on the date of expiry of the Term the Market Value (as defined in Clause59.7) agreed between the Trust and SPV or, in the event of disagreement, determined pursuant to the Dispute Resolution Procedure together with, in the event of non-payment, interest at the Interest Rate on the Market Value for the period from the date of expiry of the Term or, if later, the date of performance by SPV of its obligations referred to in Clause 59.6.1 until paid in full; and

59.7 For the purposes of Clauses 58.3.1 (ii)59.4.3 and 59.6.2, the "**Market Value**" shall be the open market value on the last day of the Term of the interest of SPV in the Head Lease on the assumption (if not a fact) of -

(i) a willing purchaser and willing seller;

(ii) that the Tenant under the Sub-lease has given notice of termination of the Sub-lease and has agreed to remove such that there will be vacant possession; and

(if a fact)

(a) the interest of the Trust as a special purchaser; and

(b) the likelihood of a planning consent for change of use.

59.8 **Inspection, remedy and retention**

59.8.1 In the event of termination pursuant to Clauses 56.9 (Trust Default), 57 (Relief Event) and 60 (Force Majeure) prior to the Compensation Payment Date, the parties shall jointly appoint an independent person

("Independent Person") agreed by them to undertake an inspection of the Hospital.

59.8.2 If the parties are unable to agree on the Independent Person within 14 days of a notice from one party to the other requiring agreement to a specified firm or individual either may refer the selection of the Independent Person to the chairman for the time being of the Scottish Branch of the Royal Institution of Chartered Surveyors.

59.8.3 The Independent Person shall be asked to issue a report ("Report") addressed to the Trust and SPV describing the condition and state of repair of the Hospital, taking into consideration the age of the facilities and the wear and tear naturally occurring in a hospital similar in age and character to the Hospital and listing all remedial action and repairs (if any) required to put the Hospital in the Required Handback Condition but identifying any remedial action or repairs that are required as a direct result of a breach by the Trust of its obligations under this Agreement, Patient Risk, Visitor Risk or any other remedial actions for which the Trust is responsible in terms of this Agreement a Relief Event or an event of Force Majeure ("the Excluded Repairs") and the estimated cost of putting the Hospital in the Required Hardback Condition and the amount of such cost attributable to the Excluded Repairs.

59.8.4 The Trust and SPV agree that the Report shall be a conclusive statement of the matters stated within it and shall not be challengeable by either party.

59.8.5 If and to the extent that the Report discloses that the Hospital is not in the Required Handback Condition, the Trust shall be entitled to deduct from compensation payable to SPV under Clause 58 the sums set against each of the remedial action and repair obligations (other than those set against the Excluded Repairs) set out in the Report that has not been complied with in full. Provided always that, in the case of any termination pursuant to Clause 56.9 (Trust Default), if such Report has not been agreed prior to the Compensation Payment Date, the Trust shall make payment pursuant to Clause 58.3.1 less such amount as the Independent Person shall have provisionally assessed as an appropriate deduction pending availability of the Report, and the parties shall reconcile the proper amount due within 14 days of the Report being issued.

PART 13 - MISCELLANEOUS

60 Force Majeure

60.1 For the purpose of this Clause 60, **"Force Majeure"** means:-

60.1.1 circumstances of war, civil war, armed conflict or terrorist attacks in each case in or affecting the United Kingdom; or

60.1.2 nuclear, chemical or biological contamination of the Site, or SPV's property arising from any of the circumstances specified in Clause 60.1.1 hereof unless the source or cause of the contamination or radiation is brought to or near the Site or SPV's property by or on behalf of SPV or any other person for whom SPV is responsible;

60.1.3 sonic booms, pressure waves from aircraft or aerial objects travelling at sonic or supersonic speed;

60.1.4 any Act of God (otherwise known as *damnum fatale*) (including lightning, exceptional adverse weather conditions and earth tremors) in excess of the standards required to be designed against in terms of this Agreement but this Clause 60.1.4 will only apply where at the relevant time the relevant Act of God on the assumption that it was an Insured Risk is Uninsurable (as such expression is defined in Part T of the Schedule).

60.2 Neither party shall be in breach of an obligation or warranty under this Agreement and any other DBFO Contract and neither party shall have any claim for indemnity or any other remedy to the extent that it is unable to perform that obligation in whole or in part by reason of Force Majeure.

60.3 If either party shall seek to rely on this Clause 60, it shall forthwith upon becoming aware of the event of Force Majeure give notice to the other with full particulars to the extent known by such party at such time of the act or matter claimed as a Force Majeure event. The party so affected shall take all reasonable steps to remedy the failure to perform and keep the other party informed of the steps so being taken.

60.4 On the occurrence of a Force Majeure event the Trust and SPV shall negotiate in good faith with a view to restructuring arrangements to resolve or avoid the impact of the Force Majeure and ensure the continued provision of Services.

60.5 Notwithstanding the occurrence of an event of Force Majeure which results in SPV being unable to provide any part of a Service or being unable to perform the Services in their entirety, the Trust shall for the period of subsistence of the period of Force Majeure cease to pay the Unitary Payment and shall for the period of subsistence of the period of Force Majeure or until termination as a result thereof in terms of Clause 60.8 pay to SPV

60.5.1 IDC, where the event of Force Majeure occurs before Services Commencement Date

60.5.2 where the event of Force Majeure occurs after Services Commencement Date, the debt service and principal repayment elements of the Approved Debt as set out in the Financial Model

60.6 If an event of Force Majeure occurs which results in SPV being unable to provide any part of the Services (which in aggregate with all other parts of the Services then affected by an event of Force Majeure, does not amount to a substantial part of the Services) but so that SPV is able to provide and the Trust is able to benefit from one or more of the Services or part thereof SPV will (unless notice to is given pursuant to Clause 60.8) continue to perform the Services or part thereof unaffected by an event of Force Majeure and the Trust will remain liable to pay the elements of the Unitary Payment which are attributable to the Services which SPV continues to provide in accordance with the terms of this Agreement.

60.7 If an event of Force Majeure occurs which results in SPV being unable to perform its obligations under the Project Documents (in so far as restructured arrangements cannot be reached between the Trust and SPV pursuant to Clauses 60.3, 60.4 and 60.6), the Trust at its own cost may obtain the affected Services from any third party until SPV resumes the provision of the affected Services. SPV shall give all reasonable proper assistance and information to that third party which is necessary to enable that third party to provide the affected Services (and shall procure like co-operation from each relevant Service Provider or Sub-Contractor). The Trust shall indemnify SPV and its employees or agents against any claims or reasonable costs suffered by them as a consequence of any negligent or improper act or omission of such third party in the provision of the affected Services.

60.8 If any event of Force Majeure has effect for more than 180 days either party may terminate this Agreement on giving one month's notice in writing and the provisions of Clause 58.3.2 shall apply.

61 Indemnities

61.1 As a separate obligation and without limiting the Trust's rights and remedies stated elsewhere in this Agreement SPV shall indemnify the Trust on demand and hold it and its servants, agents, employees and officers harmless against all damages, losses, claims, demands, expenses (including legal and other professional expenses), costs, liabilities, fines, penalties and compensation orders (all hereinafter described as "Indemnity Losses" and individually an "Indemnity Loss") which are sustained by the Trust and its servants, agents, employees and officers (but excluding consequential loss or loss of profit):-

61.1.1 as a result of any claim for or in respect of the death or personal injury of any person employed or engaged by the Trust, any patients or visitors if and to the extent that such claim is caused by the negligence of SPV or its employees, agents, the Service Providers, Contractor, or sub-contractors or other person for whom it is or they are responsible;

61.1.2 in repairing or reinstating or replacing any assets owned by or in the possession of the Trust which have been lost or damaged, if and to the extent that such loss or damage has been caused by the negligence, default or breach of contract of SPV, its employees, agents, the Service Provider, Contractor, or sub-contractors or other persons for whom it is or they are responsible;

61.1.3 as a result of any Prosecution brought against the Trust as a result of the operation or purported operation by SPV or any Service Provider, Contractor, Permitted Sub-Contractor or sub-contractor of any of the Services or any obligations under this Agreement or any other Project Document; and

61.1.4 as a result of any claim by any third party in respect of any contract, agreement or relationship between the Trust and any such third party if and to the extent that that claim would not have arisen but for the negligence, act or omission of SPV or its employees, agents, the Service Provider, Contractor, or sub-contractors.

Notwithstanding anything to the contrary in the foregoing and all other indemnities in favour of the Trust contained in this Agreement, the indemnification provided for therein shall not apply to any Indemnity Loss:

61.1.5 which is attributable to matters which occur, or fail to occur, prior to the Execution Date or after the expiration or earlier termination of this Agreement regardless of when asserted

61.1.6 to the extent which it is attributable to matters which are caused by acts or omissions of the Trust or any of its officers, employees, servants and agents, contactors or affiliates or any Patients or Visitors

61.1.7 to the extent that such claim or loss is a result of any failure on the part of the Trust to comply with any of the terms of this Agreement, or is a result of any default of the Trust pursuant to this Agreement

61.1.8 which are part of the normal administrative costs and expenses of the Trust

61.1.9 to the extent that such is caused by or arises out of or as a consequence of any negligence or wilful misconduct of the Trust

61.1.10 which are required to be borne by the Trust in accordance with any other provision of this Agreement

61.2 The Trust shall indemnify SPV on demand and hold it harmless against all damages, losses, claims, demands, expenses (including legal and professional expenses), costs and liabilities which are sustained by SPV (but excluding consequential loss or loss of profit)

61.2.1 in consequence of any claim for or in respect of the death or personal injury of any person employed or engaged by SPV to the extent caused by the negligence, default or breach of contract of the Trust, its employees, officers, agents or servants

61.2.2 in relation to infringement by the Trust or those for whom it is responsible of any rules or regulations (whether statutory or otherwise) or licences and any loss or withdrawal of any licences, permissions or authorisations, relating to the activities of the Trust, and the consequences thereof

Notwithstanding anything to the contrary in the foregoing and all other indemnities in favour of the SPV contained in this Agreement, the indemnification provided for therein shall not apply to any Indemnity Loss:

61.2.4 which is attributable to matters which occur, or fail or occur, prior to the Execution Date or after the expiration or earlier termination of this Agreement regardless of when asserted

61.2.5 to the extent which it is attributable to matters which are caused by acts or omissions of the SPV or any of its officers, employees, servants and agents, contractors or affiliates

61.2.6 to the extent that such claim or loss is a result of any failure on the part of the SPV to comply with any of the terms of this Agreement, or is a result of any default of SPV pursuant to this Agreement

61.2.7 which are part of the normal administrative costs and expenses of the SPV

61.2.8 to the extent that such is caused by or arises out of or as a consequence of any negligence or wilful misconduct of the SPV

61.2.9 which are required to be borne by the SPV in accordance with any other provision of this Agreement

61.3 Upon payment in full of any indemnity pursuant to this Clause61 or any other indemnity in favour of a party contained in this Agreement the indemnifying party will be subrogated to any right of the indemnified party in respect of the matter against which such indemnity has been made

the Trust and the rights and liabilities under this Agreement and the Financier Direct Agreement are assigned to such Health Service Body, which becomes responsible to SPV for discharging the Trust's obligations under this Agreement and (ii) such Health Service Body has demonstrably adequate resources immediately available to it to meet its obligations under this Agreement and the Financier Direct Agreement and has the support of its purchaser; and

56.9.3 the assets of the Project are expropriated in whole or in part as a result of any action taken or implemented by the United Kingdom Government to the effect that such expropriation will have a material adverse effect on the ability of the Trust to comply with any of its material obligations under this Agreement;

56.9.4 the Trust commits a fundamental breach of its obligations under this Agreement or any of the other DBFO Contracts to which it is expressed to be a party or any part thereof and such breach has an adverse actual effect on SPV or the ability of SPV to perform its obligations under the Agreement or any part thereof that is material unless the breach gives rise to a claim for money under the terms of this Agreement whether by way of payment, damages or otherwise and such amount is paid within one month of the same becoming due

56.9.5 (a) any law, statute, statutory instrument, order, bye-law or other enforceable legislation

(b) any regulation, directly applicable directive, decision or other legislation of the European Union or its predecessor organisations having the force of law in Scotland from time to time or otherwise applying to the Trust, or

(c) any other legal provision, publicly proposed whether in any green paper, white paper, draft legislation, subordinate legislation, treaty, regulation, directive or decision

in each case published by HM Government and/or the European Commission which will have a material adverse effect on the ability of the Trust to comply with any of its material obligations including, for the avoidance of doubt, its payment obligations under this Agreement or any of the other DBFO Contracts to which it is expressed to be a party or which will remove or adversely amend the Secretary of State's powers over the Trust without reasonably acceptable alternative solutions being provided; it being declared that in relation to putative legislation and others no right to terminate under this Clause 56.9.5 shall arise until the relevant legislation shall have passed its Second Reading in the House of Commons or its equivalent stage in any Scottish Parliament or equivalent stage in any other relevant legislatory or regulatory process provided that SPV

61.4 If the indemnified party obtains any recovery in respect of all or any part of any amounts (which amounts may include interest) which the indemnifying party has paid the indemnified party, the indemnified party will promptly account to the indemnifying party for such amount

61.5 In the event that any Indemnity Loss results from the joint or concurrent negligence or intentional acts or omissions of the Parties, each party shall be liable under this Clause 61in proportion to its relative degree of fault

61.6 Each party shall promptly notify the other party of all loss or proceedings in respect of which it is or may be entitled to indemnification under Clause 61. Such notice shall be given as soon as reasonably practicable after the relevant party becomes aware of the loss or proceeding

61.7 The indemnifying party shall be entitled, at its option, and expense and with counsel of its selection, to assume and control the defence of any claim, action, or proceeding in respect of, resulting from, relating to or arising out of any matter for which it is obligated to indemnify the other party hereunder, subject to the prior approval of such counsel by the indemnified party (which approval shall not be unreasonably withheld or delayed), provided it gives prompt notice of its intention to do so to the indemnified party and reimburses the indemnified party for the reasonable costs and expenses incurred by the indemnified party in connection with the defence of such claim, action or proceeding prior to the assumption by the indemnifying party of such defence

61.8 Unless and until the indemnifying party acknowledges in writing its obligations to indemnify the indemnified party and assumes control of the defence of a claim, action or proceeding in accordance with Clause61.7, the indemnified party shall have the right but not the obligations, to contest, defend and litigate, with counsel of its own selection, any claim, action or proceeding by any third party alleged or asserted against such party in respect of, resulting from, related to or arising out of any matter for which it is entitled to be indemnified hereunder, and the reasonable costs and expenses thereof shall be subject to the indemnification obligations of the indemnifying party hereunder

61.9 Upon assumption by the indemnifying party of the control or the defence of a claim, action or proceeding, the indemnifying party shall reimburse the indemnified party for the reasonable costs and expenses of the indemnified party in the defence of the claim, action or proceeding prior to the indemnifying party's acknowledgement of the indemnification and assumption of the defence

61.10 Neither party shall be entitled to settle or compromise any such claim, action or proceeding without the prior written consent of the other party (which consent shall not be unreasonably withheld or delayed); provided however, that after agreeing in writing to indemnify the indemnified party, the indemnifying party may settle or compromise any claim without the approval of the indemnified party. Except where such consent is unreasonably withheld, if a party settles or

compromises any claim, action or proceeding in respect of which it would otherwise be entitled to be indemnified by the other party without the prior written consent of the other party, the other party shall be excused from any obligation to indemnify the party making such settlement or compromise in respect of such settlement or compromise

61.11 Following the acknowledgement of the indemnification and the assumption of the defence by the indemnifying party, the indemnified party shall have the right to employ its own counsel and such counsel may participate in such action, but the fees and expenses of such counsel shall be at the expense of such indemnified party, when and as incurred, unless (i) the employment of counsel by such indemnified party has been authorised in writing by the indemnifying party, (ii) the indemnified party shall have reasonably concluded that there may be a conflict of interest between the indemnifying party and the indemnified party in the conduct of the defence of such action, (iii) the indemnifying party shall not in fact have employed independent counsel reasonably satisfactory to the indemnified party to assume the defence of such action and shall have been so notified by the indemnified party, or (iv) the indemnified party shall have reasonably concluded and specifically notified the indemnifying party either that there may be specific defences available to it that are different from or additional to those available to the indemnifying party or that such claim, action or proceeding involves or could have a material adverse effect upon it beyond the scope of this Agreement. If (ii), (iii) or (iv) of the preceding sentence shall be applicable, the counsel for the indemnified party shall have the right to direct the defence of such claim, action or proceeding on behalf of the indemnifying party and the reasonable fees and disbursements of such counsel shall constitute expenses for which indemnity is given

61.12 In this Clause 61 all references to counsel shall include solicitors and advocates

61.13 The indemnifying party will pay the indemnified party in respect of any Indemnity Loss pursuant to this Clause 61 within (10) Business Days of receipt of a written demand therefor accompanied by a written statement describing the basis of such indemnity and the computation of the amount so payable provided however that such an amount need not be paid by the indemnifying party prior to the earlier of (i) the date such Indemnity Loss is payable (where not already paid by the indemnified party) or (ii) the date of demand (if no date for payment is specified therein)

61.14 The Trust shall not in any circumstances be liable to SPV, whether in contract, delict or otherwise for any claims or losses of any person arising out of, or in the course of or in connection with the Project, but so that this Clause 61.14 shall not affect any obligation or liability on the Trust's part expressed in the DBFO Contracts, including without limitation Clause 61.2.

62 **Status of SPV**

62.1 In carrying out its obligations under the Agreement and the other Project Documents SPV acknowledges that it is acting as principal and not as the agent of the Trust.

62.2 Except where expressly provided for in the Agreement SPV shall not say or do anything that may lead any other person to believe that SPV is acting as the agent of the Trust.

63 **Compliance with Legislation, Corrupt Gifts and Commissions**

63.1 In carrying out its obligations under the Agreement and the other DBFO Contracts SPV shall comply in all respects with all Applicable Laws and Statutory Requirements and in particular shall ensure that:

63.1.1 SPV does not commit an act of discrimination rendered unlawful by the Sex Discrimination Act 1975 or the Race Relations Act 1976; and

63.1.2 SPV shall comply with all relevant requirements contained in or having effect under any legislation relating to health, safety and welfare at work.

63.2 Where any of SPV's obligations under the Agreement are carried out by a Service Provider or a Sub-Contractor, SPV shall ensure that in carrying out those obligations the Service Provider or Sub-Contractor complies with this Clause 63.

63.3 SPV shall not offer to give, or agree to give, to any director, member, employee or representative of the Trust any gift or consideration of any kind as an inducement or reward for doing or refraining from doing, or for having done or refrained from doing, any act in relation to the obtaining or execution of any DBFO Contract or for showing or refraining from showing favour or disfavour to any person in relation to any such contract.

63.4 SPV's attention is drawn to the Prevention of Corruption Act 1906. SPV shall not, and shall procure that no Service Provider or Sub-Contractor will, commit any offence under that Act in relation to the provision of Services or any DBFO Contract.

63.5 Any breach by SPV of Clauses 63.3 and 63.4 shall in the case of a Serious Breach entitle the Trust to exercise its rights pursuant to Clause 56.1.8 and/or recover from SPV the amount of any loss resulting from such termination in accordance with this Agreement and to recover from SPV the amount or value of any such gift, consideration or commission or, if such corrupt act is of a less serious nature, SPV will incur a fine of £1,000 for each such act.

63.6 In this Clause 63, references to SPV include anyone acting on its behalf (with its knowledge) including but not limited to SPV Staff.

64 **Equal Opportunities**

64.1 SPV shall, and shall procure that SPV Staff and the Service Provider and all others authorised by them will, comply with the Trust's code of practice (forming Part of the Trust's Procedures) relating to the treatment of employees and others by contractors.

64.2 To the extent that any amendment to the Trust's code of practice has been implemented through the Change Procedure SPV shall comply and procure compliance with the amended code of practice as from the date the amended code of practice takes effect or such later date as may be stipulated by the Trust.

65 **Access and Information**

65.1 SPV shall comply fully with the accounting and information provisions set out or referred to in this Agreement all of which information shall be compiled with due care and skill.

65.2 SPV shall provide the Trust with access to the information set out or referred to in this Project Agreement as and when at all reasonable times required by the Trust

65.3 SPV shall provide access at all reasonable times to the Trust's Auditors or other duly authorised staff or agents to inspect such documents as the Trust considers acting reasonably necessary to enable the Trust to audit the monitoring procedure of SPV in accordance with Clause 41.5. The Trust shall be entitled to request such additional information and evidence in support thereof as it may reasonably require and SPV shall provide all proper assistance as may be required by the Trust.

66 **Liaison**

SPV undertakes that it will procure that the Service Provider and any and all Permitted Sub-Contractors, if appropriate, comply at all times with, and co-operate in the establishment and operation of, the Liaison Procedures to be developed in accordance with Part P of the Schedule .

67 **Transfer of Responsibility on Expiry or Termination**

67.1 SPV shall, at no cost to the Trust, promptly provide such assistance and comply with such timetable as the Trust may reasonably require for the purpose of ensuring an orderly transfer of responsibility for provision of the Services (or their equivalent) upon the expiry or other termination of this Agreement both prior to and after the expiry or other termination of this Agreement.

67.2 Such assistance may include (without limitation) delivery of or, at SPV's option, access at all reasonable times to:

67.2.1 documents and data in the possession or control of SPV which relate to performance, monitoring, management and reporting of the Services, including the documents and data, if any, referred to in this Agreement;

67.2.2 data relating to the terms and conditions of employment and the employment records of those of SPV's employees who may be affected by the Employment Regulations and/or the Directive upon any transfer of responsibility for the provision of the Services (or their equivalent) including the data, if any, referred to in this Agreement.

67.3 SPV undertakes that it shall not knowingly do or omit to do anything which may adversely affect the ability of the Trust to ensure an orderly transfer of responsibility for provision of the Services.

68 **Security**

68.1 SPV shall be responsible for the security of all Related Materials and any other goods and equipment belonging to SPV, the Service Provider or Sub-Contractors relating to the provision of the Services.

68.2 SPV shall ensure that its employees and the employees of the Service Provider and Sub-Contractors take all reasonable steps not to compromise the security of the Trust's premises when carrying out the Services or any part thereof.

68.3 Not less than three months prior to the Services Commencement Date, SPV shall make available to the Trust its security and health and safety and welfare (including, for the avoidance of doubt, human resources) policies (forming part of the Trust Procedures).

69 **Recovery of Sums due and Set Off**

Whenever pursuant to the terms of this Agreement any sum of money is payable by or recoverable from SPV and due to the Trust as a Permitted Deduction, then the Trust may deduct or set off the amount of such sum from any sum then due or

which may at any time thereafter become due from the Trust to SPV under this Agreement, but save as so described, the Trust shall have no right to set off or withhold or deduct from any sum due by it to SPV against any sum due or alleged to be due by SPV to the Trust.

70 **Not Used**

71 **Not Used**

72 **Dispute Resolution Procedure**

72.1 The parties shall use their best efforts to negotiate in good faith and settle amicably any Dispute during the continuance of this Agreement.

72.2 Any Dispute not capable of resolution under Clause 72.1 shall become subject to the terms of Part M of the Schedule

73 **Notices**

Any notices to be given under this Agreement must be in writing and shall be delivered personally or sent by first class post or by facsimile transmission to the address or facsimile number of the other party set out in this Agreement or otherwise notified. Any such notice shall be deemed to be served, if delivered personally, at the time of delivery or, if sent by post, 48 hours after posting or, if sent by facsimile transmission, 24 hours after proper transmission.

74 **Law and Jurisdiction**

This Agreement shall be governed by and construed in accordance with Scots law and the parties irrevocably agree that any proceedings raised by either or both parties will be as a commercial action (as defined in Chapter 47 of the Rules of the Court of Session) (or an equivalent court of competent jurisdiction if a commercial action is no longer available). Each party agrees not to raise proceedings in any other court whether in Scotland or in any other jurisdiction, and save as aforesaid further agrees not to seek to remit any cause raised pursuant to this provision to any other court whether in Scotland or otherwise.

75 **Restrictive Trade Practices Act/Competition Act**

Unless this Agreement is, or forms part of an arrangement which is a non-notifiable agreement (as specified in paragraph 5 of Schedule 13 to the Competition Act 1998), no provision of this Agreement which is of such a nature as to make this agreement or any arrangement of which it forms part liable to registration under the Restrictive Trade Practices Act 1976 shall take full effect until the day after that on which particulars thereof have been duly furnished to the Director General of Fair Trading pursuant to such Act.

76 **General**

76.1 SPV's rights and obligations under this Agreement and the other DBFO Contracts may not be assigned, transferred, sub-contracted or otherwise disposed of in whole or in part without the Trust's prior written consent such consent not to be unreasonably withheld or delayed;

76.1.1 except to the extent expressly provided in this Agreement; and

76.1.2 otherwise than by a fixed and/or floating charge or assignation in security given to a Financier, as security for the Financial Indebtedness under the Finance Facilities Agreements (but not otherwise).

76.2 The Trust may assign and transfer all (but not part only) of its rights and obligations under this Agreement and the other DBFO Contracts to which it is a party to any other Health Service Body in connection with the reorganisation of health services only if such Health Service Body;

76.2.1 has the support of its purchaser (or the support of substantially all of the former group of purchasers) for the continuing purchase of services from the assignee; and

76.2.2 such Health Service Body has demonstrably adequate resources immediately available to it to meet its obligations under this Agreement and the Financier Direct Agreement.

76.3 No amendment to this Agreement or any part of the DBFO Contracts shall have effect unless agreed in writing signed by the Chief Executive of the Trust and a director of SPV. Each of SPV and the Trust acknowledges that it does not enter into this Agreement or any other DBFO Contract in reliance on any representation, warranty or other undertaking by the other party not expressly set out or referred to in this Agreement.

76.4 Save where an express time limit is applied thereto, no delay by or omission of either party in exercising any right, power, privilege or remedy under this Agreement shall operate to impair that right, power, privilege or remedy or be

construed as a waiver. Any single or partial exercise of any such right, power, privilege or remedy shall not preclude any other or further exercise or the exercise of any other right, power, privilege or remedy.

76.5 Nothing in this Agreement shall be construed as establishing or implying a partnership, joint venture or agency.

76.6 If any provision in this Agreement shall be or become illegal, invalid or unenforceable, the effectiveness of the remaining provisions of this Agreement shall not be prejudiced or impaired. In such circumstances, each party undertakes to work with the other party in good faith to secure an amendment to or restructuring of the Project Documents to give substantial effect to the original intentions of the parties under the Project Documents.

76.7 Each party shall at the request of the other execute any additional documents and do any other acts or things which may reasonably be required to give effect to this Agreement.

76.8 Each party shall be responsible for paying its own costs and expenses in relation to the preparation, execution and implementation of this Agreement, except where expressly provided to the contrary and except for any award of costs or expenses by a competent court.

76.9 Subject to Clauses 76.1 and 76.2, this Agreement shall enure for the benefit of and be binding on the respective successors in title and permitted assignees of each party, who shall procure that each such transferee executes a deed with the other party by which the transferee agrees to be bound by this Agreement: IN WITNESS WHEREOF these presents consisting of this and the preceding 106 pages and the Schedule annexed hereto are:-

Subscribed for and on behalf of
the Trust at GLASGOW
on 25 MAY 1999 by

.....

.....

Subscribed for and on behalf of
SPV at GLASGOW
on 25 MAY 1999 by

.....

.....

This is the Schedule referred to in the foregoing Project Agreement between The Argyll and Clyde Acute Hospitals National Health Service Trust and LH Project Limited.

The Schedule - Part A

Monitoring Procedure

1 SPV will provide to the Trust's Representative within 14 days after being issued by SPV or the Contractor: -

- up-dated plans and specifications
- instructions given by or on behalf of SPV under the Building Contract
- an up-dated monthly programme noting any divergences from the Construction Programme and identifying proposals for overcoming delay.

2 SPV will provide to the Trust's Representative adequate information relating to the Works in a format to be agreed and within 14 days of becoming aware of the same and will give notification of any event or circumstance which might cause either (i) any acceleration of the anticipated Services Commencement Date or (ii) delay or an inability on the part of SPV to achieve the Services Commencement Date on or before the Construction Backstop Date.

3 SPV will permit the Trust's Representative to obtain access to the Site at all times to inspect the progress of the Works and shall permit the Trust's Representative to attend all relevant meetings and shall provide the Trust's Representative with copies of the Minutes of all such meetings and shall permit the Trust's Representative to make representations to SPV or the Relevant Professional whether arising out of any such meetings or otherwise and shall procure that any proper and reasonable representations or requirements of the Trust's Representative so made and given in writing to SPV or the Relevant Professional are noted and taken account of and insofar as requisite to ensure compliance with the obligations of SPV in terms of this Agreement are complied with and implemented as soon as practicable thereafter. If the Trust's Representative considers that there has been a failure to carry out the Development in accordance with this Agreement SPV will be obliged to open up such parts of the Works and carry out such tests as are necessary to establish whether there has been such a failure to comply with this Agreement. Where such tests establish that there has been no failure in compliance with this Agreement, the Trust shall reimburse SPV's reasonable costs incurred (i) in opening up and subsequently making good the Works, and (ii) as a consequence of the delay to the Works arising out of the requirement to open up parts of the Works and carry out tests under this Part A.

4 If SPV and the Trust's Representative cannot agree on whether such a failure as referred to in paragraph 3 has taken place and/or the works necessary to remedy such failure, the matter or matters will be referred to the Dispute Resolution Procedure.

5 SPV will provide the Trust's Representative with copies of all as-built drawings, operating manuals, copies of all necessary consents and manufacturers guarantees, a copy of the Health & Safety file within a reasonable period of completion of the Works, such period not exceeding three months.

The Schedule - Part B

Practical Completion Procedure

1 SPV will carry out a series of inspections and appropriate tests of the Works to satisfy itself that the Works are practically complete.

2 Subject as aftermentioned the Trust's Representative shall be given the opportunity by SPV or the Relevant Professional at the time when the Relevant Professional proposes to issue a Certificate of Practical Completion pursuant to the Building Contract to carry out a joint inspection of the Works by giving the Trust's Representative notice in writing stating that the issue of a Certificate of Practical Completion of those works is anticipated within no more than fourteen and no less than seven days after the date of the notice and thereafter the following shall apply in relation to the issue of such Certificate:-

2.1 the Trust's Representative shall carry out such inspection jointly with the Relevant Professional;

2.2 if the Relevant Professional and the Trust's Representative are satisfied that the Works are at that time practically complete subject to such snagging matters as are approved in writing by the Trust's Representative (acting reasonably) the Relevant Professional shall issue a Certificate of Practical Completion together with the list of the approved snagging matters, if any, and the reasonable time period within which they are to be made good and the Trust's Representative shall immediately following the inspection mentioned in paragraph 2.1 and the issue of such Certificate, give notice in writing to that effect to SPV;

2.3 if the Trust's Representative is not satisfied that the Works are at that time practically complete (subject to any snagging works as aforesaid), then without prejudice to the right of the Relevant Professional to issue a Certificate of Practical Completion, the Trust's Representative shall immediately following the inspection mentioned in paragraph 2.1 give notice in writing to that effect to SPV stating those matters which he considers to be outstanding and SPV, if it agrees with the Trust's Representative or if the Chairman of SPV and the official of the Trust or Expert nominated pursuant to paragraph 2.5 determines that works remain to be executed, shall procure that such works are completed with all due expedition under declaration that if SPV disagrees with the Trust's Representative the provisions of paragraph 2.5 shall apply;

2.4 upon SPV procuring the completion of the matters specified pursuant to paragraph 2.3 above as requiring to be carried out to complete the Works to the satisfaction of the Trust's Representative and subject to the issue by the Relevant Professional (if not already done) of a Certificate of Practical Completion the Trust's Representative shall be entitled to reinspect the Site and if satisfied that the works pursuant to paragraph 2.3 have been carried out to his satisfaction shall forthwith so advise SPV in writing; and

2.5 if SPV and the Trust's Representative disagree as to whether any further works are required before a Certificate of Practical Completion of the Works ought properly to be issued the matter or matters in dispute shall be referred to the Dispute Resolution Procedure save that for the purposes of this Part B of the Schedule the decision of the Expert referred to in the Dispute Resolution Procedure as to the extent of such works and the date which shall be the date of Contractual Practical Completion shall be subject to the Related Dispute Procedure set out in Section 3 of Part M of the Schedule.

2.6 SPV will procure that the Contractor carries out SPV's obligations under the Commissioning Procedure prior to Completion to satisfy the Relevant Professional that it is appropriate to issue the Certificate of Practical Completion and for the Services Commencement Date to occur. The parties shall follow the same procedure in relation to the completion of the Commissioning Procedure as relates to the Works and will do so contemporaneously, pursuant to paragraph 2 of this Part 2. On determination that the Commissioning Procedure has been satisfactorily completed, the Relevant Professional will issue the Certificate confirming the date of occurrence of Contractual Practical Completion and the Services Commencement Date, and the Services Commencement Date will for all purposes of this Agreement be the date of practical completion as set out in the Certificate of Practical Completion subject to any review of that date under the Dispute Resolution Procedure. Forthwith upon such agreement or determination the Trust's Representative (failing whom the Expert) shall issue a Certificate confirming the date upon which the Services Commencement Date occurred.

The Schedule - Part C

Remedying of Defects

1 SPV will procure that the Contractor completes any incomplete minor works which are noted in the Certificate of Contractual Practical Completion within the timescale specified therein.

2 SPV will procure that the Contractor diligently makes good any defects which are the responsibility of the Contractor under the Building Contract ("Defects") which arise before the end of the Defects Liability Period including those in respect of which notice is given to SPV by the Trust's Representative prior to the expiry of the Defects Liability Period.

3 SPV will inspect the works sixty days prior to expiry of the Defects Liability Period and shall, if necessary, produce a preliminary schedule of defects which shall be given to the Trust's Representative. Thereafter, the Trust's Representative shall be entitled to make a joint inspection with the SPV of the Works with a view to agreeing a schedule of defects ("the Schedule of Defects").

4 If the SPV and the Trust's Representative agree on the items to be included in the Schedule of Defects SPV or the Relevant Professional shall issue to the Contractor the agreed Schedule of Defects and thereafter SPV shall diligently procure that there is carried out and completed the works narrated in the Schedule of Defects within a period of time to be agreed between SPV and the Trust's Representative or if the Chairman of SPV and the official of the Trust or Expert nominated pursuant to paragraph 6 determines that defects are required to be remedied SPV shall procure that such defects are remedied with all due expedition under declaration that if SPV and the Trust's Representative do not agree the Schedule of Defects the provisions of paragraph 6 shall apply.

5 Upon SPV procuring the remedy of the defects specified pursuant to paragraph 4 the Trust's Representative shall be entitled to reinspect the Works and if satisfied that the defects have been remedied to his satisfaction shall forthwith so advise SPV in writing failing which the provisions of paragraph 6 shall apply.

6 If SPV and the Trust's Representative cannot agree on the defects to be included in the Schedule of Defects or that the defects have been remedied the matter shall be referred to the Dispute Resolution Procedure on the same terms as apply in paragraph 2.5 of Part B of the Schedule.

The Schedule - Part D

Drawings

Wylie Shanks - Architectural

(5)400030 AL(0)1B	Site Plan
(5)400030 AL(0)4	Site & Location Plan
(5)400030 AL(0)10	Ground Floor Plan
(5)400030 AL(0)11	First Floor Plan
(5)400030 AL(0)12	Elevations
(5)400030 AL(0)13	Sectional Elevations

McLay Collier - Structural

3702/01	Foundation Plan
3702/19	Drainage
3702/101	Typical Structural Cross Section

The Schedule - Part E

Trust's Requirements

Appendix A - Accommodation Schedule

See attached

GERIATRIC ASSESSMENT

SPACE				Criticality Areas M^2			
Room No	Area (T)	Rooms	Rating	Critical	Intermediate	Non-critical	Description
F99	8.0		C	8.0			TOILET ANNEX
F100	4.0	Y	N			4.0	OCCUPATIONAL THERAPY / PHYSIO STORE
F101	3.0	Y	I		3.0		PATIENTS' TOILET (DAYSPACE)
F102	3.0	Y	I		3.0		PATIENTS' TOILET (DAYSPACE)
F103	73.0	Y	I		73.0		DINING AREA
F103S	6.0	Y	C	6.0			SERVERY
F104	19.0	Y	I		19.0		WARD PANTRY
F105	73.0	Y	I		73.0		DINING AREA
F105S	6.0	Y	C	6.0			SERVERY
F106	8.0		C	8.0			TOILET ANNEX
F107	4.0	Y	N			4.0	OCCUPATIONAL THERAPY / PHYSIO STORE
F108	3.0	Y	I		3.0		PATIENTS' TOILET (DAYSPACE)
F109	3.0	Y	I		3.0		PATIENTS' TOILET (DAYSPACE)
F110	32.0	Y	I		32.0		SITTING ROOM
F111	16.0	Y	N			16.0	SMOKING ROOM
F112	16.0	Y	N			16.0	SMOKING ROOM
F113 NS	10.0		C	10.0			NURSES' STATION
F113a	50.5		C	50.5			CORRIDORS
F113b	57.5		C	57.5			CORRIDORS
F113c	34.0		C	34.0			CORRIDORS
F114	5.0	Y	N			5.0	DOMESTIC SERVICE ROOM
F115	3.0	Y	N			3.0	CLOTHING STORE
F116	12.0	Y	N			12.0	EQUIPMENT STORE
F117	11.5	Y	C	11.5			SINGLE BEDROOM WITH DAYSPACE
F118	4.0	Y	C	4.0			WC AND SHOWER
F119	45.0	Y	C	45.0			FOUR BED WARD
F120/1/2	9.0	Y	C	9.0			WC AND SHOWER
F123	11.5	Y	C	11.5			SINGLE BEDROOM WITH DAYSPACE
F124	3.0	Y	C	3.0			WC
F125	11.5	Y	C	11.5			SINGLE BEDROOM WITH DAYSPACE
F126	3.0	Y	C	3.0			WC
F127	45.0	Y	C	45.0			FOUR BED WARD
F128/9/30	9.0	Y	C	9.0			WC AND SHOWER
F131	5.0	Y	I		5.0		QUIET ROOM
F132	5.0	Y	C	5.0			ASSISTED SHOWER
F133	16.0	Y	C	16.0			ASSISTED BATHROOM
F134	10.0	Y	I		10.0		CLINICAL NURSE MANAGER
F135	5.0	Y	I		5.0		CLINICAL WASTE
F136	16.0	Y	C	16.0			TREATMENT ROOM
F137	3.0		N			3.0	WHEELCHAIR BAY
F138	8.0	Y	C	8.0			WARD OFFICE
F139	13.0	Y	I		13.0		SLUICE / DISPOSAL ROOM
F140	9.0	Y	I		9.0		HOUSE OFFICERS OFFICE / MULTI PURPOSE
F141	5.0	Y	N			5.0	LINEN ROOM
F142	45.0	Y	C	45.0			FOUR BED WARD
F143/4/5	9.0	Y	C	9.0			WC AND SHOWER
F146	11.5	Y	C	11.5			SINGLE BEDROOM WITH DAYSPACE
F147	4.0	Y	C	4.0			WC AND SHOWER
F148	11.5	Y	C	11.5			SINGLE BEDROOM WITH DAYSPACE
F149	3.0	Y	C	3.0			WC
F150	11.5	Y	C	11.5			SINGLE BEDROOM WITH DAYSPACE
F151	3.0	Y	C	3.0			WC

F152	45.0	Y	C	45.0			FOUR BED WARD
F153/4/5	9.0	Y	C	9.0			WC AND SHOWER
F156	20.0		C	20.0			STAIR 4 (1st)
F157	46.0	Y	C	46.0			FOUR BED WARD
F158/9/60	8.0	Y	C	8.0			WC AND SHOWER
F161	46.0	Y	C	46.0			FOUR BED WARD
F162/3/4	8.0	Y	C	8.0			WC AND SHOWER
F46 NS	10.0		C	10.0			NURSES' STATION
F46a	50.5		C	50.5			CORRIDORS
F46b	57.5		C	57.5			CORRIDORS
F46c	34.0		C	34.0			CORRIDORS
F47	5.0	Y	N			5.0	DOMESTIC SERVICE ROOM
F48	3.0	Y	N			3.0	CLOTHING STORE
F49	12.0	Y	N			12.0	EQUIPMENT STORE
F50	11.5	Y	C	11.5			SINGLE BEDROOM WITH DAYSPACE
F51	4.0	Y	C	4.0			WC AND SHOWER
F52	45.0	Y	C	45.0			FOUR BED WARD
F53	11.5	Y	C	11.5			SINGLE BEDROOM WITH DAYSPACE
F54	3.0	Y	C	3.0			WC
F55/6/7	9.0	Y	C	9.0			WC AND SHOWER
F58	11.5	Y	C	11.5			SINGLE BEDROOM WITH DAYSPACE
F59	3.0	Y	C	3.0			WC
F60	45.0	Y	C	45.0			FOUR BED WARD
F61/2/3	9.0	Y	C	9.0			WC AND SHOWER
F64	5.0	Y	I		5.0		QUIET ROOM
F65	5.0	Y	C	5.0			ASSISTED SHOWER
F66	10.0	Y	I		10.0		CLINICAL NURSE MANAGER
F67	16.0	Y	C	16.0			ASSISTED BATHROOM
F68	5.0	Y	I		5.0		CLINICAL WASTE
F69	16.0	Y	C	16.0			TREATMENT ROOM
F70	46.0	Y	C	46.0			FOUR BED WARD
F71/2/3	8.0	Y	C	8.0			WC AND SHOWER
F74	46.0	Y	C	46.0			FOUR BED WARD
F75/6/7	8.0	Y	C	8.0			WC AND SHOWER
F78	8.0	Y	C	8.0			WARD OFFICE
F79	3.0		N			3.0	WHEELCHAIR BAY
F80	13.0	Y	I		13.0		SLUICE / DISPOSAL ROOM
F81	9.0	Y	I		9.0		HOUSE OFFICERS OFFICE / MULTI PURPOSE
F82	5.0	Y	N			5.0	LINEN ROOM
F83	11.5	Y	C	11.5			SINGLE BEDROOM WITH DAYSPACE
F84	4.0	Y	C	4.0			WC AND SHOWER
F85	45.0	Y	C	45.0			FOUR BED WARD
F86/7/8	9.0	Y	C	9.0			WC AND SHOWER
F89	11.5	Y	C	11.5			SINGLE BEDROOM WITH DAYSPACE
F90	3.0	Y	C	3.0			WC
F91	11.5	Y	C	11.5			SINGLE BEDROOM WITH DAYSPACE
F92	3.0	Y	C	3.0			WC
F93	45.0	Y	C	45.0			FOUR BED WARD
F94/5/6	9.0	Y	C	9.0			WC AND SHOWER
F97	20.0		C	20.0			STAIR 6 (1st)
F98	32.0	Y	I		32.0		SITTING ROOM
G135	120.0	Y	I		120.0		SITTING ROOM / DINING ROOM
G137	4.0	Y	N			4.0	OCCUPATIONAL THERAPY / PHYSIO STORE
G138	3.0	Y	I		3.0		PATIENTS' TOILET (DAYSPACE)
G139	3.0	Y	I		3.0		PATIENTS' TOILET (DAYSPACE)
G140	9.0	Y	C	9.0			SERVERY
G141 WB	3.0		N			3.0	WHEELCHAIR BAY

G141a	50.5		C	50.5			CORRIDORS
G141b	57.5		C	57.5			CORRIDORS
G141c	34.0		C	34.0			CORRIDORS
G142	10.0		C	10.0			NURSES' STATION
G143	9.0	Y	I		9.0		HOUSE OFFICERS OFFICE / MULTI PURPOSE
G144	5.0	Y	N			5.0	LINEN ROOM
G145	4.0	Y	C	4.0			WC AND SHOWER
G146	11.5	Y	C	11.5			SINGLE BEDROOM WITH DAYSPACE
G147	11.5	Y	C	11.5			SINGLE BEDROOM WITH DAYSPACE
G148	3.0	Y	C	3.0			WC
G149	3.0	Y	C	3.0			WC
G150	11.5	Y	C	11.5			SINGLE BEDROOM WITH DAYSPACE
G151	45.0	Y	C	45.0			FOUR BED WARD
G151a	20.0		C	20.0			STAIR 4 (GROUND)
G152/3/4	9.0	Y	C	9.0			WC AND SHOWER
G155	45.0	Y	C	45.0			FOUR BED WARD
G156/7/8	9.0	Y	C	9.0			WC AND SHOWER
G159	13.0	Y	I		13.0		SLUICE / DISPOSAL ROOM
G160	8.0	Y	C	8.0			WARD OFFICE
G161	16.0	Y	C	16.0			TREATMENT ROOM
G162	5.0	Y	I		5.0		CLINICAL WASTE
G163	16.0	Y	C	16.0			ASSISTED BATHROOM
G164	45.0	Y	C	45.0			FOUR BED WARD
G165/6/7	9.0	Y	C	9.0			WC AND SHOWER
G168	45.0	Y	C	45.0			FOUR BED WARD
G169/70/7	9.0	Y	C	9.0			WC AND SHOWER
G172	12.0	Y	N			12.0	EQUIPMENT STORE
G173	3.0	Y	N			3.0	CLOTHING STORE
G174	5.0	Y	N			5.0	DOMESTIC SERVICE ROOM
G175	4.0	Y	C	4.0			WC AND SHOWER
G176	11.5	Y	C	11.5			SINGLE BEDROOM WITH DAYSPACE
G177	11.5	Y	C	11.5			SINGLE BEDROOM WITH DAYSPACE
G178	3.0	Y	C	3.0			WC
G179	11.5	Y	C	11.5			SINGLE BEDROOM WITH DAYSPACE
G180	3.0	Y	C	3.0			WC
G181	5.0	Y	I		5.0		QUIET ROOM
G182	5.0	Y	C	5.0			ASSISTED SHOWER
G183	10.0	Y	I		10.0		CLINICAL NURSE MANAGER
G184	46.0	Y	C	46.0			FOUR BED WARD
G185/6/7	8.0	Y	C	8.0			WC AND SHOWER
G188	46.0	Y	C	46.0			FOUR BED WARD
G189/90/9	8.0	Y	C	8.0			WC AND SHOWER

	Area (T)	Rooms	Critical	Intermediate	Non-critical
TOTALS	2548.0	131	1927.0	493.0	128.0

GERIATRIC PSYCHIATRY ASSESSMENT

SPACE				Criticality Areas M^2			
Room No	Area (T)	Rooms	Rating	Critical	Intermediate	Non-critical	Description
F174	11.5	Y	C	11.5			SINGLE ROOMS & DAY SPACE
F176	11.5	Y	C	11.5			SINGLE ROOMS & DAY SPACE
F180	11.5	Y	C	11.5			SINGLE ROOMS & DAY SPACE
F182	11.5	Y	C	11.5			SINGLE ROOMS & DAY SPACE
F188	11.5	Y	C	11.5			SINGLE ROOMS & DAY SPACE
F190	11.5	Y	C	11.5			SINGLE ROOMS & DAY SPACE
F197	11.5	Y	C	11.5			SINGLE ROOMS & DAY SPACE
F199	11.5	Y	C	11.5			SINGLE ROOMS & DAY SPACE
F175	3.0	Y	C	3			WC COMPARTMENT & SHOWER
F177	3.0	Y	C	3			WC COMPARTMENT & SHOWER
F181	3.0	Y	C	3			WC COMPARTMENT & SHOWER
F183	3.0	Y	C	3			WC COMPARTMENT & SHOWER
F189	3.0	Y	C	3			WC COMPARTMENT & SHOWER
F191	3.0	Y	C	3			WC COMPARTMENT & SHOWER
F198	3.0	Y	C	3			WC COMPARTMENT & SHOWER
F200	3.0	Y	C	3			WC COMPARTMENT & SHOWER
F184	45.0	Y	C	45			FOUR BED WARD
F193	45.0	Y	C	45			FOUR BED WARD
F213	45.0	Y	C	45			FOUR BED WARD
F194/5/6	8.0	Y	C	8			WC COMPARTMENT & SHOWER
F185/6/7	8.0	Y	C	8			WC COMPARTMENT & SHOWER
F214/5/6	8.0	Y	C	8			WC COMPARTMENT & SHOWER
F204S	38.0	Y	I		38		SITTING ROOM
F207	13.0	Y	I		13		QUIET ROOM
F204D	49.0	Y	I		49		DINING AREA
F192	13.0	Y	N			13	SMOKING ROOM
F208	3.0	Y	I		3		PATIENT WC
F209	3.0	Y	I		3		PATIENT WC
F205	7.0	Y	C	7			SERVERY
F167	8.0	Y	N			8	OCCUPATIONAL THERAPY STORE
F211	4.0	Y	N			4	PHYSIO STORE
F202	11.0	Y	C	11			WARD OFFICE
F3	10.0	Y	I		10		HOUSE OFFICER'S / SOCIAL WORK OFFICE
F2	12.0	Y	I		12.0		CLINICAL NURSE MANAGER
F14	12.0	Y	I		12.0		SERVICE MANAGER'S OFFICE
F171	9.0	Y	C	9.0			EXAMINATION ROOM
F178	12.0	Y	I		12		SLUICE TEST & DISPOSAL ROOM
F169	15.0	Y	C	15			TREATMENT ROOM
F206	9.0	Y	I		9		WARD PANTRY
F172	6.5	Y	I		6.5		ASSISTED SHOWER ROOM
F210	6.5	Y	I		6.5		ASSISTED SHOWER ROOM
F168	15.0	Y	I		15		ASSISTED BATHROOM
F212	15.0	Y	I		15		ASSISTED BATHROOM
F170WB	3.0		N			3	WHEELCHAIR BAY
F179	6.0	Y	I		6		CLINICAL WASTE
F203	8.0	Y	N			8	LINEN ROOM
F173	12.0	Y	N			12	EQUIPMENT STORE
F201	5.0	Y	N			5	DOMESTIC SERVICE ROOM
F21	11.0	Y	I		11.0		PHYSIOTHERAPY AREA
F166	17.0	Y	C	17			O/T AREA INC ADL KITCHEN
F165	20.0		C	20			STAIR 1 1st FLOOR
F217	20.0		C	20			STAIR 2 1st FLOOR
F170a	56.5		C	56.5			CORRIDOR
F170b	37.0		C	37			CORRIDOR
F170c	58.5		C	58.5			CORRIDOR

	Area (T)	Rooms	Critical	Intermediate	Non-critical
Totals	800.0	49	526.0	221.0	53.0

GERIATRIC DAY HOSPITAL

SPACE Room No	Area (T)	Rooms	Rating	Criticality Areas M^2 Critical	Intermediate	Non-critical	Description
G100	24.0	Y	C	24.0			CONSULTING / EXAMINATION
G101	12.0	Y	C	12.0			TREATMENT ROOM
G102	12.0	Y	C	12.0			TREATMENT ROOM
G103	24.0	Y	C	24.0			CONSULTING / EXAMINATION
G104	9.0	Y	C	9.0			ASSISTED SHOWER & WC
G105	3.0	Y	N			3.0	DOMESTIC SERVICES ROOM
G106	8.0	Y	C	8.0			SPEECH THERAPY OFFICE
G107	8.0	Y	C	8.0			SPEECH THERAPY TREATMENT ROOM
G108	20.5	Y	C	20.5			SPEECH THERAPY GROUP THERAPY ROOM
G109	7.0	Y	C	7.0			OT OFFICE
G110	4.0	Y	C	4.0			OT STORE
G111	30.0	Y	C	30.0			OCCUPATIONAL THERAPY WORKSHOP
G112	51.0	Y	C	51.0			PHYSIOTHERAPY AREA
G113	4.0	Y	I		4.0		COMPUTER ROOM
G114	7.0	Y	C	7.0			PHYSIO OFFICE
G115	5.0	Y	C	5.0			PHYSIOTHERAPY STORE
G116	10.0	Y	C	10.0			ADL BEDROOM
G117	9.0	Y	C	9.0			KITCHEN (ADL)
G118	8.0	Y	I		8.0		HEAD PHYSIO OFFICE
G119	8.0	Y	I		8.0		HEAD OT OFFICE
G120	10.0	Y	C	10.0			ADL BATHROOM (WHEELCHAIR)
G121	10.0	Y	I		10.0		PREPARATION ROOM
G122	15.0	Y	I		15.0		DISPOSAL/SLUICE ROOM
G123	3.0	Y	I		3.0		DISABLED TOILET
G124	10.0	Y	C	10.0			DENTAL SURGERY
G124	23.0		C	23.0			CORRIDOR
G125	12.0	Y	C	12.0			CHIROPODY
G126	10.0	Y	I		10.0		DIETICIAN / INTERVIEW ROOM
G127	10.0	Y	I		10.0		CLINICAL NURSE MANAGER
G128	62.0	Y	C	62.0			DINING ROOM
G129	8.0	Y	C	8.0			SERVERY
G130	18.0	Y	I		18.0		PANTRY
G131	8.0		C	8.0			TOILET ANNEX
G133	3.0	Y	I		3.0		PATIENTS' TOILET
G134	3.0	Y	I		3.0		PATIENTS' TOILET
G230	20.0		C	20.0			STAIR 6 (GROUND)
G80	71.0		I		71.0		ENTRANCE RECEPTION & WAITING AREA
G82	13.0	Y	I		13.0		RECORDS
G83	10.0	Y	I		10.0		CONSULTANT'S OFFICE
G84	7.0	Y	I		7.0		CONSULTANT'S OFFICE
G85	7.0	Y	I		7.0		CONSULTANT'S OFFICE
G86a	29.0	Y	I		29.0		CLERICAL OFFICE (4 STAFF)
G86	35.0	Y	I		35.0		MEDICAL SECRETARIES (3 STAFF)
G87	10.0	Y	N			10.0	WRVS STORE
G88	9.0	Y	C	9.0			HAIRDRESSER
G89 NS	6.0		C	6.0			NURSES' STATION
G89 WB	3.0		N			3.0	WHEELCHAIR BAY
G89a	37.0		C	37.0			CORRIDOR
G89b	55.5		C	55.5			CORRIDOR
G89c	59.5		C	59.5			CORRIDOR
G90	6.0	Y	I		6.0		PATIENTS' CLOAKROOM
G91	2.5	Y	I		2.5		PATIENTS' TOILET
G92	6.0	Y	I		6.0		PATIENTS' CLOAKROOM

G93	2.5	Y	I		2.5		PATIENTS' TOILET
G93	10.0	Y	I		10.0		ADMINISTRATOR'S OFFICE
G94	6.0	Y	N			6.0	PHOTOCOPIER
G95	17.0	Y	I		17.0		CONSULTANT'S OFFICE
G96	31.0	Y	C	31.0			DAY ROOM
G97	12.0	Y	I		12.0		DAY HOSPITAL OFFICE
G98	12.0	Y	I		12.0		SMOKING ROOM
G99	15.0	Y	C	15.0			ASSISTED BATHROOM & WC

	Area (T)	Rooms	Critical	Intermediate	Non-critical
Totals	960.5	52	606.5	332.0	22.0

GERIATRIC PSYCHIATRY DAY HOSPITAL

SPACE				Criticality Areas M²			
Room No	Area (T)	Rooms	Rating	Critical	Intermediate	Non-critical	Description
G194	28.0		C	28.0			CORRIDOR
G195a	48.0		C	48.0			CORRIDOR
G195b	62.0		C	62.0			CORRIDOR
G196	12.0	Y	N			12.0	PATIENTS CLOAKROOM
G197	3.0	Y	I		3.0		PATIENTS' TOILET
G198	8.0	Y	N			8.0	PATIENTS CLOAKROOM
G199	3.0	Y	I		3.0		PATIENTS' TOILET
G1WB	4.0		N			4.0	WHEELCHAIR BAY
G200	46.0	Y	C	46.0			DINING ROOM
G201	8.0	Y	C	8.0			SERVERY
G202	10.0	Y	I		10.0		PANTRY
G203	10.0	Y	C	10.0			DAY HOSPITAL OFFICE
G204	16.0	Y	C	16.0			TREATMENT ROOM
G205	8.0		I		8.0		TOILET ANNEX
G206	5.0	Y	N			5.0	EQUIPMENT STORE
G207	3.0	Y	I		3.0		PATIENTS' TOILET
G208	3.0	Y	I		3.0		PATIENTS' TOILET
G209	33.0	Y	C	33.0			SITTING ROOM
G210	15.0	Y	C	15.0			CONSULTING EXAMINATION
G211	8.0	Y	I		8.0		DOCTOR'S ROOM
G212+A427	15.0	Y	C	15.0			CONSULTING EXAMINATION
G214	9.0	Y	I		9.0		PATIENTS' SMOKING ROOM
G214	9.0	Y	C	9.0			KITCHEN (ADL)
G215	15.0	Y	I		15.0		DISPOSAL ROOM INCL CLINICAL WASTE
G216	10.0	Y	I		10.0		QUIET ROOM
G217	11.0	Y	I		11.0		PHYSIOTHERAPY STORE
G218	4.0	Y	N			4.0	DSR
G219	8.0	Y	I		8.0		ASSISTED SHOWER & WC
G220	13.0	Y	C	13.0			ASSISTED BATHROOM
G221	8.0	Y	I		8.0		ASSISTED SHOWER & WC
G222	18.0	Y	C	18.0			DENTAL SURGERY
G223	18.0	Y	C	18.0			CHIROPODY / HAIRDRESSER
G224	20.0		C	20.0			STAIR 2 GROUND FLOOR
G226	9.0	Y	N			9.0	LINEN ROOM
G227	11.0	Y	N			11.0	OT STORE
G228	46.0	Y	C	46.0			OCCUPATIONAL THERAPY WORKSHOP
G229	46.0	Y	C	46.0			PHYSIOTHERAPY AREA
G2	19.0	Y	I		19.0		RECEPTION AND RECORDS
G3	3.0	Y	C	3.0			PATIENTS' WC (WHEELCHAIR)
G4	3.0	Y	C	3.0			PATIENTS' WC (WHEELCHAIR)
G5	13.0	Y	I		13.0		CONSULTANT'S OFFICE
G6	31.0	Y	C	31.0			COMMUNITY TEAM
G7	21.0	Y	I		21.0		MEETING ROOM
G8	3.0	Y	N			3.0	STORE

	Area (T)	Rooms	Critical	Intermediate	Non-critical
Totals	696.0	38	488	152	56

YOUNG PHYSICALLY DISABLED

SPACE				Criticality Areas M²			
Room No	Area (T)	Room	Rating	Critical	Intermediate	Non-critical	Description
G36Ca	42.0		C	42.0			CORRIDOR
G36Cb	54.0		C	54.0			CORRIDOR
G36Cc	54.0		C	54.0			CORRIDOR
G36	17.0		I		17.0		WAITING AREA
G36Z	2.0		N			2.0	ZIMMER STORAGE
G37	16.0	Y	N			16.0	STORE
G38	18.0	Y	I		18.0		GENERAL PURPOSE / INTERVIEW ROOM
G39	4.0		N			4.0	WHEELCHAIR BAY
G40	9.0	Y	C	9.0			CLOAKROOM
G41	2.0	Y	C	2.0			DISABLED TOILET
G42	2.0	Y	C	2.0			DISABLED TOILET
G43	14.0	Y	I		14.0		KITCHEN (ADL)
G44	13.0	Y	C	13.0			OCCUPATIONAL THERAPY ROOM
G45	9.0	Y	N			9.0	PHYSIO STORE
G46	20.0	Y	C	20.0			PHYSIOTHERAPY ROOM
G47	59.0	Y	C	59.0			DAY / DINING AREA
G48	11.0	Y	C	11.0			SERVERY
G49	13.0	Y	I		13.0		PANTRY (ADL)
G50	13.0	Y	C	13.0			SINGLE ROOM WITH DAY SPACE
G51	5.0	Y	C	5.0			WC AND SHOWER
G52	5.0	Y	C	5.0			WC AND SHOWER
G53	13.0	Y	C	13.0			SINGLE ROOM WITH DAY SPACE
G54-56	8.0	Y	C	8.0			WC AND SHOWER
G57	19.5	Y	C	19.5			DOUBLE ROOM WITH DAY SPACE
G58	19.5	Y	C	19.5			DOUBLE ROOM WITH DAY SPACE
G59-61	8.0	Y	C	8.0			WC AND SHOWER
G62	13.0	Y	C	13.0			SINGLE ROOM WITH DAY SPACE
G63	5.0	Y	C	5.0			WC AND SHOWER
G64	5.0	Y	C	5.0			WC AND SHOWER
G65	13.0	Y	C	13.0			SINGLE ROOM WITH DAY SPACE
G66	14.0	Y	C	14.0			ASSISTED BATHROOM & WC
G67	6.0	Y	C	6.0			ASSISTED SHOWER & WC
G68	5.5	Y	I		5.5		VISITORS WASH AREA
G69	2.0	Y	I		2.0		VISITORS WC
G70	2.0	Y	I		2.0		VISITORS WC
G71	8.0	Y	I		8.0		WARD OFFICE / RECEPTION
G72	15.0	Y	I		15.0		SLUICE, DISPOSAL, CW AND TEST ROOM
G73	9.0	Y	I		9.0		PREPARATION ROOM
G74	4.0	Y	N			4.0	DOMESTIC SERVICE ROOM
G75	13.0	Y	C	13.0			NURSES STATION
G76	8.0	Y	I		8.0		UTILITY ROOM
G7	5.0	Y	N			5.0	LINEN ROOM
G78	17.0	Y	C	17.0			TREATMENT ROOM
G79	13.0	Y	I		13.0		CONSULTANT'S OFFICE
G81	10.0	Y	I		10.0		CLINICAL NURSE MANAGER

	Area (T)	Rooms	Critical	Intermediate	Non-critical
Totals	617.5	39	443.0	134.5	40.0

ADMIN. and MISCELLANEOUS

SPACE				Criticality Areas M^2			
Room No	Area (T)	Rooms	Rating	Critical	Intermediate	Non-critical	Description
F4	1.5	Y	N			1.5	FEMALE STAFF CHANGING (ANNEX)
F9	1.5	Y	N			1.5	MALE STAFF CHANGING (ANNEX)
F10	7.0	Y	N			7.0	MALE STAFF CHANGING
F11	2.0	Y	N			2.0	STAFF SHOWER (MALE)
F12	1.5	Y	N			1.5	STAFF WC (MALE)
F13	1.5	Y	N			1.5	STAFF WC (MALE)
F15	17.0	Y	I		17.0		INTERVIEW & OVERNIGHT ROOM (RELATIVES)
F16	5.0	Y	I		5.0		INTERVIEW OVERNIGHT WC
F17	22.0	Y	N			22.0	NURSING STAFF LOUNGE
F18	10.0		C	10.0			LIFT LOBBY WEST 1st FLOOR
F1	53.0		C	53.0			CORRIDOR
F20	20.0		C	20.0			STAIR 3 FIRST FLOOR
F22	34.0		C	34.0			CORRIDOR
F23	41	Y	N			41.0	FEMALE STAFF CHANGING
F24	1.5	Y	N			1.5	STAFF WC (FEMALE)
F25	1.5	Y	N			1.5	STAFF WC (FEMALE)
F26	2.0	Y	N			2.0	STAFF SHOWER (FEMALE)
F27	2.0	Y	N			2.0	STAFF SHOWER (FEMALE)
F28	15.0	Y	N			15.0	OVERNIGHT ROOM (MEDICAL)
F29	4.0	Y	N			4.0	OVERNIGHT WC
F3	15.0	Y	N			15.0	OVERNIGHT ROOM (MEDICAL)
F31	4.0	Y	N			4.0	OVERNIGHT WC
F32	14.0	Y	N			14.0	STAFF ROOM
F33	13.0	Y	I		13.0		PDN OFFICE
F34	20.5	Y	N			20.5	MALE STAFF CHANGING
F3	1.5	Y	N			1.5	STAFF WC (MALE)
F36	2.0	Y	N			2.0	STAFF SHOWER (MALE)
F37	36.0		C	36.0			CORRIDOR
F38	16.0	Y	C	16.0			KITCHEN (ADL)

F39	15.0	Y	I		15.0		STORE (SPECIAL BEDS)
F40	10.0	Y	I		10.0		MEDICAL STAFF (5 STAFF)
F42	10.0		C	10.0			LIFT LOBBY EAST 1st FLOOR
F41	18.0	Y	N			18.0	MEETING / SEMINAR ROOM
F44	20.0		C	20.0			STAIR 5 FIRST FLOOR
F	13.0	Y	N			13.0	FEMALE STAFF CHANGING
F6	2.0	Y	N			2.0	STAFF WC (FEMALE)
F7	2.0	Y	N			2.0	STAFF WC (FEMALE)
F8	2.0	Y	N			2.0	STAFF SHOWER (FEMALE)
G10	10.0		C	10.0			LIFT LOBBY (WEST) GR. FLOOR
G11	20.0		C	20.0			LIFT (WEST)
G12	20.0		C	20.0			STAIR 3 GROUND FLOOR
G13	50.0		C	50.0			CORRIDOR
G14	44.0	Y	I		44.0		KITCHEN
G17	6.0	Y	I		6.0		DIETICIAN FOOD STORE
G18	20.0		C	20.0			STAIR 1 GROUND FLOOR
G19/20	4.0	Y	N			4.0	KITCHEN WC
G1W	14.0		C	14.0			ENTRANCE WAITING AREA
G1a	51.0		C	51.0			VISITORS' STREET
G1b	79.0		C	79.0			VISITORS' STREET
G1c	55.0		C	55.0			VISITORS' STREET
G20	8.0	Y	N			8.0	KITCHEN OFFICE
G21	11.0		C	11.0			CORRIDOR
G22	17.0	Y	I		17.0		SEWING ROOM
G23	4.5	Y	I		4.5		VEGETABLE STORE
G24	5.5	Y	N			5.5	GOODS STORE
G25	3.0	Y	I		3.0		STAFF WC MALE
G26	3.0	Y	I		3.0		STAFF WC FEMALE
G27	3.5	Y	I		3.5		VISITORS' WC DISABLED
G28	2.5	Y	I		2.5		VISITORS' WC
G29	2.5	Y	I		2.5		VISITORS' WC
G30	30.0	Y	C	30.0			LAUNDRY
G31	16.0	Y	I		16.0		CLINICAL WASTE (MAIN)
G32	10.0		C	10.0			LIFT LOBBY (EAST) GR. FLOOR

G33	20.0		C	20.0		LIFT (EAST)
G34	20.0		C	20.0		STAIR 5 GROUND FLOOR
G35	8.0	Y	I		8.0	MAIN DOMESTIC SERVICE ROOM (2)
G9	10.0	Y	I		10.0	MAIN DOMESTIC SERVICE ROOM (1)

	Area (T)	Rooms	Critical	Intermediate	Non-critical
Totals	1004.5	45	609.0	180.0	215.6

SPV Spaces

SPACE			Criticality Areas M^2			
Room No	Area (T)	Rating	Critical	Intermediate	Non-critical	Description
G192	142.0	C	142.0			PLANT ROOM
G15	13.0	C	13.0			ELECTRICAL DISTRIBUTION
G16	12.0	I		12.0		WORKSHOP

	Area (T)	Rooms	Critical	Intermediate	Non-critical
Totals	167.0	3	155.0	12.0	0.0

Appendix B - Activity Schedule

Hospital Area	Estimated Activity
Geriatric Assessment	90 Beds
Geriatric Day Hospital	30 Places
Young Physically Disabled	8 Beds 4 Day Places
Geriatric Psychiatry Assessment	20 Beds
Geriatric Psychiatry Day Hospital	24 Places

Appendix C - Functional Relationships

1 Five separate zones, namely Geriatric Assessment, Geriatric Day Hospital, Psychiatric Assessment, Psychiatric Day Hospital and Young Physically Disabled.

2 Separate entrances to the three specialties, namely Geriatric Medicine, Psychogeriatric Medicine and Young Physically Disabled.

3 The three clinical specialties linked with a visitors' "street" on the ground floor and staff corridor on the first floor.

4 Link corridor, ground floor level between visitors' "street" and Inverclyde Royal Hospital.

5 Access to courtyard and landscape areas for the Geriatric and Psychogeriatric functions at ground floor level.

6 Support facilities including kitchen, laundry and sewing room etc. to be situated parallel to the visitors' "street" linking the three principal clinical functions and having entrances separate from the main clinical function entrances.

The Schedule - Part F

Commissioning Check List

No.	DETAIL
1)	Local Authority approvals in place (in so far as the SPV has responsibility)
2)	Fire Extinguishers fitted and charged by SPV.
3)	All keys are sorted, tagged, and checked off with the Trust. Quantities confirmed and agreed, itemised schedule provided by SPV to the Trust.
4)	Electricity, gas and water meter readings taken by SPV and agreed with the Trust and passed on to relevant authorities and/or suppliers
5)	Draft Operating manuals and commissioning/test results are available by SPV to the Trust.
6)	All necessary external ducting, chambers, power supply and internal containment for telephone services are provided by SPV.
7)	One draft set of "as fitted" drawings are provided by SPV to the Trust together with one copy on disc.
8)	All necessary documentation relating to compliance with all statutory requirements is made available by SPV to the Trust including the draft Health & Safety file.
9)	All Equipment is fixed by the SPV in the correct locations and is in working order.
10)	Ensure all service connections are available and commissioned for equipment to be installed and commissioned by other parties.

11) SPV to ensure that all fire and security detection systems installed, tested, commissioned and in correct location.

12) SPV to ensure that all materials have been conditioned to the normal working temperature of the building.

13) SPV to ensure that all installations for the supply of piped medical gases and vacuum installations are operational in accordance with Applicable Standards.

14) SPV to ensure that all temporary markings, coverings and protective wrappings are removed unless otherwise instructed.

15) SPV to ensure that the works are cleaned thoroughly inside and out and all splashes, deposits, efflorescence, rubbish and surplus materials consequent upon the execution of the work are removed.

- Cleaning materials and methods as recommended by manufacturer or in product information.

16) SPV to ensure moving parts of new work are adjusted as necessary to ensure easy and efficient operation, including doors, windows, drawers, ironmongery, appliances and controls.

17) SPV to ensure that the Hospital is secure, and all accesses are locked/lockable and that arrangements for 24 hour security cover are in place from Completion to the Services Commencement Date.

18) SPV to ensure that agreed Signage is provided and installed in the agreed location.

The Schedule - Part G

Not Used

The Schedule - Part H

Payment Mechanism

1 Calculation of Payments

1.1 Definitions

In this Part H of the Schedule, unless the context otherwise requires:-

Accrued Surplus Land Consideration means an amount equal to £2,000 per Contract Month (or relevant proportion thereof in respect of periods of less than a complete Contract Month) in respect of the period of delay in completion of the purchase of the Surplus Land by Melville Dundas Limited ("SL Completion") pursuant to the Tripartite Agreement (such period commencing on the Services Commencement Date and ending on the date of SL Completion) where (i) such delay is solely attributable to breach by Melville Dundas Limited of its obligations under the Tripartite Agreement and (ii) SL Completion has occurred; such Accrued Surplus Land Consideration to be applied as a deduction in the Calculation Schedule relative to Calculation of the Net Monthly Payment in respect of the Contract Month in which SL completion occurs;

Availability Deduction or **AD** means the deduction (if any) from the Basic Monthly Sum as a result of a Zone being Unavailable or Unavailable but Used, calculated in accordance with paragraph 2.2 below;

Availability Failure means a failure, in respect of any Zone, to provide those Services identified in Column 6 of the table incorporated in Section B Part I of the Schedule by the letter "A", in accordance with the Output Specification, other than to the extent that any such failure is a direct result of:-

a) a Trust Event of Default; or
b) a Trust Change; or
c) an Event of Force Majeure; or
d) a Utility Failure; or
e) Patient and Visitor Risk; or
f) Planned Maintenance; or
g) a Qualifying Legislative Change; or
h) a Qualifying Service Interruption Event; or
i) any act or omission of the Trust or Trust Staff;

Basic Annual Sum means, subject to any Change, the Indexed Amount under deduction where the purchase of the Surplus Land by Melville Dundas Limited has been completed in accordance with the Tripartite Agreement of the Surplus Land Consideration;

Basic Monthly Sum or **BMS** means in respect of any Contract Month, one twelfth of the Basic Annual Sum for the Contract Year in which the Contract Month falls save for (i) the first Contract Month where it shall be the Basic Annual Sum multiplied by n/365 where n is the number of days between the Services Commencement Date and the end of the first Contract Month, both dates inclusive and (ii) for the last Contract Month where it shall be the Basic Annual Sum multiplied by n/365 where n is the number of days between the first day of the last Contract Month and the last day of the Term or if earlier the Termination Date

Calculation Schedule means a schedule prepared by SPV as evidence of its calculation of each Net Monthly Payment in such form as shall be agreed with the Trust from time to time;

Deductions or **D** means the payment deductions in respect of a month or other period, calculated in accordance with paragraph 2.1.2 below and, if appropriate, including the Accrued Surplus Land Consideration;

Failure means an Availability Failure or a Service Failure;

Incentive Factor or INF means a factor as calculated pursuant to paragraph 2.4 below;

Index means RPI

Indexed Amount means, subject to any Change:-

(a) in respect of the Contract Year ending on 31 March first following the Services Commencement Date, the sum set out in Table 1 to this Part H multiplied by

$$1 + \left[\frac{\{RPI\ (\text{the Month for which the Index has been most recently published prior to the Services Commencement Date}) - RPI\ (\text{January } 1998)\} \times 0.25}{RPI\ (\text{January } 1998)} \right]$$

or

(b) in respect of any subsequent Contract Year ending on 31 March in year n, the sum for that Contract Year as set out in Table 1 to this Part H multiplied by

$$1 + \left[\frac{\{RPI\ (\text{February } n-1) - RPI\ (\text{January } 1998)\} \times 0.25}{RPI\ (\text{January } 1998)} \right]$$

where RPI (January 1998) is the Index in respect of January 1998, being 157.7, RPI (the Month for which the Index has been most recently published prior to the Services Commencement Date) is the Index in respect of the Month for which the Index has been most recently published prior to the Services Commencement Date and RPI (February n - 1) is the Index in respect of February of year n - 1.

Intervention Costs or **IC** means 110% of the expenses incurred by the Trust in remedying a breach or non-performance by SPV in accordance with Clause 43.2.2 of this Agreement.

Metre Rate or **MR** means the Basic Annual Sum divided by the total Weighted Area of the Hospital, as set out in this Part H (as such may be amended from time to time as a result of a Change) and divided by 365;

Net Monthly Payment means the amount calculated in respect of any Contract Month in accordance with paragraph 2.1.1 below.

Period for Remedy means the period for remedy set out in Column 5 of the table forming Annexure 1 to Part I of the Schedule the Output Specification in respect of each of the Services, which will commence in any case upon the later of:-

(a) the time that the call intimating a Failure is logged in terms of the Monitoring System referred to in Clause 41.3 of this Agreement or, if earlier, the time at which the Failure is otherwise notified by the Trust and acknowledged by an agent of the SPV; and

(b) access to remedy the Failure being granted by the Trust and notified to an agent of the SPV;

provided that the Period for Remedy shall be extended by any period during which the SPV would be in breach of Applicable Laws if it took steps to remedy the Failure.

Reporting Failure means a failure by the SPV to make a deduction in a Calculation Schedule in respect of an event which ought to give rise to a deduction from a Basic Monthly Sum in accordance with this Part H of the Schedule;

Repetition Deduction or RD means the deduction from the Basic Monthly Sums for a Service Failure Repetition in accordance with paragraph 2.5 below.

Reporting Failure Deduction or **RFD** means a deduction (if any) from the Basic Monthly Sum for a Reporting Failure calculated in accordance with paragraph 2.7 below;

Service Failure means a failure to provide those Services identified in Column 6 of the table incorporated in Section B of Part I of the Schedule by the letter "S" in accordance with Section B3 of the Output Specification, other than to the extent that any such failure is a direct result of:-

a) a Trust Default; or
b) a Trust Change; or
c) an Event of Force Majeure; or
d) a Utility Failure; or
e) Patient and Visitor Risk; or

f) Planned Maintenance; or
g) a Qualifying Legislative Change; or
h) any act or omission of the Trust or Trust Staff; or
i) a Qualifying Service Interruption Event;

Service Failure Repetition means the occurrence of 3 Service Failures at the Hospital in any 3 consecutive months relating to the same failure affecting the same Zone provided that no Service Failure which arises or continues in a Zone which is not in use at any time on the day in question after the failure arises shall be taken into account when establishing whether a Service Failure Repetition has occurred;

Service Shortfall means, in relation to any Zone, the continuation after the expiry of the relevant Period for Remedy of a Service Failure in respect of that Zone, provided that in calculating the relevant Period for Remedy, there shall be excluded:-

(a) in the case of a Zone within hospital areas or areas ancillary thereto any period of time falling outwith Hospital Hours or during which, the Zone would not normally be used by the Trust

(b) in the case of a Zone within day case areas, or administration areas or areas ancillary thereto any period of time falling outwith Office Hours

(c) any day where the Trust has decided to close the Hospital for the relevant day other than as a direct result of an Availability Failure or a Service Failure

provided that a Zone, having been affected by a Service Shortfall, will not cease to be so affected until the SPV's failure to provide the relevant Service in accordance with the Output Specification has been remedied.

Service Shortfall Deduction or SSD means the deduction (if any) from the Basic Monthly Sum as a result of a Zone being affected by a Service Shortfall calculated in accordance with paragraph 2.3 below;

Surplus Land Consideration means the sum of Twenty Four Thousand Pounds (£24,000) Sterling;

Unavailable but Used means, in relation to any Zone, that the relevant Zone is Unavailable but is used by the Trust for any period during which it would otherwise be Unavailable;

Unavailable and **Unavailability** means, in relation to any Zone, the continuation after the expiry of the relevant Period for Remedy of an Availability Failure in respect of that Zone provided that a Zone will not become Unavailable if it is Unavailable but Used provided that in calculating the relevant Period for Remedy, there shall be excluded:-

(a) in the case of a Zone within hospital areas or areas ancillary thereto any period of time falling outwith Hospital Hours or during which, the Zone would not normally be used by the Trust

(b) in the case of a Zone within day case areas, or administration areas or areas ancillary thereto any period of time falling outwith Office Hours

(c) any day where the Trust has decided to close the Hospital for the relevant day other than as a direct result of an Availability Failure or a Service Failure;

provided that a Zone, having become Unavailable, will not cease to be Unavailable until the SPV's failure to provide the relevant Service in accordance with the Output Specification has been remedied.

Weighted Area means, in respect of a Zone, the area of that Zone multiplied by the Absolute Weighting Factor for the relevant Zone Type as identified in Table 2 annexed to this Part of the Schedule

Zone means an area of the Hospital identified on the Accommodation Schedule by reference to a room number and being shown on the Drawing forming Annexure II to this Part of the Schedule

Zone Type means, as the case may be, Critical, Intermediate or Non-Critical as each Zone is identified as such in the Accommoation Schedule.

1.2.1 If a Zone shall be Unavailable then, the following provisions shall apply:-

1.2.1.1 the Trust Contract Officer shall forthwith complete Section 1 of the Notice of Unavailability in the form set out in Annexure I to this Part of the Schedule and shall forthwith issue such notice to the SPV Contract Officer.

1.2.1.2 If such circumstances (or any of them) shall remain unremedied for the appropriate Period for Remedy commencing at the time when Section 1 of the Notice of Unavailability was issued to the SPV Contract Officer in accordance with paragraph 1.2.1 then the Trust Contract Officer having taken the Zone out of use shall complete Section 2 of the Notice of Unavailability in the form set out in Annexure I to this Part of the Schedule and shall re-issue such notice to the SPV Contract Officer.

1.2.1.3 If the Notice of Unavailability with Section 2 completed is re-issued then the relevant Zone thereupon shall be deemed Unavailable for Trust use from the time at which it was or were taken out of use in accordance with paragraph 1.2.2

1.2.2 Following the service of a Notice of Unavailability on the SPV Contract Officer pursuant to paragraph 1.2.1.1 then SPV shall have an obligation to remedy the circumstances causing the Unavailability as soon as reasonably possible. The provisions of this paragraph 1.2.2 shall not prejudice or relieve any of SPV's other obligations under the Project Documents.

2. **Calculations**

2.1.1 (i) The Net Monthly Payment for the first Contract Month shall be the Basic Monthly Sum.

(ii) The Net Monthly Payment for the each subsequent Contract Month other than the last Contract Month of the Term shall be

the Basic Monthly Sum

minus

the Reporting Failure Deduction in respect of the previous Contract Month

minus

the Deductions in respect of the previous Contract Month

(iii) The Net Monthly Payment for the last Contract Month of the Term shall be the Basic Monthly Sum

minus

the Reporting Failure Deduction in respect of the previous Contract Month and the last Contract Month of the Term

minus

the Deductions in respect of the previous Contract Month and the last Contract Month of the Term

and shall be payable on the last day of the Month which is two months following the month during which the Term expires

2.1.2 The Deductions in respect of each Contract Month shall be calculated as the sum of

(a) the Availability Deductions
(b) the Service Shortfall Deductions
(c) the Repetition Deductions

(d) the Intervention Costs
(e) the Indemnity Amount ("IA")

that is to say,

D = AD + SSD + RD + IC + IA

2.2 The Availability Deduction shall be calculated for each day during which a Zone was Unavailable or Unavailable but Used, by applying the following formulae in respect of each Zone which was Unavailable or Unavailable but Used during that day and then taking the sum of the products of such calculations, that is to say:-

(a) for each Zone which was Unavailable - **WA x MR x INF**

(b) for each Zone which was Unavailable but Used - **WA2 x MR x 0.50 x INF**

where:

"WA" is the Weighted Area for each Zone which was Unavailable and not Unavailable but Used on the relevant day;

"WA2" is the Weighted Area for each Zone which was Unavailable but Used on the relevant day;

2.3.1 The Service Shortfall Deduction shall be calculated for each day during which a Zone was affected by a Service Shortfall by applying the following formula in respect of each Zone which was affected by a Service Shortfall during that day and then taking the sum of the products of such calculations, that is to say:-

WA3 x MR x 0.25 x INF

where:-

"WA3" is the Weighted Area for each Zone in the Hospital which was affected by the Service Shortfall on the relevant day;

2.3.2 No deduction will be made in respect of a Zone affected by a Service Shortfall (i) for any day in respect of which that same Zone is Unavailable, or Unavailable but Used or (ii) where the Trust recovers Intervention Costs in respect of remedying the Failure which was the cause of such Service Shortfall.

2.3.3 No deduction will be made in respect of a Zone affected by Unavailability or a Zone Unavailable but Used where the Trust recovers

Intervention Costs in respect of remedying the Failure which was the cause of the Unavailability.

2.4 The Incentive Factor shall be calculated as follows:-

The Incentive Factor in respect of a particular Zone is determined on each day ("the day in question") when there is a Service Shortfall or an Availability Failure according to the number of days (including the day in question) for which that Zone has been affected continuously by Service Shortfall or an Availability Failure, as follows-

Number of days during which Zone is affected	**Incentive Factor applying to the day in question**
1-7	100%
8-30	120%
31-90	130%
91 or over	140%

2.5 The Repetition Deduction shall be a deduction in respect of the third of a series of Service Failures that contribute to a Service Failure Repetition (irrespective of whether or not it gave rise to a Service Shortfall) which will be calculated as follows:-

(i) if the Service Failure did give rise to a Service Shortfall, it will be an additional 50% of the Service Shortfall Deduction that applied as calculated in 2.3 above.

(ii) if the Service Failure did not give rise to a Service Shortfall it will be 100% of the Service Shortfall Deduction that would otherwise have applied

The Repetition Deduction shall be made in addition to any deduction due in respect of any of the three Service Failures that contributed to the Service Failure Repetition and which gave rise to a Service Shortfall, which will be calculated in accordance with the provision dealing with the relevant Service Shortfall in paragraph 2.3 above.

2.6 Notwithstanding the provisions of this Part H of the Schedule no Availability Deductions or Service Shortfall Deductions shall apply in respect of the period of 3 months following the Services Commencement Date.

2.7 If it is agreed or determined that there has been a Reporting Failure in respect of any of the three preceding Contract Months but not otherwise in calculating the Deductions in respect of any period, the SPV will make the Deductions from the relevant Basic Monthly Sum which it is agreed or determined ought to have been made but for the Reporting Failure and, in addition, the SPV shall apply the Reporting Failure Deduction, being a deduction of a sum equal to 15% of any part of the Deductions (or 30% of the part of the Deductions where it is agreed or determined that the Reporting Failure has been due to fraud or

wilful default of any party other than the Trust) which ought to have been made but for the Reporting Failure.

2.8.1 In the event that a Zone is Unavailable and SPV can provide satisfactory temporary alternative accommodation either by using another part of the Hospital which is not required for use by the Trust or otherwise the SPV shall give notice to the Trust to that effect.

2.8.2 On receipt of such notice the Trust, acting reasonably, shall determine whether such temporary alternative accommodation is acceptable or unacceptable and shall advise SPV accordingly.

2.8.3 If SPV considers that the Trust has unreasonably rejected the proposed temporary alternative accommodation then it may refer the matter to the Dispute Resolution Procedure.

2.8.4 The provision of temporary alternative accommodation shall be the responsibility of the SPV and the SPV shall meet (i) all costs incurred in relation to the provision of such temporary alternative accommodation situated outwith the Hospital and (ii) where the temporary alternative accommodation includes the use of another part of the Hospital any reasonable additional costs incurred by the Trust as a consequence of the implementation of temporary alternative accommodation which it would not have incurred had the Zone the subject of the alternative accommodation been Available.

2.8.5 If the temporary alternative accommodation requires the use of another Zone within the Hospital then, for the purpose of calculating the Availability Deduction, that other Zone and the Zone it is replacing via the temporary alternative accommodation shall be deemed Available for the time during which the alternative accommodation is in use as such and is not required at any other time by the Trust for another use.

2.8.6 Where any Zone is Unavailable as a result of any SPV Infection Risk, SPV shall be *prima facie* responsible for such outbreak of infection and such relevant Zone shall be deemed to be Unavailable and as such Availability Deductions shall be made.

2.8.7 Where any Zone is Unavailable as a result of any infection which is not an SPV Infection Risk, the Trust shall be *prima facie* responsible and in such circumstances the relevant Zone shall be deemed to be available.

2.9 The total deductions in respect of any month, being

AD + SSD + RD + RFD + IC + IA

shall excluding Indemnity Amounts and Intervention Costs not exceed one twelfth of the Basic Annual Sum and any deduction in excess of this amount shall be disregarded in calculating the Net Monthly Payment.

2.10 Not Used.

2.11 The SPV will calculate the Indexed Amount at the commencement of each Contract Year after the first Contract Year as soon as practicable after the Index for the month of February of the preceding Contract Year is published or otherwise determined and will notify the same to the Trust. If the Trust disputes the calculation, and the parties cannot agree such calculation, then the calculation shall be referred to the Expert under the Dispute Resolution Procedure. Increases in the Basic Annual Sum which fall to be made as a result of such calculation will not be made until the calculation of the Indexed Amount is agreed or determined, provided that any such increase will take effect from the commencement of the Contract Year. Any increase attributable to the period before such calculation was agreed or determined - as reduced by any deduction which would fall to be made in accordance with the provisions of this Part of the Schedule - will be paid in one lump sum by the Trust to the SPV at the end of the Month in which such calculation is agreed or determined together with interest at 3% below the Interest Rate.

2.12 For the purposes of calculating Availability Deductions and Service Deductions in respect of Failures not affecting the interior of the Hospital the deemed Weighted Area (WA, WA2 or WA3 as the case may be) for the purposes of Clauses 2.2 and 2.3.1 shall be 100 sq. m.

3. Contract Payments and Invoices

3.1 The Trust, in respect of each Contract Month, shall pay to the SPV by electronic transfer of funds to an account nominated by the SPV within 5 Business Days of the latest to occur of:-

(i) the last day of the relevant Contract Month;

(ii) the delivery of a valid VAT invoice by the SPV addressed to the Trust in the Agreed Form and accompanied by a Calculation Schedule;

the Net Monthly Payment for the relevant Contract Month subject to the provisions of paragraphs 3.4 to 3.7 inclusive.

3.2 The SPV will submit a draft Calculation Schedule to the Trust not later than 2 weeks before the end of the Contract Month in relation to which the invoice requires to be submitted pursuant to paragraph 3.1 above and in the 2 weeks following submission the Trust and the SPV will, acting in good faith, liaise as often is required so as to ensure that, so far as possible, the invoice, when submitted, is in agreed terms.

3.3 Notwithstanding paragraph 3.1 above, the payment in respect of the last Contract Month of the Term shall not be made until a completed Calculation Schedule has been agreed between the Trust and the SPV in respect of the last two Contract Months.

3.4 The Trust shall inform the SPV if in its reasonable opinion the Trust disputes any amount ("the Disputed Amount") specified in the relevant invoice or Calculation Schedule submitted in accordance with paragraph 3.1 above within 5 Business Days receipt of the relevant invoice providing all relevant details of the Disputed Amount including the grounds of the dispute.

3.5 Subject to the provisions of paragraph 3.4 above, the Trust shall pay the undisputed part of the invoice the subject of a Disputed Amount in accordance with paragraph 3.1 above and shall be entitled to withhold the Disputed Amount pending resolution of the Dispute provided always that the Trust shall not be entitled to withhold payment of any amount which has not been notified to the SPV in accordance with paragraph 3.4 above.

3.6 The parties shall negotiate in good faith in an attempt to resolve such dispute. If the Trust and the SPV are unable to resolve the dispute within 14 days of the date of the relevant invoice either party may refer the dispute for resolution under the Dispute Resolution Procedure.

3.7 Following resolution of any dispute under this paragraph 3, any amount agreed or determined to be due shall be paid within 5 days of the date of agreement or determination together with interest at the rate which the SPV is being charged under the Finance Facilities Agreement at the time of such payment.

3.8 Except in the case of manifest error, neither SPV, nor the Trust shall be entitled to question any invoice or Calculation Schedule after a period of three months following its date of issue.

The Schedule - Part H

Annexure I
Notice of Unavailability

To: .....

From: .....
Trust Contract Officer

Section 1 - Notice under paragraph 1.2.1.1 of Part H of the Schedule

For the purposes of paragraph 1.2.1.1 of Part H of the Schedule to the Project Agreement dated [ ] 1999 between the Trust and LH Project Limited and as notified to you by me at the date(s) and time(s) indicated being the date(s) and time(s) shown on the reverse of this notice, circumstance(s) as set out on the reverse of this notice have arisen in the specified areas of the Hospital.

Take notice that in accordance with paragraph 1.2.1.1 the relevant area of the Hospital is unavailable.

Signed: .....
as Trust Contract Officer

Date: .....

Time: .....

Section 2 - Notice under paragraph 1.2.1.2 of Part H of the Schedule

Take notice that further to the above Section 1 Notice, the circumstances reported therein have now been remedied and the area has been put back into use.

Signed: .....
as Trust Contract Officer

Date: .....

Time: .....

Help Desk Log No.	Area Description	Zone reference Room Number per Accommodation Schedule	Area Affected (Sq. m.)	Nature of Fault	Date and time of the notice dd/mm/yy

Annexure II
Drawing

(attached)

Part H

Table 1

Payments by the Trust (in real terms, annualised)

£'000

Year	Anticipated Contract Year ending 31 March	
1	2001	1,471
2	2002	1,411
3	2003	1,425
4	2004	1,421
5	2005	1,403
6	2006	1,397
7	2007	1,384
8	2008	1,512
9	2009	1,537
10	2010	1,529
11	2011	1,516
12	2012	1,521
13	2013	1,510
14	2014	1,513
15	2015	1,526
16	2016	1,528
17	2017	1,509
18	2018	1,498
19	2019	1,490
20	2020	1,490
21	2021	1,485
22	2022	1,483
23	2023	1,441
24	2024	1,441
25	2025	1,439
26	2026	1,486

TABLE 1

Payments by the Trust (in real terms, annualised)

(attached)

TABLE 2

Aggregate Weighted Areas of Zones by Type

Zone Type		Actual area of zones	Relative Weighting Factor	Absolute Weighting Factor	Weighted Area (WA)
Critical	1	4,754	9.0	1.28	6,072
Intermediate	2	1,525	3.0	0.43	649
Non-critical	3	515	1.0	0.14	73
TOTALS		6,794		14%	6,794

The Schedule - Part I

Output Specification

Section A General Description of Services Required

A1.1 Introduction

SPV shall meet and satisfy all of the Core Service Requirements as detailed in Section B of this Part of the Schedule and shall comply with the Output Standards in Section C of this Part of the Schedule.

A1.2 Philosophy of Core Service Requirements

The objective of the Core Service Requirements is to provide a safe and comfortable environment suitable for the delivery of health care.

A1.3 Operation

The Trust undertakes to maintain the cleanliness of the hospital building in accordance with Applicable Laws and Applicable Standards. Breach of this obligation will entitle the SPV to require that the Trust put the building into such a state of cleanliness .

A1.4 Accommodation

The maintenance technician will be located within the support accommodation area of the hospital.

A1.5 Hours of Operation

The Services will be available for Emergency Maintenance 24 hours each day throughout the Term.

The site will be manned during Normal Working Hours which are 0800 hours to 1700 hours Monday to Friday all year, excluding public holidays. Suitable holiday/sickness cover will be provided by the Service Provider.

A1.6 Compliance & Transfer of Risk

SPV will comply fully with the requirements of this Part of the Schedule and all current legislation from time to time. The standard required by the Trust will be met by SPV adhering to the requirements in Sections B and C of this Part of the Schedule. The "Service Requirement" means the relevant requirement to be met in relation to the provision of each part of the Services as set down in Column 3 of the Tables set out in Section B of this Part of the Schedule.

A.2 ACTS, REGULATIONS, CODES OF PRACTICE, etc

A2.1 The Services will ensure the provision of a high quality hospital environment which is safe, efficient and of acceptable appearance to the Trust.

A2.2 The standards maintained will meet or exceed requirements set out in the NHS Building Notes, Health Technical Memoranda and Approved Codes of Practice as detailed in Section D of this Part of the Schedule.

A2.3 The Services will be organised and co-ordinated to ensure optimum productivity with minimal disruption of Trust business and activities.

A2.4 All relevant guidelines, regulations and EC Directives will be complied with in undertaking the Services.

A2.5 SPV shall not, and shall use all proper endeavours to procure that no SPV Staff shall, knowingly do or omit to do anything in relation to this Agreement or otherwise which is calculated to or will demonstrably bring the standing or reputation of the Trust or the Hospital into disrepute or attract adverse publicity to the Trust or the Hospital.

A2.5.1 SPV shall at all times provide the Services with due regard for the requirement that public services need to be carried out with the highest standards of efficiency, economy, courtesy, consideration and hygiene and in accordance with Good Industry Practice.

A3 SERVICE SPECIFICATION DEFINITIONS

A3.1-A3.4Not Used

A3.5 **Plant History Manual**
SPV will supply the Trust with a Schedule of Planned Maintenance for individual plant and equipment. It will include all repairs and renewals including manufacturers call outs and work schedules. The plant and equipment items will be identified and agreed with the Trust prior to the Services Commencement Date and all documentation will be submitted for Trust approval.

A3.6 **Work Content Manual**
This will be as specified in the detailed descriptions of each activity of Planned Maintenance reflecting the manufacturers recommendations, plant history, published technical information, health and safety or other legislative or mandatory requirement or Scottish Home and Health Department's requirement or guidance.

A3.7 **Permit to Work System**
SPV will be responsible for implementing a proper operational policy for a permit to work system as required by Health Technical Memoranda. All staff whose duties include those covered by a permit to work system will be trained to the level of a "Competent Person". This training will be undertaken at an accredited/acknowledged training centre and will be given to operatives based on site as necessary. The role of "Authorised Person" will be fulfilled by external qualified personnel, approved by the Trust, who will be party to a service level

agreement with SPV. It will be the intention of SPV to procure Trust personnel, to undertake the duties of Authorised Persons where possible.

A3.8 **Hazard Notices**

SPV will adopt and meet the Trust policy for HAZARD/SAN (Safety Action Notices) notices, which notices are issued by the Scottish Healthcare Supplies and relate to warnings of potential dangers in supplies or equipment. It will be the Trust's responsibility to provide all such notices to SPV.

A3.9 **Planned Maintenance**

A building and plant replacement programme is required throughout the Term ensuring that the building and plant continue to meet their original design specification. A rolling programme will be agreed and will be incorporated within Planned Maintenance Statements in Agreed Form, with the Trust being given between 12/24 months notice of internal works. In the case of the external works where the routine activities in a Zone may be interrupted, 12/24 months notice shall likewise be required.

This service will be provided by a site based maintenance technician supported by the Service Provider and competent sub-contractors approved by the Trust.

A3.9A **Mechanical Services**

1 **Boiler**

Routine boiler cleaning and servicing of burner equipment on yearly basis.

Periodic major overhaul and replacing of necessary burner equipment.

2 **Pumps**

Routine checking and lubrication of pumps and motors on yearly basis or as per manufacturers recommendations.

Replacement of mechanical seals, glands, etc as necessary.

3 **Calorifiers**

Routine cleaning of calorifiers and meet all requirements in relation to the control of Legionellosis and opening up for insurance assessors inspection.

Replacement of gaskets on cleanouts etc.

4 **Radiators/Pipework**

Checking system for leaks, packing valves, releasing air from system, etc.

Cleaning heater batteries.

5 **Controls**

Checking controls and calibrating sensors, etc. Replacement of system towards the end of the 25 year period.

6 **Water Tanks**

Cleaning and chlorinating to meet requirements of Health Technical Memoranda relating to control of Legionellosis.

7 **Water Filters**

Cleaning and servicing of filters including chemicals for cleaning.

Replacement of membranes periodically.

8 **Air Handling Plant**

Checking of belt drives, lubrication, replacing filter media, etc, on yearly basis or as for manufacturers recommendations.

Replacing units and fans at end of life.

9 **Medical Gases**

Routine servicing yearly and replacement of vacuum filters every second year as for manufacturers recommendations.

10 **Plumbing**

Routine checking of valve gland packing, pump seals and glands, lubrication of motors, etc, and the calibration and servicing of thermostatic mixing valves.

A3.9B Electrical Services

1 **Standby Generator**

Routine maintenance of generator including checking battery and regular load testing.

Major servicing/replacement towards the end of the 25 year period.

2 **Lamp Replacement**

Replacement of lamps following failure or replacement on a planned replacement basis.

3 **Emergency Lighting**

Routine maintenance and testing of emergency lighting. Replacing faulty components.

Replacing/major upgrading of fittings periodically.

4 **Fire Alarm Systems**

Routine maintenance and testing of fire alarm system. Replacing faulty components.

Phased replacement/upgrading of system towards the end of the 25 year period.

5 **Intruder Alarm System**

Routine maintenance and testing of security system. Replacing faulty components.

Phased replacement/Upgrading of system towards the end of the 25 year period.

6 **Nurse Call System**

Routine maintenance and testing of nurse call system. Replacing faulty components.

Phased replacement/upgrading of system towards the end of the 25 year period.

7 **General Electrical Installation**

Routine maintenance of general electrical installation including listing and testing of those portable appliances supplied or owned by SPV. Replacing faulty components.

Phased upgrading/replacement of system towards the end of the 25 year period.

8 **Patient Tracking**

Routine maintenance and testing of patient tracking system. Upgrading of system towards the end of the 25 year period.

9 **Switchgear**

Routine maintenance and testing of switchgear.

Periodic replacement of circuit breakers on an as required basis.

10 **Lifts**

Routine maintenance and testing of the lift installation replacing any faulty components.

Periodic replacement of lift ropes.

11 **Laundry Equipment**

Routine maintenance and testing of the laundry equipment including replacement of any faulty components. Replacement within the 25 year period.

12 **Group 1 Equipment**

Routine maintenance and testing of Group 1 equipment.

Replacement within the 25 year period.

A3.9C Building Fabric

1 **Redecoration**

A proportion of re-active redecoration annually with more extensive redecoration periodically with the exact scope and timing of the work being agreed with the Trust in advance.

2 **Floor Coverings**

Re-active repairs and replacement with major life replacement being allowed for on a periodic basis.

3 Ironmongery/Glazing

Re-active maintenance work as required although window seals and mechanisms will form part of the regular inspection procedures.

4 **Window Cleaning**

Internal and external clean by specialist window cleaning contractors every 2 months.

5 **General Building Maintenance**

Regular inspection programme and any maintenance resulting from these inspections.

In addition to the following inspections the building will be thoroughly inspected internally and externally at six monthly intervals in the presence of a representative of the Trust. These inspections will be fully documented and recorded.

(a) **External Drainage**
All manholes opened once a month, inspected, and flushed or repaired as necessary.

(b) **Roof and Gutters**
Inspected twice a year using appropriate access equipment with gutters cleaned, loose tiles refixed and other maintenance as necessary.

(c) **External Brickwork and Rendering**
Inspected twice a year and pointed, repaired as necessary

(d) **Windows**
Seals and Operations (hinges, handles, locks etc) inspected annually.

(e) **External Doors**
Locking mechanisms and integrity inspected monthly.

(f) **Wall Decoration & Coverings**
Inspected annually.

(g) **Floor Coverings**
Inspected annually

(h) **Ceiling Tiles**
Inspected annually but individual damaged tiles replaced on a response basis.

(i) **Internal Doors**
Inspected annually

(j) **Sanitaryware**
Checked for proper operation on a monthly basis.

(k) **Signage**
Safety Signage inspected monthly.

(l) **Boundary Fencing**
Inspected monthly

The inspections are all in addition to any Unplanned Maintenance or Emergency Maintenance which is required from time to time and are intended to reduce the requirement for re-active maintenance.

Section B Core Service Requirements

B1 Performance Standard

SPV will carry out the Services in accordance with all Applicable Laws and Applicable Standards subject to the terms of this Agreement.

SPV shall provide the Related Materials all of which shall conform to the requirements of this Agreement.

B2 Explanatory Notes

B2.1 General

The first four columns of the tables contained in this section ("the Tables") detail the Services and performance requirements. The Periods for Remedy are shown in the fifth column of the Tables. In the sixth column, items marked "A" relate to Availability Shortfall, items marked "S" relate to Service Shortfall.

When measuring room temperatures in Zones where a heating system or cooling system is installed, all windows and doors must be closed and temperature readings taken with properly calibrated equipment according to recognised practice. For the avoidance of doubt, temperature measurement should be carried out using a properly calibrated approved digital thermometer at shoulder height.

B2.2 Resolution

Resolution shall be considered to have been achieved when the Service Requirement has been met. The Parties agree that the Periods for Remedy apply during Relevant Hours. In circumstances where a Period for Remedy commences but does not expire before the end of a Relevant Day, that Period for Remedy shall end immediately prior to the beginning of the next Relevant Day. In the case of any failure reported outwith Relevant Hours either at the time or immediately prior to the time the call intimating the failure is logged, the Period for Remedy shall commence at the beginning of the next Relevant Day.

B2.3 Deviation

Deviation is the level of performance of a Service at which remedial action is required.

B3 Service Requirements

The Tables set out the Services and the Service Requirements in detail. The SPV shall ensure compliance with each of the Service Requirements.

			Performance		
SERVICE /SYSTEM (Column 1)	**(Column 2)**	**SERVICE REQUIREMENT (Column 3)**	**Deviation (Column 4)**	**Period for Remedy (Column 5)**	**(Column 6)**
Life	Fire detection, fire fighting equipment and emergency lighting	Provision to allow occupation of the Zone in accordance with Applicable Law and Applicable Standards.	Any	30 Minutes during Normal Working Hours, 60 Minutes at all other times	A
Security	Hospital building and periphery	Maintenance to ensure that equipment used functions properly in accordance with the Specification and Manufacturer's Recommendations	Any	4 hours during Normal Working Hours, 8 hours at all other times	S
Public Health Systems		Maintenance of all water, drainage, heating and drinking water systems to allow occupation of Zone in terms of Applicable Laws and Applicable Standards	Any	30 Minutes during Normal Working Hours, 60 Minutes at all other times	A
Utilities		Sufficient supply in terms of the Electricity Supply Regulations shall be available at all times during Hospital Hours Supplies available to allow occupation of the Zone in accordance with Applicable Laws and Applicable Standards	Any Any	30 Minutes during Normal Working Hours, 60 Minutes at all other times 1 Hour	S A

			Performance		
SERVICE /SYSTEM (Column 1)	**(Column 2)**	**SERVICE REQUIREMENT (Column 3)**	**Deviation (Column 4)**	**Period for Remedy (Column 5)**	**(Column 6)**
Building Fabric	Wind and Watertight	Wind and watertight at all times	Any	I Hour	S
		To allow occupation of the Zone in accordance with Applicable Laws and Applicable Standards	Any	2 Hours	A
Building Fabric	Acoustic Standards	Maintenance of standards specified in the Specification and as built drawings (Ref HTM 2045)	Any	1 Week	S
		Where areas are particularly noise sensitive (e.g. Patient areas next to plant rooms; and speech therapy areas)	Any (during normal working hours)	2 Hours	A
			Any (at all other times)	4 Hours	A
Building Fabric	Lighting Levels (external)	Maintenance of standards specified in the Specification and as built drawings	Failure to achieve specified level	8 Hours	S
Building Fabric	Telecommunications cabling	To meet the Specification.	Any	4 Hours	S
Building Fabric		Means of communication with Emergency Services	Any	30 Minutes	A

			Performance		
SERVICE /SYSTEM (Column 1)	**(Column 2)**	**SERVICE REQUIREMENT (Column 3)**	**Deviation (Column 4)**	**Period for Remedy (Column 5)**	**(Column 6)**
Building Interior	Floor Finishes/Carpets	Maintain even surface without excessive wear and tear and not present a hazard (walking aids)	Any	1 Month	S
		To allow occupation of Zone in accordance with Applicable Laws and Applicable Standards and not present a hazard to Patients, Trust staff or Visitors	Any	I Hour	A
Building Interior	Wall Finishes/Decoration	Maintain unbroken surface (without graffiti)	Any	1 Week	S
		To allow occupation of Zone in accordance with Applicable Laws and Applicable Standards	Any	I Hour	A

			Performance		
SERVICE /SYSTEM (Column 1)	**(Column 2)**	**SERVICE REQUIREMENT (Column 3)**	**Deviation (Column 4)**	**Period for Remedy (Column 5)**	**(Column 6)**
Drainage	Drainage (other than critical services)	Maintenance to ensure compliance with Construction Specification and as built drawings			
		Underground drainage	Not functioning	4 Hours	S
		Drainage above ground within the Facility and all connected sanitary ware including sinks, wash hand basins, macerators, dishwashers and washing machines.	Not functioning	1 Hour	S
		Drainage in Ward or Day Unit	Complete failure	1 Hour	A
Water Supply	Domestic hot & cold water supply other than covered by critical services	Provision of constant and safe water supply at the appropriate temperature and sanitation to allow occupation of the Zone in accordance with Applicable Laws and Applicable Standards	Any	1 Hour	A
		Maintenance to ensure compliance with the Specification and as built drawings	Any	1 Hour	S

			Performance		
SERVICE /SYSTEM (Column 1)	**(Column 2)**	**SERVICE REQUIREMENT (Column 3)**	**Deviation (Column 4)**	**Period for Remedy (Column 5)**	**(Column 6)**
Heating	Heating System (comprising heat source, ancillary equipment, distribution pipework, heating terminals, BMS and environmental Controls)	Available to allow occupation of the Zone in accordance with Applicable Laws and Applicable Standards Maintenance of system to ensure compliance with the Specification and as built drawings	Any More than 2o C below specified limits when the external temperature is not lower than -4oC Service Fault	1 Hour 1Hour 1 Hour	A S S
Lifts	Lifts (NB Lift cars must contain emergency contact facility sufficient to ensure rescue within 30 minutes)	100% functioning in terms of the Specification during Hospital Hours save that not more than one lift may be not so functioning if due to planned preventative or reactive maintenance	System Failure No lifts functioning	4 Hours 1 Hour	S A

			Performance		
SERVICE /SYSTEM (Column 1)	**(Column 2)**	**SERVICE REQUIREMENT (Column 3)**	**Deviation (Column 4)**	**Period for Remedy (Column 5)**	**(Column 6)**
Lighting (Levels within room)		Available to allow occupation of Zone in accordance with Applicable Laws and Applicable Standards Lighting to be a mixture of daylight (where applicable) and artificial light that in combination or by artificial light alone achieves such lighting levels	Failure to achieve minimum regulatory lux level for the relevant Zone	I Hour	A
Lighting	Maintenance	Maintenance of lighting level (Lux) as defined in the Specification available during Hospital Hours and Office Hours	Failure to achieve specified Lux levels (within 5% band) measured on the working plane	4 Hours	S
Lighting	Maintenance	Maintenance of lighting installation as required by the Specification	Any other failure	2 Days	S
Internal Aesthetic	Maintenance	Maintenance to ensure compliance with the Specification	Any	2 Days	S
Equipment provided pursuant to the Specification	Maintenance	Maintenance to ensure compliance with the Specification	Any	4 Hours	S

			Performance		
SERVICE /SYSTEM (Column 1)	**(Column 2)**	**SERVICE REQUIREMENT (Column 3)**	**Deviation (Column 4)**	**Period for Remedy (Column 5)**	**(Column 6)**
Internal Functional		To allow occupation of Zone in accordance with Applicable Laws Maintenance to ensure compliance with the Specification and as built drawings	Any Any	4 Hours 1 Week	A S
External Aesthetic		No visible disfigurement of building appearance	Any	1 Week	S
External Access		Vehicular and pedestrian access to Facility in compliance with Applicable Law	Any	1 Week	A
Internal Access		Access to all internal Zones as defined in the Specification	Any	1 Hour	A
Medical Gases	Pipework, Plant, including equipment and all valves, terminals and outlets	Function in accordance with the Specification and as built drawings	Leaks Other Faults	1 Hour 1 Hour	A S

Section C Output Standards

1	Management and Administration
2	Staffing
3	Health and Safety
4	Estate Buildings
5	NOT USED
6	NOT USED
7	Electrical
8	Energy Efficiency/Consumption
9	Piped Medical Gas Supply
10	Fire Prevention and Training
11	Ground Maintenance
12	Garden Maintenance

MONITORING FREQUENCY

The following alphabetical coding is used to indicate minimum frequency for monitoring each output standard.

KEY TO MINIMUM MONITORING FREQUENCY

D	DAILY	28 occasions (on separate days) within month
T	TWICE WEEKLY	8 occasions (on 2 separate days weekly) within month
W	WEEKLY	4 occasions (in separate weeks) within month
M	MONTHLY	1 occasion within month
Q	QUARTERLY	4 occasions (at 3 monthly intervals) within 12 months
B	BI-ANNUALLY	2 occasions (at 6 monthly intervals) within 12 months
A	ANNUALLY	1 occasion within 12 months
C	CONTINUOUS	Automatic processes, e.g Temperature Control and Recording
DD	DETERMINED BY DEFAULT	Standards in this category will be considered as a routine pass unless a specific occasion demonstrates failure, e.g Compliance with Trust policies, Patients confidentiality

1	Management and Administration	Minimum Monitoring Frequency
1.1	SPV Contract Officers are appropriately qualified and experienced in the requirement of hospital services.	B
1.2	Day to Day management of the service is ensured and supported by 24-hour management cover/contact with full back-up arrangements through a single point of contact.	Q
1.3	All Estates' data requirements are recorded and maintained on a continuous basis. (Period to be held agreed with the Trust)	Q
1.4	All information is precise, defined and free from error.	Q
1.5	Detailed information is maintained and available for audit within 3 days of request.	Q
1.6	Planned Maintenance Statements and routines are applied with comprehensive monitoring systems to ensure compliance with the output specification requirements.	Q
1.7	As appropriate to the work in hand, maintenance and repairs are carried out by suitably qualified, competent persons under the direct control of an Authorised Person/SPV Contract Officer.	Q
1.8	Permit to work systems are complied with as appropriate.	Q
1.9	An appropriate and effective procedure is in place for hospital staff notification and/or request for maintenance or repairs and conforming to performance factors to be agreed with the Trust.	B
1.10	SPV Contract Officers and Staff know the defined obligations they are required to undertake under the Trust's major incident procedure.	B
1.11	Quality assurance monitoring is applied in accordance with the contracted service monitoring procedure.	Q
1.12	SPV Contract Officers and staff know the procedures contained in the Estates Emergency Manual and its relationship to the Trust's Major Incident Procedure.	Q

2	**Staffing**	
2.1	All staff are medically screened before employment in this service.	B
2.2	Staff are appropriately trained, qualified and competent to undertake specific designated duties.	B
2.3	Staff are friendly, identifiable, courteous and respectful of their customers.	B
2.4	Not Used	
2.5	Adequate manpower resources are provided to ensure estates maintenance to the specified standards.	Q
2.6	Adequate manpower resources are provided to ensure that 24-hour full back up arrangements are provided.	Q
2.7	Staff comply with all policies and procedures of the Trust.	Q
3	**Health and Safety**	
3.1	All regulations encompassed by the Health and Safety at Work Act 1974 and Management of Health and Safety at Work Regulations 1992 are fully complied with.	Q
3.2	A comprehensive Health and Safety Manual is available and used by all staff.	Q
3.3	A training programme is in place to ensure Health and Safety awareness, as appropriate to duties of individual staff.	Q
3.4	Staff demonstrates an awareness of health and safety issues.	Q
3.5	All equipment is maintained, by suitably qualified service personnel to a safe standard that minimises risk.	Q
3.6	All equipment, materials and supplies are stored in safe conditions appropriate to risk.	Q

3.7	Suitable warning notices are displayed in working areas.	Q
3.8	Staff are provided with, and given instructions in use of, suitable personal protective equipment (PPE) and appropriate records maintained.	Q
3.9	All chemical solutions and powders are stored in protected ventilated conditions.	Q
3.10	All chemical solutions and powders are labelled with relevant safety precautions and COSHH information.	Q
3.11	COSHH manuals are available and up to date.	Q
3.12	Suitable first aid facilities are trained first aiders are readily available at all times, when staff are on duty.	Q
3.13	Accident and untoward occurrences reporting procedures are available, known, understood and implemented by staff.	Q
3.14	Regular workplace inspections are undertaken to identify hazards and minimise risk by Senior Management.	M
3.15	Full integration with the Trust's Health and Safety culture shall be ensured.	Q
3.16	All risk assessments pertinent to the whole maintenance activity have been undertaken and documented.	Q
4	**Estate Buildings**	
External		
4.1	All elements of the external building works and main structure are functional, regularly maintained and of good appearance.	B
4.1a	The Estate Buildings are safe	Q
Internal		
4.2	All internal elements are functional, regularly maintained and of good appearance.	B

	These standards will be achieved by the implementation of Planned Maintenance Statements, programme of service contracts and Emergency Maintenance.	
4.3	Redecorations will be carried out as required throughout the duration of the contract to maintain the building to Estate Code B Standards i.e the building is sound, operationally safe and exhibits only minor deterioration.	A
5	NOT USED	
6	NOT USED	
7	**Electrical**	
Electrical Distribution		
7.1	All electrical distribution systems are functional to the required design capacity and their integrity maintained at all times.	DD
7.2	All internal and external lighting is maintained at required levels to ensure safety and security.	M
7.3	Test certificates and appropriate documentation is accurate and readily available.	A
Communication Systems		
7.4	All communication systems, including Building Management Systems and nurse call systems, are functional to the required design capacity and their integrity maintained at all times.	DD
Electrical Plant/Equipment		
7.5	All electrical plant/equipment is available for use and maintained in line with relevant guidance, good practice and legislation.	A
	The operation of all plant and equipment is maintained to ensure availability at all times.	DD

Emergencies		
7.6	Response to emergency breakdowns of each of the above is immediate (i.e within 20 minutes during normal working hours or as an emergency call out) and appropriate action will be taken.	DD
Energy Efficiency/ Consumption		
8	**Energy Management**	
8.1	Energy is available, maintained and monitored to meet the needs of the Trust at all times.	DD
8.2	Energy management is assessed to ensure customer satisfaction.	M
8.3	Up to date technology is utilised to ensure optimum energy efficiency and economy.	A
8.4	Metering and monitoring systems are employed to determine and control areas of high energy consumption. (The sub-metering all main wards and departments to be agreed) (including laundry)	M
8.5	Detailed records of energy usage and associated charges are maintained and available for Trust audit as required including data from the Building and Engineering Management System.	W
9	**Piped Medical Gas ("PMG") Supply**	
9.1	The pipework plant, equipment and manifolds for medical gases is maintained in accordance with relevant health guidelines, good practice and legislation.	B
9.2	Documentation is accurate and up to date and readily available within 3 days of request.	Q
9.3	As appropriate to the work in hand, maintenance and repairs are carried out by suitably qualified, competent persons under the direct control of an Authorised Person. Any work on PMG systems require Permit to Work approvals.	Q
9.4	Medical vacuum maintained to ensure availability at all times to the relevant standards by qualified personnel.	Q

9.5	The response to emergency breakdown is immediate and appropriate action is taken. "Immediate" has the same definition as in 7.6 of Section D of this Part of the Schedule.	DD
9.6	Medical gas systems including alarms and back-up systems are maintained to ensure availability at all times.	Q
10	**Fire Prevention and Training**	
10.1	Compliance with Firecode in Scotland - Policy and Principles, Statutory Requirements, Firecode HTM 83 and any other relevant guidance and directives is ensured throughout the premises. (Refer to references)	A
10.2	An agreed hospital Fire Policy and Procedure (refer to references) is implemented and made known through training of all core and non-core staff and relevant contractor's staff.	A
10.3	Mandatory checks on all fire equipment, escape routes and fire exits are routinely undertaken and recorded.	M
10.4	Fire alarm systems comply with current legislation and guidance and are directly linked to the Hospital switchboard.	W
11	**Grounds**	
11.1	In the event or likelihood of freezing conditions or settling snow, all fire escapes, means of access, roads, paths and paved areas are cleared/salted/gritted to maintain a safe condition for use. (Winter)	D
11.2	Records of clearing/salting/gritting are maintained and available for reference. (Winter)	D
11.3	Car parks, roads and pathways are kept free of litter and debris.	W
11.4	All external furniture, within the scope of the contract is functional and well maintained.	M
11.5	All roads, paths and car parks are kept safe for use at all times.	DD

11.6	Surfaces are monitored for faults that are reported for general maintenance as required.	M
11.7	All appropriate documentation including records of inspections is accurate and up-to-date and available for audit within 3 days of request.	Q
Signs		
11.8	All signs are kept free of any obstruction so as to be legible at all times.	Q
11.9	A review of all signs takes place for updating/accuracy.	Q
12	**Gardens**	
12.1	Cultivated areas are free from weeds, litter and debris.	M
12.2	Lawned areas are regularly cut, edged and free from grass cuttings and debris to ensure an attractive appearance.	M
12.3	Specified lawned areas are scarified annually.	A
12.4	Non-cultivated areas are regularly inspected and treated as required for disease, damage and maintain condition of the green belt, or otherwise actioned to correct.	M
12.5	Seasonal regeneration schedules are carried out in accordance with annual programmes to be determined.	M
12.6	Flower beds and shrubberies are kept weed and litter free and pruned to suit species.	M
12.7	Tree maintenance is ensured with appropriate pruning or cutting as necessary.	Q
12.8	Paths and drainage channels/gulleys are maintained clear of fallen leaves. (Winter)	W

12.9	Regular inspection of trees is carried out with appropriate records maintained.	Q

Section D Reference Information

D.1 Acts and Regulations (Statutory Instruments)

The Electricity Act (1989)
The Electricity Supply Regulations (1988)
The Electricity at Work Regulations (1989)
The Low Voltage Electrical Equipment Regulations (1989)
The High Voltage Electrical Equipment Regulations
The Electromagnetic Compatibility Regulations (1992)
Lifting Plant & Equipment (Record of Test & Examinations, etc) Regulations
Pressure Systems & Transportable Gas Containers Regulations (1989)
The Supply of Machinery (Safety) Regulations 1992
The Gas Safety (Installation & Use) Regulations 1984
Gas Appliances (Safety) Regulations
Highly Flammable Liquids & Liquefied Petroleum Gases Regulations (1992)
Petroleum (Consolidation) Act 1928
Model Water Byelaws (1986)
Water Resources Act (1991)
Water Industry Act (1991)
Water Supply (Water Quality) Regulations (1989)
Trade Effluent Regulations (1989)
The Building Act (1984)
The Building Regulations (1991)
The Building (Disabled People) Regulations (1987)
The Building Standards Regulations (1992)
The Construction (Design & Management) Regulations (1994)
Fire Safety & Safety of Places of Sport Act (1987)
(Proposed) Fire Precautions (Places of Work) Regulations (1994)
The Housing Act 1985 (as amended by the Local Government & Housing Act 1989)
The Registered Homes Act (1984)
Environmental Protection Act (1990)
Control of Pollution Act (1974)
Clean Air Act (1968)
Food Safety Act (1990)
Occupiers's Liability Act
The Safety Signs Regulations (1980)
Radiological Protection Act
Environmental Protection (Duty of Care) Regulations (1991)
The Active Implantable Medical Services Regulations (1992)
The Medical Devices Regulations
Disability Discrimination Act

All acts regulations to be the current version or Scottish versions where applicable at the time of contract signing.

D2 Health Technical Memoranda (All published and current)

HTM 1 Anti-static Precautions - rubber, plastics and fabrics
HTM 2 Anti-static Precautions - flooring, anaesthetising areas
HTM 17 Health Building Engineering Installations

Building Component Series

HTM 54.1User Manual Update
HTM 55 Windows
HTM 56 Partitions
HTM 57 Internal Glazing
HTM 58 Internal Door-Sets
HTM 59 Ironmongery
HTM 60 Ceilings
(Note: Some partitions may not be taken to structural soffit without prejudice to the obligation on SPV to comply with Firecode)
HTM 61 Flooring
(Note: carpeting in office areas may not be impervious)
HTM 62 Demountable Storage Systems
HTM 63 Fitted Storage Systems
HTM 64 Sanitary Assemblies
HTM 65 Health Signs
HTM 66 Cubicle Curtain Track
HTM 67 Laboratory Fitting Out
HTM 68 Duct & Panel Assemblies
(Note: proprietary panel systems may not be provided)
HTM 69 Protection
HTM 70 Fixings

HTM 2007 Electrical Services Supply & Distribution
HTM 2009 Pneumatic Air Tube Transport Systems
HTM 2010 Sterilisation
HTM 2011 Emergency Electrical Services (Generating Plant)
HTM 2014 Abatement of Electrical Interference
HTM 2015 Bedhead Services
HTM 2020 Electrical Safety Code for LV (Escode LV)
HTM 2021 Electrical Safety Code for HV (Escode HV)
HTM 2022 Medical Gas Pipeline Systems
HTM 2023 Access & Accommodation for Engineering Services
HTM 2024 Lifts
HTM 2025 Ventilation in Healthcare Premises
HTM 2027 Hot & Cold Water Supply, Storage & Mains Services
HTM 2030 Washer Disinfectors

HTM 2040 Control of Legionellae in Healthcare Premises - Codes of Practice
HTM 2045 Acoustics
(Note: Upper floor construction is normally in-situ concrete Holorib floor of 70-130mm tolerance with suspended ceiling below with associated acoustic performance but without prejudice to the obligation of SPV to comply with CIBSE Guidelines and Recommendations as aftermentioned
HTM 2050 Risk Management in NHS Estate
HTM 2055 Telecom (Telephone Exchanges)
HTM 2060 Supply and Treatment of Water
HTM 2065 Waste Guidance
SHTN2 DWS and materials

Firecode

HTM 81 Fire Precaution in New Hospitals
HTM 81 Fire Precaution in New Hospitals (suppl.)
HTM 82 Firecode - Alarm & Detection Systems
HTM 83 Fire Safety in Healthcare Premises - General Fire Precautions
HTM 85 Fire Precautions in Existing Hospitals
HTM 86 Fire Risk Assessment in Existing Hospitals
HTM 87 Firecode - Textiles & Furniture
HTM 88 Fire Safety in Healthcare Premises

Department of Health

Safety Action Bulletins}
Safety Information Bulletins} Formerly WKO letters
Hazard Notices}

Safecode: Statutory Compliance Audit
Incident Recording & Information System
Safety Prioritisation - Priority for Investment in Improving Health & Safety

Plant Maintenance: Code of Practice (all)
Department of Health: Codes of Practice
Ministry of Health: Codes of Practice
DHSS: Codes of Practice

Permit to Work Schemes
Fully Trained Authorised & Competent Persons

Encode 1}
Encode 2} Energy Efficiency in Healthcare Premises

Estate Code

This list shall be deemed to include the equivalent Scottish Health Technical Notes and Memoranda. It shall also include any upgrade or amendment to the list published at the time of completion of contract signature.

D3 Professional Institutions/bodies

Institution of Electrical Engineers - Guidelines, Recommendations & Procedures

Institution of Mechanical Engineers - Guidelines, Recommendations & Procedures

CIBSE - Guidelines & Recommendations, Design & Commissioning, Codes of Practice

Institution of Plant Engineers

Institution of Hospital Engineering, Guidelines, Recommendations & Procedures

CORGI Requirements

NICEIC Requirements

Electricity Association (EA) - Standards & Engineering Recommendations

CENELEC - Standards & Engineering Recommendations

Any requirements, guidelines, etc not stated are included in the latest editions of both the Works Guidance Index and the Barber Index.

The Schedule - Part J

Monitoring Reports

1 ESTATES MAINTENANCE

1.1 Details of self monitoring of the Output Specifications along with the actions to be taken.

1.2 Details of self monitoring of the Output Specifications where penalties have been applied.

1.3 Results of management quality control inspections.

1.4 Summary of all breakdown incidents.

1.5 Summary of all call-outs.

1.6 Summary of all reports on plant performance.

1.7 Progress reports on the Planned Maintenance Programme.

1.8 Details of monthly energy performance for space heating, domestic hot water and electrical consumption, including notification of all sub-metering records. Energy performance recording to include the facility for ad-hoc remote interrogation by the Trust of the BMS system.

1.9 Detailed reports on all statutory and Health Technical Memoranda maintenance requirements, i.e. emergency generators, emergency lighting tests etc.

1.10 Details of water consumption and effluent discharge.

1.11 Result of customer satisfaction survey.

1.12 Summary of formal complaints raised via the Trust and remedial action taken.

1.13 Summary of grounds inspections detailing defects in streetlighting, roads and pathways, damaged shrubs etc and remedial action taken.

1.14 Details of winter maintenance programme, including call-out details.

1.15 Contingency Planning: Summary results of all contingency planning tests.

1.16 Application of herbicides and pesticides register.

1.17 Reports as necessary relating to hazard notices and safety action notices.

2 Not Used

3 GENERAL

3.1 **Complaints Summary:** A summary of complaints made across all Services.

3.2 **Incident Reporting:** Details of all incidents relating to the building grounds members of the public, patients, Trust staff and Service Provider's employees and sub-contractors (certain incidents will be required to be reported to the Trust at the time of the incident utilising the Trust's Incident Recording and Information System, IRIS). Reports to be provided on a six monthly basis or to a mutually agreed frequency.

3.3 **Health & Safety:** Details of staff training across all relevant areas, including fire safety, etc. Summary report of amendments/revisions to all risk assessments. Details of all inspections, planned and unplanned, from statutory bodies. Reports to be provided on a six monthly basis or to a mutually agreed frequency. In addition should there be any changes to the Service Provider's work methods exceptional reports must be provided as soon as possible to determine whether there is any detrimental operational implications for Health and Safety.

3.4 **Environment:** Summary report on environmental management performance (this would be based upon agreed policy and set targets).

3.5 **Contingency Planning:** Summary results of all contingency planning tests.

3.6 **Report Presentation**: All information should be reported on a month to month basis or as specifically detailed elsewhere or as mutually agreed with the Trust and displayed graphically where possible to assist in the identification of trends. Monthly reports to be provided in electronic format.

3.7 Details of Staff Training Records across all services.

3.8 Summary reports on Occupational health screening.

3.9 Details of compliance with Argyll and Clyde Health Board and Trust's Control of Infection manuals and documentation.

3.10 Reports originating from the requirements of all legislation and reference material highlighted in the Output Specification.

3.11 Ad hoc requests relating to all Services.

3.12 Copies of purchase orders/receipts for all Services.

3.13 Approved list of suppliers for all Services.

N.B. All Monitoring Reports may only be amended within 3 months and cannot be reopened thereafter.

The Schedule - Part K

Section 1
Trust Changes

1 **Right to Require Changes**

The Trust shall be entitled to require the implementation of a Change in accordance with the provisions of this Section provided that:

1.1 until such time as a Change is made in accordance with the Change Control Procedure, SPV shall, unless otherwise agreed in writing between the parties, continue to operate in accordance with this Agreement as if the request or recommendation had not been made

1.2 any discussions which may take place between the Trust and SPV in connection with a request or recommendation for change before the authorisation of a resultant Change shall be without prejudice to the rights of either party

1.3 when a proposed Change affects both Services and the Hospital the procedure for both a Works Change and a Services Change shall be followed

1.4 the Trust shall not be entitled to require a Works Change during the period of 3 months prior to the anticipated Services Commencement Date.

2 **Works Change**

Subject to the provisions of Section 4 (Limitations on Change) of this Part of the Schedule the Trust may require a Works Change (i) at any time during the carrying out of the Works under the Building Contract but subject to paragraph 1.4 of this Section of this Part of the Schedule or (ii) at any time thereafter during the Term in each case by sending a Change Notice to SPV setting out the details of the Works Change

2.2 SPV shall submit a CCN regarding the Works Change in accordance with the Change Control Procedure within 28 days of the date of the Change Notice or such later date as may be reasonable as stipulated by the Trust in the Change Notice

2.3 The Change Control Procedure shall establish, *inter alia*

2.3.1 the Change Capital Cost or Change Capital Savings associated with implementing a Works Change

2.3.2 if applicable, the Change Financing Cost associated with implementing the Works Change

2.3.3 if applicable, any Change Operational Costs or Change Operational Savings associated with implementing the Works Change

3 Service Changes

3.1 Subject to the provisions of Section 4 (Limitations on Change) of this Part of the Schedule the Trust may require a Service Change at any time during the Term by sending a Change Notice to SPV setting out details of the Service Change required

3.2 SPV shall submit a CCN regarding the Service Change in accordance with the Change Control Procedure within 28 days of the date of the Change Notice or such later date as may be reasonable as stipulated by the Trust in the Change Notice

3.3 The Change Control Procedure shall establish, *inter alia*

3.3.1 the Change Capital Cost or Change Capital Savings associated with implementing the Service Change

3.3.2 if applicable, the Change Financing Cost associated with implementing the Service Change

3.3.3 if applicable, any Change Operational Costs or Change Operational Savings associated with implementing the Service Change

4 Trust Procedure Changes

4.1 Subject to the provisions of Section 4 (Limitations on Change) of this Part of the Schedule and Clause 12.1.2 of this Agreement the Trust may require a Trust Procedures Change at any time during the Term by sending a Change Notice to SPV setting out details of the Trust Procedures Change

4.2 SPV shall submit a CCN regarding the Trust Procedure Change in accordance with the Change Control Procedure within 28 days of the date of the Change Notice or such later date as may be reasonable as stipulated by the Trust in the Change Notice

4.3 The Change Control Procedure shall establish, *inter alia*

4.3.1 the Change Capital Cost or Change Capital Savings associated with implementing the Trust Procedure Change

4.3.2 if applicable, the Change Financing Cost associated with implementing the Trust Procedure Change

4.3.3 if applicable, any Change Operational Costs or Change Operational Savings associated with implementing the Trust Procedure Change

The Schedule - Part K

Section 2
SPV Recommendations

SPV may recommend (but may not require other than pursuant to the provisions of Section 3 (Necessary Change) of this Part of the Schedule) a Change in accordance with the Change Control Procedure and the Trust shall give reasonable consideration to such recommendations.

The Schedule - Part K

Section 3
Necessary Change

1 Where there is a Necessary Change then either the Trust or SPV shall give notice to the other of such Necessary Change and the effect it will have on the Works, the Hospital, Services or cost of provision thereof, and any such notice shall forthwith trigger a Change and the Change Control Procedure shall then apply (with the proviso that SPV may, subject to the Dispute Resolution Procedure, require, and not just recommend, that the Change be made in respect of the Necessary Change)

2 To the extent a Necessary Change arises as a result of a Qualifying Legislative Change, adjustments to the Unitary Payment shall be made in accordance with the provision of Section 5 (General Provisions) of this Part of the Schedule. If and to the extent a Necessary Change does not arise as a result of a Qualifying Legislative Change, there will be no adjustment to the Unitary Payment.

The Schedule - Part K

Section 4
Limitations on Change

SPV will not be obliged to implement a Change (excluding Necessary Changes) in any of the following circumstances, namely, where:

1. SPV using all reasonable endeavours is unable to secure debt finance in order to implement a Change unless upon receiving notice in writing by SPV of the circumstances arising under this paragraph 1, the Trust undertakes in writing to SPV pursuant to paragraph 2 of Section 5 of this Part of the Schedule that it shall make payment to SPV by a single capital sum; or

2. the estimated Change Capital Cost exceeds the Change Limit; or

3. the Hospital or the Works subject to the Change cannot be insured on commercial terms (unless the Trust, as between itself and SPV accepts responsibility as insurer for those risks which cannot be insured against); or

4. the Change is dependent on the issue of a new, or an amendment to an existing, Necessary Consent if, having used all reasonable endeavours, SPV is unable to obtain such Necessary Consent or amendment thereto; or

5. implementation of the Change will demonstrably diminish the value of the Hospital or be reasonably likely to reduce its marketability at the end of the Term; or

6. the Change is not technically feasible or is otherwise impracticable; or

7. implementation of the Change would be unsafe to any personnel or equipment or any other part of the Hospital; or

8. implementation of the Change would contravene any Statutory Requirement; or require a material departure from Good Industry Practice; or

9. the obligations which the SPV is required to perform under this Agreement, after taking in to account the effect of the Change can only be satisfied if an eventuality occurs which lies outwith the control of the SPV and such eventuality does not subsequently occur; or

10. in the period prior to full repayment of Financial Indebtedness under the Finance Facilities Agreements in the reasonable opinion of the Financier the implementation of such a change would be prejudicial to the Trust's ability to continue to meet its payment obligations pursuant to the Project Agreement.

The Schedule - Part K

Section 5
General Provisions

1 **Payment for Change**

1.1 Subject to the provisions of paragraph 2 of this Section and paragraph 2 of Section 3 (Necessary Changes) of this Part of the Schedule on the occurrence of a Change the Unitary Payment shall and Table 1 of Part H shall be adjusted

1.2 If the implementation of a Change requires an outlay of capital by SPV the Trust may elect at its absolute discretion to pay to SPV, as an alternative to adjusting the Unitary Payment, a sum equal to the Change Capital Cost and Change Financing Cost and any corresponding adjustment to the Unitary Payment by reason of the effect on the Services shall be calculated and made in accordance with Section 6 (Change Control Procedure) of this Part of the Schedule. For the avoidance of doubt, any such capital payment shall be unconditional (and shall not operate by way of loan).

2.1 In the event that the estimated Change Capital Cost required to implement any Change set out in the CCN is equal to or below the Change Limit, SPV shall use all reasonable endeavours to obtain funding for the Change. If it is unable to do so within 3 months of submitting the CCN then SPV shall give notice of that fact to the Trust, whereupon the Trust shall by notice in writing served on SPV within 1 month of the date on which SPV gives notice to the Trust that it is unable to fund the cost of such Change:

2.1.1 agree to meet the Change Cost; or

2.1.2 withdraw the Change Notice

2.2 If no such notice is served by the Trust upon SPV pursuant to paragraph 2.1 the Change Notice will be deemed to have been withdrawn.

3 **Date of Implementation of Change**

3.1 Subject always to the provisions of paragraph 5 of this Section SPV undertakes to procure the performance of the Service or Services affected by a Change in accordance with the Change as from the date set out in the approved CCN.

4 **Disputes**

4.1 If the Trust disputes the proposed revision to the Unitary Payment contained in the CCN then the Trust and SPV shall negotiate in good faith the extent of the revision to the Unitary Payment. If the Trust and SPV are unable to agree either may refer the dispute to the Dispute Resolution Procedure.

5 **Continuation of Service Provision**

5.1 In the event that revision of the Unitary Payment has not been agreed or determined within 30 days of a Change Notice (or such longer period as may be reasonable as stipulated by the Trust) SPV shall:

5.1.1 in the case of the Change to a Service, provide the Service in accordance with paragraph 3 with the Unitary Payment revised to such a level as is not in dispute

5.1.2 subject always to the provisions of Section 3 (Necessary Change) of this Part of the Schedule in the case of a Change to the Hospital, work shall only commence when terms of the Change have been agreed

When the revision to the Unitary Payment is subsequently agreed or determined, such revision shall be back dated to when the Change took effect and the Trust shall pay such accumulated arrears at the time of the next due date for payment for the Unitary Payment together with interest thereon at the Interest Rate.

6.1 Where SPV (i) having complied with its obligations under paragraph 1 of Section 4 of this Part of the Schedule is unable to obtain debt financing to fund a Qualifying Legislative Change or (ii) where paragraph 2 of Section 4 of this Part of the Schedule applies and the Necessary Change is a Qualifying Legislative Change the Trust will fund the Change Capital Cost by means of a lump sum payment to SPV and the Trust's failure to do so will constitute an event of Force Majeure and the terms of this Agreement relating to Force Majeure will apply *mutatis mutandis*.

The Schedule - Part K

Section 6
Change Control Procedure

1 If the Trust issues a Change Notice to SPV, SPV shall submit a CCN containing the details set out below to the Trust within 28 days (or such longer period as may be reasonable having regard to the information received from the Trust as stipulated by the Trust) of the date of the Change Notice.

2 A recommendation by SPV for a Change shall take the form of and shall be deemed to be a CCN dated as at the date of submission. Each CCN or recommendation pursuant to this paragraph relating to a Necessary Change shall comply with (i) the requirements of this Section as if it were a Works Change and/or Services Change, *mutatis mutandis* and (ii) the relevant instrument requiring the Necessary Change; in relation to the time when such Necessary Change shall be made it shall, in the case of conflict, be the time (if any) specified in such instrument.

3 Each CCN shall contain:

3.1 the title of the Change

3.2 the originator of the requirement or recommendation for the Change

3.3 the reason for the Change

3.4 full details of the Change

3.5 a timetable for implementing the Change

3.6 the date of expiry of the validity of the CCN which shall not in any event be less than six weeks following the date of the CCN

3.7 details of the likely impact of the Change on the provision of the Hospital and/or the Services including security arrangements, service standards, working arrangements, likely implementation period or other matters, identified by SPV to be of relevance

3.8 details of required amendments to the Financial Model (and on every occasion when any revision is made to the Financial Model pursuant to the Change Control Procedure, the Financial Model, as revised shall be the Financial Model for all purposes under the Agreement)

3.9 details of any grounds of objection specified in Section 4 of this Part K of the Schedule.

4 Each CCN relating to a Works Change shall also contain:

4.1 a basic design for the Works Change if any design work is involved

4.2 an elemental cost plan for implementing the Works Change constituting the Change Capital Cost

4.3 the Change Financing Cost and the Change Capital Cost

4.4 proposed adjustments to the Unitary Payment

4.5 the identity of the Contractor(s) carrying out works in connection with the Works Change or the project manager managing the works

4.6 security arrangements during the works

4.7 the effect on the provision of any Service arising as a consequence of the Works Change and any Service Changes required

4.8 the effect on Availability of the Hospital or the provisions of the Services during the execution of the works

4.9 proposals as to any other changes reasonably required to the DBFO Contracts

4.10 proposals for obtaining Necessary Consents

4.11 proposals as to the length of any extension of time required

4.12 if the CCN relates to a Works Change where a Change Notice has been issued by the Trust on or after the date of issue of the Certificate of Contractual Practical Completion,

4.12.1 evidence satisfactory to the Trust acting reasonably that SPV has undertaken an open market tender to cost the Change

4.12.2 evidence satisfactory to the Trust acting reasonably to demonstrate the work undertaken by SPV to ensure that it is procuring a cost effective Change for the Trust

4.12.3 any additional information reasonably requested by the Trust to satisfy itself that SPV has proposed a competitive cost effective Change

5 Each CCN relating to a Service Change shall also contain:

5.1 a detailed breakdown of any Change Capital Costs (if any), Change Capital Savings, Change Operational Costs or Change Operational Savings

5.2 proposed adjustments to the Unitary Payment

5.3 the effect on the duties of SPV Staff providing the Service affected

5.4 the effect on any other Service

5.5 the identity and numbers of SPV Staff to perform the additional or changed duties

5.6 any training required or other transitional arrangements necessary for implementing the Change

5.7 proposals as to any other changes required to the DBFO Contracts

5.8 the effect on the Hospital arising as a consequence of the Services Change and any necessary Works Change (if any)

5.9 evidence satisfactory to the Trust acting reasonably to demonstrate the work undertaken by SPV to ensure that it has procured a cost effective Service Change for the Trust.

6 Each CCN relating to a Necessary Change shall also contain:

6.1 full details of the Necessary Change including a statement as to the extent of which the Necessary Change arises from a Qualifying Legislative Change

7 On receipt of a CCN the Trust shall, within the period of the validity of the CCN:

7.1 allocate a sequential number to the CCN

7.2 evaluate the CCN and as appropriate:

7.2.1 request further information

7.2.2 approve the CCN

7.2.3 negotiate the proposals contained in the CCN or

7.2.4 notify SPV of the rejection of the CCN.

8 If the Trust fails to comply with its obligations under paragraph 7 the CCN shall be deemed to be withdrawn.

9 If the proposals contained in a CCN are negotiated or otherwise altered then SPV shall produce an amended copy of the CCN for signature.

10 If the Trust and SPV agree the terms of the CCN the Trust shall approve the CCN and each party shall sign and deliver to the other two copies of the CCN.

11 If the Trust and SPV are unable to agree any matter contained in a CCN within the period of the validity of the CCN either party shall be entitled to refer the matter for resolution under the Dispute Resolution Procedure.

12 If SPV's objection under Section 4 of this Part of the Schedule is upheld under the Dispute Resolution Procedure, then the CCN shall be deemed to be withdrawn.

13 The Trust may upon giving notice to SPV withdraw a Change Notice at any time prior to the date for implementation of the Change as specified in the CCN. In the case of a withdrawal or deemed withdrawal under paragraph 8 above, SPV shall, where applicable, be entitled to be paid (i) the reasonable costs and expenses incurred by it in any reference to the Dispute Resolution Procedure under paragraph 11 (ii) any costs reasonably incurred by SPV in the preparation and submission of a CCN and (iii) (where applicable) the reasonable costs incurred by SPV in respect of making and pursuing an application for planning permission or an amendment or variation to the Necessary Consents in respect of the Works Change.

14 If a Works Change requires a Service Change the Service Change shall be subject to a separate CCN.

15 Subject always to the provisions of paragraph 2 above a Change shall come into effect on (i) signature of the CCN by both parties or (ii) determination of all matters referred to the Dispute Resolution Procedure pursuant to paragraph 11 above and shall constitute an amendment to this Agreement and any other DBFO Contract as appropriate provided that in the event of any conflict between the terms of a CCN and the Clauses of this Agreement, the Clauses of this Agreement shall prevail.

16 All signed CCN's shall be recorded in a CCN file to be maintained by the Trust.

The Schedule - Part L

Not Used

The Schedule - Part M

Dispute Resolution

1.1 If a Dispute arises to which Clause 1.2 does not apply it shall be resolved in terms of the Dispute Resolution Procedure set out at Sections 1 and 2 below.

1.2 In the event of a Dispute arising under, out of or in connection with this Agreement or the other DBFO Contracts which in the opinion of SPV relates to a dispute or potential dispute ("**Related Dispute**") arising under, out of, or in connection with any other contract between SPV and a third party or between the Trust and a third party all such contracts being referred to as the ("**Related Contracts**") and where the Related Dispute has been referred to an adjudicator for determination under an adjudication procedure ("**the Related Procedure**") which meets the requirements set out in Section 108 of the Housing Grants, Construction and Regeneration Act 1996 SPV may endeavour to procure that the Related Dispute is consolidated with the Dispute in terms of the Dispute Resolution Procedure in Section 3 in which event the Dispute and the Related Dispute shall be resolved in terms of Section 3.

Section 1: Consultation

If a Dispute arises, then, except where a Dispute is expressly stated in this Agreement to be referable to an Expert, the Dispute shall first be referred by either party by notice in writing to the Chairman of SPV and the official of the Trust nominated for that purpose by the Trust, who shall meet and endeavour to resolve the issues between them and whose unanimous decision shall be binding on the Parties.

Section 2: Dispute Resolution Procedure

1. **Referral to Expert**

If the procedure referred to in section 1 above does not resolve the Dispute within 28 days or if a Dispute is expressly stated in this Agreement to be referable to a person with appropriate expertise (the "**Expert**"), then either party may require such matter to be referred to the Expert in terms of paragraph 3 of this Section 2.

2. **Appointment of the Expert**

2.1 The party wishing to appoint an Expert shall give notice to the other party, giving details of the Dispute which it is proposed shall be resolved by the Expert.

2.2 The parties shall endeavour to agree within 14 days of the service of the notice an Expert to whom the matter in dispute shall be referred for determination.

2.3 If the parties have not so agreed, then the matter may immediately be referred by either party to the President for the time being of the Law Society of Scotland, who

shall be requested to make the appointment of the Expert within 28 days and in so doing may take such independent advice as he thinks fit.

2.4 On the Expert being so agreed or selected, the parties or either of them shall promptly notify the Expert and shall request him or her to confirm to both parties within 14 days whether the Expert can accept the appointment and whether there is any conflict as mentioned in paragraph 3 of this Section 2.

2.5 If the Expert is either unwilling or unable to accept such appointment or has not confirmed acceptance and terms of appointment within 14 days, then (unless the parties can agree on the appointment of another Expert as provided in paragraph 2.2 of this Section 2) the matter may be referred (by either party) to the President of the Law Society of Scotland, who shall be requested to make an appointment or (as the case may be) a further appointment and the process shall be repeated until an Expert is found who accepts appointment.

2.6 The parties will co-operate to ensure that the terms of the contract of appointment of the Expert are agreed with him within the 14 day period referred to in paragraph 2.5 of this Section 2. If there is any dispute between the parties as to remuneration to be paid to the Expert or any other terms of his appointment, then it shall be determined by the President of the Law Society of Scotland, whose decision shall be final and binding on them.

3. **Qualification of the Expert**

3.1 The Expert must be qualified by education, experience and training to determine the matter in dispute. If within seven days of appointment of an Expert by the President of the Law Society of Scotland, in accordance with paragraph 2.3 of this Section 2 above either party objects on the grounds that the proposed Expert is not so qualified, then the President of the Law Society of Scotland, shall decide the issue and his decision shall be final and binding. In so deciding he shall consider any written submissions either party may wish to make. If he shall decide that the proposed Expert is not so qualified, then he shall (if necessary) appoint a replacement in accordance with paragraph 2.3 of this Section 2.

3.2 Unless both parties agree otherwise, no person shall be appointed the Expert who at the time of appointment is (or within three years before such appointment has been) a director, office holder or an employee of or retained as consultant to either party or any Associated Company of either party or any Financier or is the holder of shares in a party (unless it is a company quoted on a recognised stock exchange and his shareholding is less than one per cent of the issued share capital (of any class) in that party).

3.3 If either party objects:-

3.3.1 to a proposed appointment of an Expert on grounds of a disclosed conflicting interest or duty within seven days of that disclosure; or

3.3.2 to an appointment of an Expert (which has already been made) within seven days of becoming aware of a conflicting interest or duty which has not been disclosed,

because it considers that there is a material risk of such interest or duty prejudicing the decision of the Expert or proposed Expert, then either party may apply to the President of the Law Society of Scotland, who shall determine the matter as prescribed in paragraph 3.1 of this Section 2.

4. **Confidentiality**

All information, data or documentation disclosed or delivered by a party to the Expert or to the other party in consequence of or in connection with the appointment of the Expert shall be confidential, unless it is already in the public domain. In accepting appointment, the Expert shall agree not to disclose to any person or company including other parties save with the consent of the party providing that information, data or documentation and all of which shall remain the property of the party disclosing or delivering it and all copies shall be returned on completion of the Expert's work.

5. **Procedure for expert determination**

5.1 The terms of reference of the Expert shall include provisions that:-

5.1.1 not later than seven days after appointment, the Expert shall call the parties to a meeting at which he or she shall raise any matters requiring clarification (whether arising out of his contract or appointment or otherwise) and lay down the procedural rules to be applied, which rules shall be in accordance with this paragraph 5;

5.1.2 the parties may supply data and information or authorise third parties to produce data or information and make submissions to the Expert within 21 days after his appointment;

5.1.3 either party may make a reply submission within 21 days of receiving the submission of the other party;

5.1.4 subject to paragraph 5.1.8 of this Section 2, the Expert shall ignore data, information and submissions supplied and made after that 21 day period referred to in paragraph 5.1.3 of this Section 2 unless furnished in response to a specific request from him or by agreement between the parties;

5.1.5 the Expert may obtain such independent professional and/or technical advice as he or she may reasonably require and to obtain any necessary secretarial assistance as is reasonably necessary. The costs of that advice or assistance shall be recoverable by the Expert as provided in paragraph 7of this Section 2;

5.1.6 all communications between and submissions made by either of the parties and the Expert shall be made in writing and a copy provided simultaneously to the other party and no meeting between the Expert and either party shall take place unless both parties have a reasonable opportunity to attend it;

5.1.7 the Expert shall give full written reasons for his or her determination;

5.1.8 the Expert may include in his or her decision actions required by one or both parties, including payment of any sum by way of a valuation or compensation provided for under the Agreement. Those actions shall commence and be completed according to periods specified by the Expert in the notification of the decision to the parties. If any payment is delayed beyond the specified period, the Expert shall be entitled to award interest to the party receiving that payment, at the Interest Rate for the period of that delay; and

5.1.9 the Expert shall provide a draft of his or her decision to each of the parties and the parties shall be given a period of not less than three Working Days to make comments on it.

5.2 The Expert shall make his or her decision as soon as reasonably practicable and in any event within 30 days after the later of (a) receipt of the reply mentioned in paragraph 5.1.3 of this Section 2 or (b) the receipt of any information by the Expert under paragraph 5.1.4 of this Section 2. If he fails to do so, then another Expert shall be appointed at the request of either party.

5.3 The Expert shall not be an arbitrator, but shall render his or her decision as an expert and the provisions of the Arbitration (Scotland) Act 1894 and the law relating to arbitration shall not apply to the Expert, the determination or the procedure by which the determination is reached.

5.4 Each party shall bear the costs of providing all data, information and submissions given by it and the costs and expenses of all witnesses and persons retained by it by the costs and expenses of the Expert and any independent advisers to the Expert and any costs of appointment if the Expert is appointed by the President of the Law Society of Scotland shall be borne equally by the Trust and by SPV.

6. **Expedited Interim Finding**

In relation to any dispute over the amount of any payment due the parties agree that if, for any reason, the dispute has not been resolved within 7 days, the matter may immediately on demand by either party be referred to an Expert pursuant to paragraph 1 for a preliminary finding to be made on an expedited basis as follows:-

6.1 if the parties cannot within one day agree the identity of the Expert then he shall be appointed in accordance with paragraph 3 of this Section 2

6.2 each party shall submit representations to the Expert within two Business Days of his appointment with a view to the Expert making a preliminary finding within a further two Business Days of receipt of such evidence

The procedure set out in this paragraph 6 is without prejudice to the rights and remedies of the parties under the rest of this Part of the Schedule or the other provisions of this Agreement (any or all of which may be pursued in conjunction with this paragraph 6). The parties agree, however, to abide by any preliminary finding of the Expert pursuant to this paragraph 6 and to make the payments determined by the Expert within two Business Days following the date of determination (pending any further resolution under the Dispute Resolution Procedure and without prejudice to either party's right to receive an adjusting payment if any further and different resolution to the dispute is reached pursuant to the Dispute Resolution Procedure)

7. If a Dispute arises in connection with the issue of a Certificate of Practical Completion, the suitability or readiness of any Equipment or any aspect of the Commissioning Procedure, or any other matter which bears upon the occurrence or otherwise of the Services Commencement Date, such Dispute, (except where, for the avoidance of doubt, it falls to be resolved in terms of Section 3 below), shall be resolved in accordance with the provisions of this Part F, subject to the following changes:

7.1 two days shall be allowed for agreement upon an Expert pursuant to paragraph 2.2 of this Section 2

7.2 any request to the President for the time being of the Law Society of Scotland pursuant to paragraph 2.3 of this Section 2 shall require appointment of the Expert within seven days

7.3 any request to the Expert pursuant to paragraph 2.4 of this Section 2 shall require a response within one day

7.4 the terms of appointment of the Expert shall be agreed or determined within three days

7.5 the procedure in paragraph 5 of this Section 2 shall be altered such that each party shall submit representations to the Expert within two days of his appointment with a view to the Expert making his determination within fourteen days of accepting appointment

7.6 Notwithstanding the provisions of paragraph 8 of this Section 2 the decision of the Expert appointed in terms of this paragraph 7 shall be final and binding on the parties and the parties hereby agree that they shall not be entitled to refer such Dispute to any Court for determination.

8. **Reference to the courts**

8.1 Nothing in paragraphs 1 to 6 above shall prevent either party at any time seeking any interim relief from a competent court.

8.2 In the case of Dispute referred to an Expert under paragraph 5 or paragraph 6 of this Section 2, the decision of the Expert shall not be final and binding on the parties unless (i) the relevant Clause in this Agreement directs that it shall be (ii) the parties shall previously (or subsequently) otherwise agree or (iii) neither party commences legal proceedings within the time specified in paragraph 8.3 of this Section 2.

8.3 Subject to paragraph 7.6 of this Section 2 in all other cases, either party may, within 180 days after receipt of the determination of the Expert, refer any matter comprised in the Dispute to the court for determination. For the avoidance of doubt, the court shall have full power to open up, review and revise any aspect of the Dispute and any determination of the Expert.

9. **Costs, fees and expenses**

9.1 The Expert shall be entitled to fees as set out in the Contract of Appointment and to reasonable expenses. Fees shall be paid by the parties in equal shares, unless otherwise determined by the Expert.

9.2 The Expert may determine an amount of costs incurred by a party in respect of the dispute, which are to be recovered from the other party and if so determined, he or she shall notify the parties of that determination.

10. **Pre-emptive settlement**

At any time prior to the decision of the Expert being communicated to the parties, they may agree a settlement of the Dispute referred to the Expert. In such event, the Expert may recover from the parties fees in respect of time already spent on the reference and all reasonable expenses incurred in relation to it.

11. **Communications**

All communications relating to the referral shall take place in writing between the authorised representatives of each of the parties and the Expert.

12. **Continuing obligations**

Unless the Agreement has already been terminated, SPV shall in every case continue to proceed with the Project with all due diligence and the parties shall continue to comply with all their obligations under this Agreement regardless of the nature of the Dispute and notwithstanding the referral of the Dispute for resolution under this Section 2.

Section 3

1 **Adjudication Procedure**

1.2 Any Dispute or Related Dispute which falls to be resolved under this Section shall be referred to an adjudicator agreed between the parties or appointed in accordance with the following procedure ("the **Expert**"). The adjudication shall be adjudicated in accordance with the ORSA Adjudication Rules - 1998 Version 1.2 (the "**Adjudication Rules**"), provided always that:-

1.2.1 all references to the Adjudicator in the Adjudication Rules shall be deemed and treated as a reference to the Expert as defined in Section 2 paragraph 1.2 above.

1.2.2 the following words shall be deleted from the Adjudication Rules:-

(i) "Contract" means the agreement which includes the agreement to adjudicate in accordance with these Rules" in lines 2 to 4 of Rule 2

(ii) "of £100" in line 5 of Rule 7(i);

(iii) "an arbitrator appointed pursuant to the Contract and/or" in lines 3 and 4 of Rule 16;

(iv) "or arbitration" in line 3 of Rule 31;

(v) "or arbitration" in line 6 of Rule 31;

1.2.3 Rule 1(i) shall be deleted from the Adjudication Rules;

1.2.4 Rule 1(ii) shall be deleted from the Adjudication Rules;

1.2.5 the party giving written notice pursuant to Rule 3(i) shall, at the same time, also give a copy of the notice to the Adjudicator;

1.2.6 notwithstanding Rules 14 and 33, no party shall, save in the case of bad faith on the part of the Adjudicator make any application whatsoever to a competent court in relation to the conduct of the Adjudication or the decision of the Adjudicator until after Contractual Practical Completion or the alleged Contractual Practical Completion of the Works or termination or alleged termination of this Agreement or the other DBFO Contracts, unless and until the prior

written consent of both SPV and the Trust has been obtained;

1.2.7 notwithstanding Rules 14 and 33, no party shall make any application whatsoever to a competent court in relation to the conduct of the Adjudication or the decision of the Adjudicator after that date being the later of, ninety (90) days from the decision of the Adjudicator or ninety (90) days from Contractual Practical Completion;

1.2.8 notwithstanding Rules 14 and 33, no party shall make any application whatsoever to a competent court in relation to the conduct of the Adjudication or the decision of the Adjudicator unless it shall involve the pursuit of a claim or a counterclaim of a monetary value in excess of £150,000 (Indexed from Financial Closing) or in the case of claims or counterclaims of a lesser monetary value arising out of the same facts and circumstances an aggregate monetary value in excess of £300,000 (Indexed from Financial Closing);

1.2.9 Rule 19(x) and Rule 19(xiii) shall be deleted from the Adjudication Rules;

1.2.10 Rule 21(v) shall be deleted from the Adjudication Rules;

1.2.11 Rule 24 shall be deleted from the Adjudication Rules;

1.2.12 Rule 28 shall be deleted from the Adjudication Rules;

1.2.13 Rule 32 shall be deleted from the Adjudication Rules;

1.2.14 the following Rules shall be inserted in the Adjudication Rules:-

(i) "1A. the following rules meet the requirements of adjudication procedure as set out in section 108 of the Housing Grants, Construction and Regeneration Act 1996; Part I of the Scheme for Construction Contracts (Scotland) Regulations 1998 shall thus not apply"

(ii) "2A. "Contract" means this Agreement and/or the other DBFO Contracts and shall include the agreement to adjudicate in accordance with these Rules."

(iii) "2B. "Chairman of ORSA" means the President or Chairman as appropriate for the time being of ORSA or such other officer as is authorised to deputise for him;"

(iv) "2C. "ORSA" means the Law Society of Scotland or the Scottish Branch of the Chartered Institute of Arbitrators (Arbiters);"

(v) "19A. The Adjudicator shall only reach his decision after holding an oral hearing, and with or without having endeavoured to facilitate an agreement between the parties"

(vi) "19B. Upon becoming aware that the dispute is the same or arises out of substantially the same facts as a dispute which has previously been referred to adjudication under the Contract, the Adjudicator shall immediately resign."

(vii) "21A. The Adjudicator may require any Party to pay or make contribution to, the legal costs of another Party arising in the Adjudication, and/or the legal costs of any party to a "Related Dispute" where the adjudication of the Related Dispute has been consolidated or joined with the adjudication of the Dispute between the Parties (the "Consolidated Adjudication"), to the extent that the legal costs of that third party arise in respect of the Related Dispute during the period in which the Related Dispute is consolidated or joined with the dispute between the Parties."

(viii) "24A. Save as aforesaid, the Parties shall be jointly responsible for the Adjudicator's fees and expenses including those of any specialist consultant appointed under 19(viii) (the "Costs of Adjudication"), the Adjudicator shall have the discretion to make directions to require any Party to pay or make contribution to the Costs of Adjudication and/or the fees and expenses of any adjudicator and specialist consultant appointed in relation to the Consolidated Adjudication. If no such directions are made, the Parties shall bear the Costs of Adjudication in equal shares, and if any Party has paid more than such equal share, that Party shall be entitled to contribution from other Parties accordingly

(ix) "28A. Every decision of the Adjudicator shall be implemented without delay. The parties shall be entitled to such reliefs and remedies as are set out in the decision, and shall be entitled to summary enforcement thereof, regardless of whether such decision is or is to be the subject of any challenge or review. No party shall be entitled to raise any right of set-off counterclaim or abatement in connection with any enforcement proceedings. The parties agree and bind themselves to each other to docquet every decision with their consent and to registration of the Adjudicator's decision in the Books of Council and Session for execution."

(x) "30A. All information, data or documentation disclosed or delivered by a Party to the Adjudicator in consequence of or in connection with his appointment hereunder shall be treated as confidential by the Adjudicator and each party to the Adjudication (save as otherwise agreed between the parties) and shall be returned to the owner on completion of the Adjudication proceedings."

2.1 Within fourteen (14) days of a Dispute arising SPV may or may procure that the other party to the Related Dispute shall give to the Expert conducting the adjudication and also to the other parties to the Dispute and the Related Dispute the particulars set out in paragraph 2.2 below.

2.2 The particulars referred to in paragraph 2.1 of this Section 3 above are:-

2.2.1 a copy of the Related Contract;

2.2.2 a preliminary statement from SPV and/or, as the case may be, the other party to the Related Dispute setting out:-

(i) the basis and grounds for consolidation of the Related Dispute and the Dispute;

(ii) the cases of the parties to the Related Dispute;

(iii) any relief sought by the parties to the Related Dispute; and

(iv) a list of any documents served in relation to the Related Dispute.

Any such particulars sent by SPV to the Expert and the other parties to the Dispute shall be sent at the same time to the other party to the Related Dispute.

2.3 On receiving the particulars set out in paragraph 2.2 of this Section 3 above prior to Contractual Practical Completion the Expert shall, at the request of SPV and provided the other party to the Related Dispute has given consent under the Related Contract immediately order consolidation of the Dispute and the Related Dispute and shall have the authority and the power referred to in paragraph 2.10 of this Section 3.

2.4 On receiving the particulars set out in paragraph 2.2 of this Section 3 above on or after Contractual Practical Completion the Expert shall immediately request that the parties to the Dispute and the other party to the Related Dispute attend a meeting with the Expert with a view to determining whether or not the Dispute and the Related Dispute should be consolidated.

2.5 SPV shall use its reasonable endeavours to procure that an authorised representative of the other party to the Related Dispute shall attend the meeting with the Expert referred to in paragraph 2.4 of this Section 3. SPV and the Trust each agree to send an authorised representative or nominee to any meeting of this kind under this Agreement and any of the other DBFO Contracts or under a Related Contract, which they may be requested to attend. The parties hereby agree that the Trust shall be entitled to attend any meeting of the kind referred to in paragraph 2.4 of this Section 3 above, in relation to a Related Contract as SPV's nominee.

2.6 At the meeting referred to in paragraph 2.4 of this Section 3, the Trust's representative shall, as a preliminary matter, either:-

2.6.1 confirm to the Expert that the Trust accepts the proposed consolidation of the Related Dispute with the Dispute; or

2.6.2 inform the Expert that the Trust does not accept the proposed consolidation of the Related Dispute with the Dispute.

2.7 Where paragraph 2.6.1 of this Section 3 above applies, the Expert shall provided that the other party to the Related Dispute has given his consent under the Related Contract immediately order consolidation of the Dispute and the Related Dispute and shall have the authority and the power referred to in paragraph 2.10 of this Section 3

2.8 Where paragraph 2.6.2 of this Section 3 above applies. the Expert shall issue within one (1) day of the meeting referred to in paragraph 2.4 of this Section 3 above his written decision, which shall not include any

reasons, as to whether or not there is demonstrably no basis or ground for consolidation of the Dispute and the Related Dispute. If the Expert determines that there is demonstrably no basis or ground for consolidation of the Dispute and the Related Dispute, the Dispute and the Related Dispute shall not be consolidated. If the Expert determines otherwise, or if the Expert has failed or is unable to reach a decision within one (1) day of the meeting referred to in paragraph 2.4 of this Section 3, the Expert shall provided that the other party to the Related Dispute has given his consent under the Related Contract immediately order consolidation of the Dispute and the Related Dispute and shall have the authority and the power referred to in paragraph 2.10 below of this Section 3.

2.9 Notwithstanding anything to the contrary, a Related Dispute shall only be consolidated with a Dispute under this Agreement or the other DBFO Contracts if within fourteen (14) days of the Expert's order to consolidate the Dispute and Related Dispute the Dispute under this Agreement or the other DBFO Contracts is referred to the Expert and provided that the other party to the Related Dispute has given his consent under the Related Contract.

2.10 Subject to paragraph 2.9 of Section 3 of Part M of the Schedule the Expert shall have the authority and the power to consolidate the Dispute and the Related Dispute and to direct that all procedural and/or evidential matters arising in both the Dispute and the Related Dispute are consolidated in whatever manner the Expert considers shall lead to the fair and expeditious resolution of both the Dispute and the Related Dispute and the parties (including the party to the Related Dispute) shall thereafter abide by and implement such consolidation and any such direction.

2.11 In the event that the Related Dispute is consolidated with the Dispute, the Expert shall reach a decision on the Dispute and the Related Dispute at the same time and in any event within twenty eight (28) days of the earlier of the referral of the Dispute or the referral of the Related Dispute, or such longer period as is agreed by the parties to the Dispute and the Related Dispute after the date that the Related Dispute has been consolidated with the Dispute. The Expert shall be entitled to extend the said period of twenty-eight (28) days by up to fourteen (14) days with the consent of the party by whom the relevant dispute was referred.

2.12 Without fettering or restricting the Expert's power and authority in any way, it is the intention of SPV and the Trust that in the event that the Related Dispute is consolidated with the Dispute, the Expert shall, insofar as is relevant, practicable and appropriate, come to the same conclusion as to the facts and apply the same reasoning and analysis in reaching a decision on both the Dispute and the Related Dispute.

2.13 In the event that an adjudicator under a Related Contract ("**the Related Expert**") orders that a Dispute under this Agreement or the other DBFO Contracts be consolidated with a Related Dispute with which he is dealing under the Related Contract, then:-

2.13.1 notwithstanding anything in the Adjudication Rules or in Section 2 above, with effect from the time of such order, the Expert shall cease to have authority or jurisdiction to determine the Dispute which shall instead be determined by the Related Expert and the appointment of the Expert under this Agreement or the other DBFO Contracts shall cease; and

2.13.2 such order shall be binding on SPV and the Trust and both of them shall acknowledge the appointment of the Related Expert as the adjudicator of the Dispute, with SPV procuring that the third party who is a party to the Related Contract shall with effect from the time of such order comply with the requirements of the Related Contract (including if applicable any requirement or direction of the Related Expert appointed under such Related Contract) as to the future conduct of the determination of the Dispute and the Related Dispute; and

2.13.3 notwithstanding Rule 24A of the Adjudication Rules, SPV and the Trust shall be jointly responsible with the third party who is a party to the Related Contract for the Related Expert's fees and expenses including those of any specialist consultant appointed under the adjudication procedure in the Related Contract, in respect of the period in which the Dispute is consolidated with the Related Dispute pursuant to an order of the Related Expert ("**the Consolidated Adjudication Costs**"). SPV and the Trust agree that the Related Expert shall have the discretion to make directions to require SPV, the Trust and the third party who is a party to the Related Contract to pay or make contribution to the Consolidated Adjudication Costs in different proportions. If no such directions are made, SPV, the Trust and the third party who is a party to the Related Contract shall bear the Consolidated Adjudication Costs in equal shares, and if SPV, the Trust or the third party has paid more than such equal share, that party or third party shall be entitled to a contribution from the other party, parties or third party, as the case may be; and

2.13.4 notwithstanding anything to the contrary a Dispute under this Agreement or the other DBFO Contracts shall only be consolidated with a Related Dispute, if the Related Expert

receives particulars of the Dispute within fourteen (14) days of the referral of the Related Dispute to the Related Expert under the Related Contract.

2.14 Notwithstanding anything to the contrary, in the Adjudication Rules and paragraphs 2.1 to 2.12 above, SPV shall pay the Trust's reasonable costs arising from the consolidation of the Dispute and the Related Dispute in circumstances where SPV has requested the Expert to order consolidation of the Dispute and the Related Dispute and it is subsequently determined by the Expert that there was no basis or ground for SPV to request the Expert to order consolidation of the Related Dispute and the Dispute.

The Schedule - Part N

Trust Procedures

1 The Royal Marsden NHS Trust - Manual of Clinical Nursing Procedures Fourth Edition. Ed. by Jane Mallett & Chris Bailey - Blackwell Science.

2 R H - NHS Trust - Guidance Note on COSHH (94) Regs - Published in January 1998.

3 R H - NHS Trust - Guidance on the use of display screen equipment Regs (1992) and Trust policy on eye screening and eye examination - issued October 1998.

4 R H - NHS Trust - Medicine for the Elderly (Inverclyde) Directorate. Operational Policy - Fire Precaution Arrangements Bridge of Weir Hospital.

5 Guidelines on the Health & Safety (First Aid) Regs 1981 - issued April 1998.

6 R H - NHS Trust - Occupational Health & Safety Advisory Service - Guidelines on Health Risk Management - June 1996.

7 R H - NHS Trust - Moving and Handling Policy and Guidelines - July 1998.

8 R H - NHS Trust - The Noise at Work Regulations - A brief guide to the requirements for controlling noise at work within the Trust.

9 Guidelines for Occupational Therapy - Department Kitchens.

10 R H - NHS Trust - Occupational Health and Safety Service - Policy and Guidelines on Personal Protective Equipment (PPE) August 1998.

11 R H - NHS Trust - Personal Safety Guidelines - August 1996.

12 R H - NHS Trust - Radiation Safety Policy - March 1998.

13 R H - NHS Trust - Guidance on the Reporting of Incidents/Accidents incorporating RIDDOR 95 - issued October 1998.

14 R H - NHS Trust - A Step by Step Guide to Risk Assessment.

15 The Health & Safety (Safety Signs and Signals) Regulations 1996 - April 1998.

16 Health & Safety Policy.

17 R H - NHS Trust - Constitution for the Trust Health & Safety Committee.

18	R H - NHS Trust - Health & Safety Action Plan - 1998-1999.
19	Ward/Department - Health and Safety Plan 1998 - 1999.
20	Medicine for the Elderly (Inverclyde) Directorate - H & S Plan 1998 - 1999.
21	R H - NHS Trust - Policy Statement - Violence to and Security of Staff - April 1997.
22	R H - NHS Trust - Workplace Health, Safety & Welfare Regulations 1992 and Approved Code of Practice - Guideline Note & Accompanying Checklist - November 1996.
23	R H - NHS Trust - Equal Opportunities in Employment Policy - December 1995.
24	R H - NHS Trust - Harassment at Work Policy - June 1998.
25	R H - NHS Trust - Policy & Procedure Relating to the Consumption of Alcohol & Substance Abuse/Misuse including Drugs & Alcohol - December 1995, March 1998.
26	R H - NHS Trust - Policy & Procedure on Smoking at Work - October 1997.
27	R H - NHS Trust - Procedures for Purchasing, Receipt and Payment of Supplies & Services and Stores Management.
28	R H - NHS Trust - Standing Fin. Procedures - Patient Funds, Property & Valuables.
29	R H - NHS Trust - Procedures for Reports & Investigating Suspected Criminal Offences.
30	R H - NHS Trust - Disposal/Waste Policy - November 1998.
31	R H - NHS Trust - Methicillin Resistant (MRSA) Policy - November 1998.
32	R H - NHS Trust - Clostoidium Difficile Policy - November 1998.
33	R H - NHS Trust - Procedure for dealing with SRSV Outbreak - November 1998.
34	R H - NHS Trust - Scabies Policy - October 1998.
34A	R H - NHS Trust - Guidelines on Man. Of Staff with Gastro Illness.
35	Food Hygiene - Guidelines for Ward Kitchens.
36	Argyll & Clyde Health Board - Food & Health Policy.

37 R H - NHS Trust - Assured Self-Catering.

38 R H - NHS Trust - Standing Orders 2/9/96.

39 R H - NHS Trust - Standing Financial Instructions.

The Schedule - Part O

Not Used

The Schedule - Part P

Liaison Procedure

1. In seeking to develop Liaison Procedures associated with this Agreement the parties shall take due account of the following matters:-

1.1 that the parties' obligations shall be undertaken with each party owing a duty of good faith to the other;

1.2 the relationship between the parties shall be based on the principle of co-operation in all matters associated with the Project;

1.3 where any matter is put before the other party for consideration the party requesting consideration shall provide sufficient information and access to its employees, agents and representatives to provide explanations to assist the other party in reaching an appropriate conclusion;

1.4 Liaison Procedures shall be adopted by the parties on a basis that provides a prompt resolution of any matter subject to the procedure. To that end, the parties shall ensure that any matter which may subsequently become subject to a Liaison Procedure will be discussed on a preliminary basis between the parties, so that on submission to the Liaison Procedure any material submitted to the other party for comment shall be in a final form and reflects, so far as practicable, matters discussed at the preliminary stage between the parties;

1.5 wherever practicable, Liaison Procedures shall be recorded in writing and shall from time to time be reviewed by the parties.

The Schedule - Part Q

Trust Consent Legislation etc

National Health Service (Scotland) Act 1978
Mental Health Act (Scotland) Act 1984
Misuse of Drugs Act 1971
Access to Health Care Records Act 1990
Data Protection Act 1984
Standards for the Administration of Medicine UKCC 1992
Health and Safety at Work Act 1974: VDU Regulations
Confidentiality of Personal Health Information Code of Practice
Medical Indemnity and Claim Requirements (solely in relation to clinical care)
Ionisation Regulations 1984
Radioactive Substances Act 1993

The Schedule - Part R

Review Procedure

1. Any proposal for review under the Review Procedure (the **"Proposal"**) will be made in writing to the other party's Contract Officer accompanied by such information as the Contract Officer may reasonably require to consider the Proposal.

2. Any Proposal so submitted shall be reviewed by the other party, who shall as soon as practicable and in any event within 28 days (or such other period as is prescribed in the circumstances by the relevant DBFO Contract) return one copy of the Proposal which shall, as appropriate, be marked:-

   2.1 "Received and Noted";

   2.2 "Received and Returned with Comments"; or

   2.3 "Proposal Not Accepted".

3. If the relevant Contract Officer responds as set out in paragraph 2.1 above, the other party may treat its obligations to the other as varied accordingly.

4. If the relevant Contract Officer responds with the statement set out in paragraph 2.2 above, the other party may treat its obligations as varied, but subject to it taking account of the comments supplied by the other party's Contract Officer which shall apply to the Proposal.

5. If the relevant Contract Officer shall respond with the statement set out in paragraph 2.3 above, the other party shall review the comments provided and may thereafter re-submit its Proposal to the relevant Contract Officer or (if it so desires) the matter may be submitted to the Disputes Resolution Procedure.

6. If the relevant Contract Officer fails to return any such Proposal (including any re-submitted Proposal) with comments as provided in paragraph 2 above within the period of 28 days (or such other period as may be specified in the relevant circumstances) of actual receipt, then the Proposal shall be deemed to have been returned marked "Received and Noted".

7. In respect of any Proposal received by either party's relevant Contract Officer that party shall be entitled to request the supply by the other party of such further information as may be reasonably required in considering the Proposal and any matters so raised by the relevant Contract Officer with the other party shall be dealt with promptly.

The Schedule - Part S

SPV Constitution

Section 1
(SPV Share Ownership)

Promoter	Registered Number and Country of Incorporation	Shareholding (to include by reference to its authorised and issued share capital) number, description and class of shares and a statement whether those shares are fully paid in cash)	Financier
Melville Dundas Limited	Registered in Scotland No. 141799	Authorised Share Capital - 100,000 Ordinary Shares of 1p Issued Share Capital - 100,000 Ordinary Shares of 1p Melville Dundas Limited's Holding - 10,000 Ordinary Shares all fully paid Quayle Munro Holdings PLC's Holding - 10,000 Ordinary Shares all fully paid	Bank of Scotland

Section 2
(SPV Board of Directors)

Name	Address	Occupation
John Fulton	Melville Dundas, Cameron Court, Hillington, Glasgow G52 4JX	Finance Director, Melville Dundas Limited
Jo Elliot	Quayle Munro Holdings PLC, 8 Charlotte Square, Edinburgh EH2 4DR	Director, Quayle Munro

The Schedule - Part T

Insurances

(Clause 12.6)

1. **Insured Risks**

1.1 At its sole expense, SPV shall, or shall procure that the Contractor and the Service Provider shall, to the extent that the same are available at commercially reasonable rates and subject always to such exclusions and conditions as are normally imposed by insurers from time to time effect and maintain at all times during the Term the following Insurances

1.1.1 During the period commencing on the date on which SPV takes possession of the Site and ending on the Services Commencement Date

(a) "All risks" of physical loss of or damage to the temporary and permanent contract works including materials, plant and equipment (excluding the Contractor's and sub-contractors' plant and equipment) intended for inclusion or incorporation in the Works whilst at the Site including inland transit and off- site storage in the United Kingdom naming SPV, the Contractor and/or sub-contractors of any tier any Financier or investor and the Trust as co-insured;

(b) third party legal liability insurance in respect of loss or damage to any property (including that of the Trust) or death or injury to any person, with a minimum cover for each occurrence of £25,000,000 index linked and naming SPV, the Contractor and/or sub-contractors of any tier any Financier or investor and the Trust as co-insured; and

(c) Not used

(d) (i) loss of gross revenue in maximum amount of £4,000,000 in respect of an indemnity period of 24 months;

(ii) additional expenditure necessarily and reasonably incurred by the insured for the sole purpose of avoiding or diminishing payments under paragraph 1.1.1(d)(i), but not exceeding the additional

amount which would have been payable under paragraph 1.1.1.(d)(i) had such expenditure not been incurred in a maximum amount of £2,500,000 in respect of an indemnity period of 24 months.

1.1.2 During the period commencing on the Services Commencement Date and ending on the expiry of the Term:

(a) all-risks of physical loss or damage to the Hospital and the Site from any cause not otherwise excluded to their full replacement value, naming SPV, the Service Provider any Financier and the Trust as co-insured;

(b) third party liability insurance in respect of legal liability for loss or damage to any property (including that of the Trust) or death of or injury to any person with a minimum amount of cover for each occurrence of £25,000,000, index linked at least each third year and naming SPV any Financier, the Service Provider and the Trust as co-insured but in respect of the Trust only in so far as this affects its vicarious liability and specifically excluding any risks of an operational nature which the Trust may attract whilst acting as a NHS Trust; and

(c) employers' liability insurance in respect of SPV's employees to comply with the Employer's Liability (Compulsory Insurance) Act 1969.

(d) where there remains any Financial Indebtedness under the Finance Facilities Agreements

(i) loss of gross revenue in a maximum amount of £4,000,000 in respect of an indemnity period of 24 months

(ii) additional expenditure necessarily and reasonably incurred by the insured for the sole purpose of avoiding or diminishing payments under paragraph 1.1.2(d)(i) but not exceeding the additional amount which would have been payable under paragraph 1.1.2(d)(i) had such expenditure not been incurred in a maximum amount of £2,500,000 in respect of an indemnity period of 24 months.

2. **Insurance terms**

2.1 All insurances required to be effected under paragraph 1 of this Part M shall be effected with a reputable insurer(s). Not less than 14 days before any Insurances are effected under paragraph 1 of this Part T of the Schedule or thereafter revised (or within 14 days after such revisal if not requested by SPV) SPV shall submit to the Trust's Representative.

2.1.1 the identity of the insurer(s); and

2.1.2 the principal terms and conditions of the proposed Insurances or any revision to those Insurances.

2.2 Each policy or contract of insurance in respect of the Insurances shall contain a waiver of subrogation as against the Trust and provision for 30 days' prior written notice of cancellation or non-renewal to be given to the Trust by the insurers.

3. **Further SPV obligations**

3.1 SPV shall promptly provide to the Trust a copy of the insurance policy(ies), a copy of the receipt for the premium for the current period of insurance and all notices and certificates of renewal.

3.2 SPV shall and shall procure that the Contractor, any Principal Services Provider, any Sub-Contractor and any persons on the Site at their instance shall :

(a) duly perform its obligations under and comply with the terms of all policies or other contracts of insurance; and

(b) in particular, but without limitation, shall not do or omit to do anything by which any such policy or contract may be or become void or voidable at the instance of any insurer(s) or which would entitle any insurer(s) to refuse to pay any claim.

3.3 The subsistence of any insurances under this Paragraph 3 shall not relieve SPV from any of its obligations or liabilities to the Trust under the DBFO Contracts.

4. **Trust's right to insure**

4.1 If SPV is in default of its obligations under this Part T of the Schedule, the Trust may take out the relevant Insurance and the costs of that Insurance shall be a debt due to the Trust from SPV payable on demand. The Trust may deduct any amount

so paid by it from any amounts payable by the Trust to the SPV under the DBFO Contracts.

5. **Application of proceeds**

5.1 The proceeds of any claim in respect of third party liability or employer's liability shall be applied in satisfaction of that claim or, where appropriate, in accordance with the provisions of the Financier Direct Agreement.

5.2 Notwithstanding any other part of paragraph 5, subject to the terms of the Financier Direct Agreement remaining in force, if the Hospital is destroyed

5.2.1 during the Term but prior to the Trust having exercised its rights to vacate pursuant to Clause 33.4 of the foregoing Agreement the proceeds of the Insurances will be paid in accordance with the provisions of the Financier Direct Agreement, and

5.2.2 after the Trust has exercised its right to vacate pursuant to Clause 33.4 of the foregoing Agreement the proceeds of the Insurances will be paid directly to SPV without restriction.

6 **Unavailability of Insurance**

6.1 In this paragraph 6 "Uninsurable" means in relation to any of the foregoing risks either that (i) insurance is not generally available in the United Kingdom insurance market in respect of that risk or (ii) the insurance premium payable for insuring that risk is at such a level that the risk is not generally being insured in the United Kingdom insurance market.

6.2 Nothing in this Part T of the Schedule or this Agreement will oblige SPV to take out insurance against a risk which is Uninsurable.

6.3 If any of the foregoing risks becomes Uninsurable and:-

6.3.1 the Uninsurability of the risk is not caused directly by a breach of this Agreement by SPV, the Service Provider or any permitted Sub-Contractor; and

6.3.2 the occurrence of the Uninsurable risk is not directly due to the actions of SPV, the Service Provider or any Permitted Sub-Contractor

then the parties will meet to discuss the means by which the risk should be managed (including considering (but not obliging either party to agree to) the issue of self-insurance by either party).

6.4 If the requirements of paragraph 6.3 are satisfied but the parties cannot agree as to how to manage the risk this Agreement shall continue and such lack of agreement will not be referable to the Dispute Resolution Procedure. On the occurrence of the risk which is Uninsurable the Trust shall (at the Trust's option) either (i) pay to SPV an amount equal to the insurance proceeds which would have been payable had the risk in question not been Uninsurable and this Agreement will continue or (ii) terminate this Agreement on the assumption, if not a fact, that there had been an occurrence of Force Majeure and that the event of Force Majeure had subsisted for a period in excess of 180 days and that in accordance with the provisions of Clause 60.8 of the foregoing Agreement.

The Schedule - Part U

Information

Section 1
Information to be supplied by the Trust to SPV

Information to be provided	Frequency and scheduled delivery date	Retention Period
Trust Implementation Plan	annually when published	7 years
Standing Financial Instructions and Standing Orders	on appointment and as amended	7 years
Monthly monitoring report as submitted to NHSME	monthly	7 years
Annual Report and Audited Accounts	as published	7 years

Section 2
Information to be supplied by SPV to the Trust

Information to be provided	Frequency and scheduled delivery date	Retention Period
Annual Report and Audited Accounts of SPV	as published	7 years
Annual Report and Audited Accounts of Service Provider	as published	7 years
Monthly Management Accounts of SPV	Quarterly	7 years

LARKFIELD HOSPITAL , GREEENOCK

LIFE CYCLE MAINTENANCE SUMMARY

SINKING FUND MAINTENANCE (refer attached breakdown sheet 1)	£ 1,625,900
PLANNED PREVENTATIVE MAINTENANCE (refer attached breakdown sheet 2)	£ 2,447,300
LIFE CYCLE MAINTENANCE TOTAL	£ 4,073,200

This is the Building Specification referred to in the Project Agreement entered into between Argyll and Clyde Acute Hospitals National Health Service Trust and LH Project Limited dated 25th May 1999.

J C Elliot

LARKFIELD HOSPITAL GREENOCK
LIFE CYCLE MAINTENANCE
PLANNED PREVENTIVE

YEAR	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	TOTAL
Building Fabric																										
Redecoration	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	50,000
Floor Coverings	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	50,000
Ironmongery Replacement/Glazing	1,000	1,000	1,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	50,000
Window Clean	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	4,000	4,000	4,000	4,000	4,000	88,000
Maintenance Operative (attendance)	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	5,000	5,000	5,000	5,000	5,000	125,000
General Building Maintenance	6,000	6,000	6,000	6,000	6,000	10,000	10,000	10,000	10,000	10,000	14,000	14,000	14,000	14,000	14,000	22,000	22,000	22,000	22,000	22,000	25,000	25,000	25,000	25,000	25,000	385,000
Mechanical																										
Boilers	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	2,400	31,200
Pumps	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	7,800
Calorifiers	150	150	150	150	650	150	150	150	150	650	150	150	150	150	650	150	150	150	150	650	150	150	150	150	650	6,650
Radiators & Pipework	400	400	400	400	400	400	400	400	400	400	1,400	1,400	1,400	400	400	400	400	400	400	400	1,000	1,000	1,000	1,000	1,000	18,000
Controls	1,850	1,850	1,850	1,850	1,850	1,850	1,850	1,850	1,850	1,850	1,850	1,850	1,850	1,850	1,850	1,850	1,850	1,850	1,850	1,850	1,850	1,850	1,850	1,850	1,850	48,250
Water Tanks	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	12,500
Water Filtration Plant	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	75,000
Air Handling Plant	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	150,000
Medical Gases	1,200	1,500	1,200	1,500	1,200	1,500	1,200	1,500	1,200	1,500	1,200	1,500	1,200	1,500	1,200	1,500	1,200	1,500	1,200	1,500	1,200	1,500	1,200	1,500	1,200	33,600
Electrical																										
Stand By Generator	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	25,000
Lamp Replacement	1,500	1,500	1,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	81,500
Emergency Lighting	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	12,500
Fire Alarm System	700	700	700	700	700	700	700	700	700	700	700	700	700	700	700	700	700	700	700	700	1,000	1,000	1,000	1,000	1,000	18,300
Intruder Alarm	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	7,800
Nurse Call System	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	25,000
General Electrical Installation	100	100	100	100	500	100	100	100	100	500	100	100	100	100	500	100	100	100	100	500	100	100	100	100	500	4,500
Patient Tracking	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	5,000
Switchgear	100	100	100	100	500	100	100	100	100	500	100	100	100	100	500	100	100	100	100	500	100	100	100	100	100	4,100
Lifts	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	26,000
CCTV	800	800	800	800	800	800	800	800	800	800	800	800	800	800	800	800	800	800	800	800	800	800	800	800	800	20,000
Plumbing																										
Valve Service	700	700	700	700	1,700	700	700	700	700	1,700	700	700	700	700	1,700	700	700	700	700	1,700	700	700	700	700	1,700	22,500
Pump Checks	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	32,500
Replacement Valves	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	8,750
Clean Gutters	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	7,500
On Call / Call Out	5,550	5,550	5,550	5,550	5,550	5,550	5,550	5,550	5,550	5,550	5,550	5,550	5,550	5,550	5,550	5,550	5,550	5,550	5,550	5,550	5,550	5,550	5,550	5,550	5,550	138,750
Laundry Equipment	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	25,000
Group 1 Equipment	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	25,000
Group 2 & 3 Equipment	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	25,000
Night Time Call Out	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	250,000
Grounds And Estate	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	250,000
GRAND TOTAL	84,000	84,300	84,000	87,300	88,300	91,300	91,000	91,300	91,000	94,800	97,000	97,300	97,000	99,300	99,300	104,300	104,000	104,300	104,000	108,100	108,000	109,300	108,000	109,300	113,200	2,447,300

14/4/99

LARKFIELD HOSPITAL GREENOCK
LIFE CYCLE MAINTENANCE
SINKING FUND

	4	6	7	9	10	12	14	15	16	20	21	22	23	24	25	TOTAL
MECHANICAL																
BOILERS					6,300			6,300			6,300				6,300	25,200
PUMPS		3,300			3,300			3,300			3,300				3,300	16,500
CALORIFIERS																-
RADIATORS & PIPEWORK																-
CONTROLS										10,000	10,000	10,000	10,000	10,000	6,150	56,150
WATER TANKS																-
WATER FILTRATION PLANT		7,000			7,000			7,000			7,000				7,000	35,000
AIR HANDLING PLANT								40,000			10,000	10,000		7,000		67,000
MEDICAL GASES																-
																-
ELECTRICAL																-
STAND BY GENERATOR							6,000									-
LAMP REPLACEMENT												16,000				24,000
EMERGENCY LIGHTING					25,000											-
FIRE ALARM SYSTEM											25,000					50,000
INTRUDER ALARM											12,000	12,000	12,000	12,000	11,000	59,000
NURSE CALL SYSTEM											5,000		5,000		4,700	14,700
GENERAL ELECTRICAL INSTALLATION										14,000	14,000	14,000	14,000	14,000	9,000	79,000
PATIENT TRACKING										10,000	10,000	10,000	10,000	9,500		49,500
SWITCHGEAR															2,800	2,800
LIFTS		5,000			5,000						5,000		10,000		9,900	24,900
											5,000				5,150	20,150
LAUNDRY EQUIPMENT			16,000				18,000									-
											18,000					54,000
CCTV		5,000			5,000			5,000		5,000		2,000		2,000	1,000	25,000
SERVICES SUBTOTAL		20,300	16,000		51,600		26,000	61,600		39,000	130,600	74,000	61,000	64,500	66,300	602,900
GENERAL BUILDING MAINTENANCE	25,000			25,000		35,000			36,000	25,000	25,000			50,000		220,000
REDECORATION		50,000			50,000			50,000		50,000			20,000		20,000	240,000
FLOOR COVERINGS		34,000			74,000			34,000		74,000		5,500	9,500	9,500	9,500	250,000
ROADS		10,000			20,000			20,000			20,000			10,000	3,000	83,000
GROUP 1 EQUIPMENT			35,000				35,000					35,000				109,000
GROUP 2 & 3 EQUIPMENT			41,000				42,000					42,000				125,000
TOTAL	25,000	114,300	94,000	25,000	195,600	35,000	103,000	165,600	35,000	188,000	175,600	156,500	90,500	124,000	98,800	1,626,900

Larkfield Hospital , Greenock

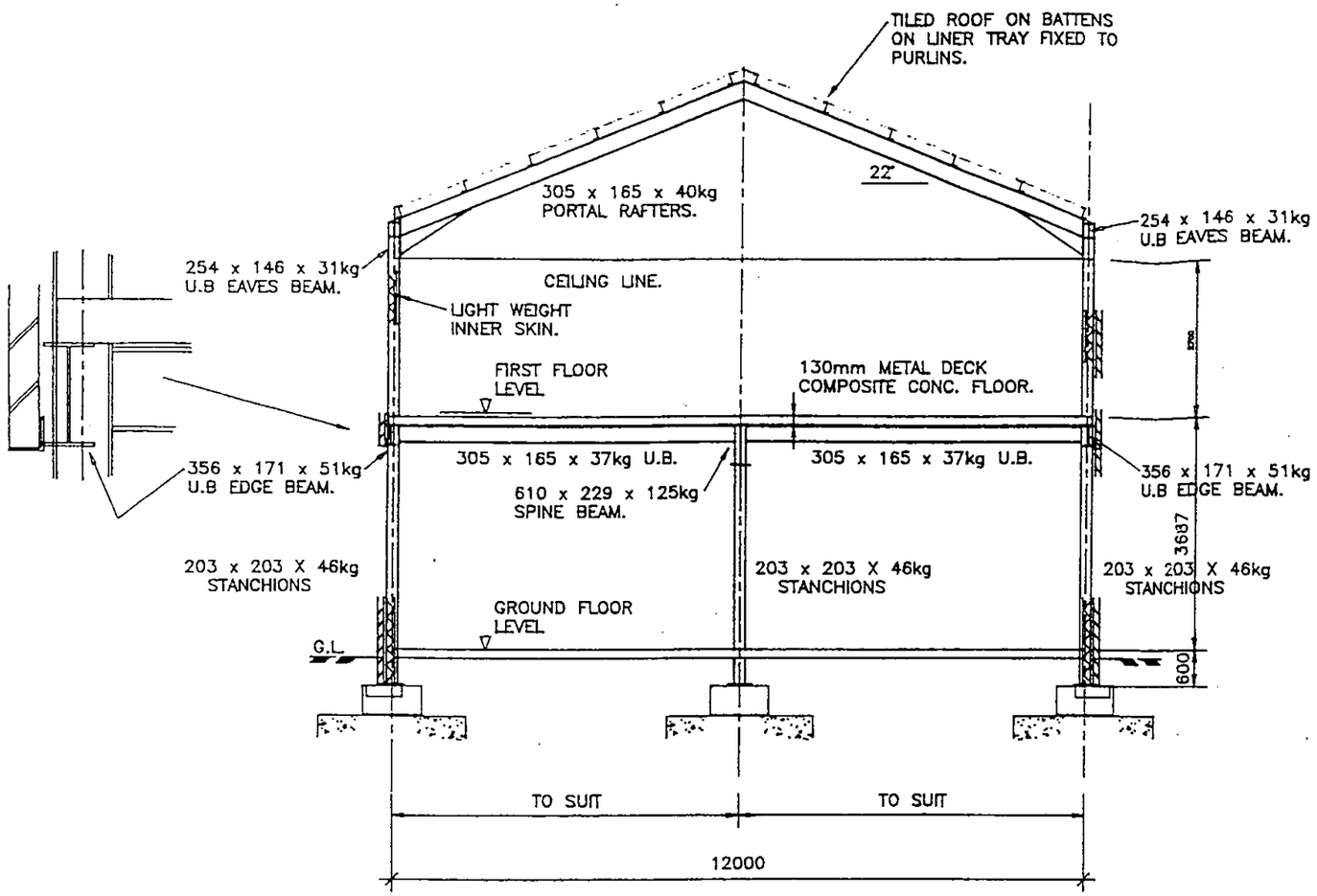
Contract Drawing List

Wylie Shanks Architectural

(5)400030 AL(0)1B	Site Plan
(5)400030 AL(0)4	Site & Location Plan
(5)400030 AL(0)10	Ground Floor Plan
(5)400030 AL(0)11	First Floor Plan
(5)400030 AL(0)12	Elevations
(5)400030 AL(0)13	Sectional Elevations

McLay Collier Structural

3702/01	Foundation Plan
3702/19	Drainage
3702/101	Typical Structural Cross Section



TYPICAL CROSS SECTION

RENFREWSHIRE
HEALTHCARE
NHS TRUST

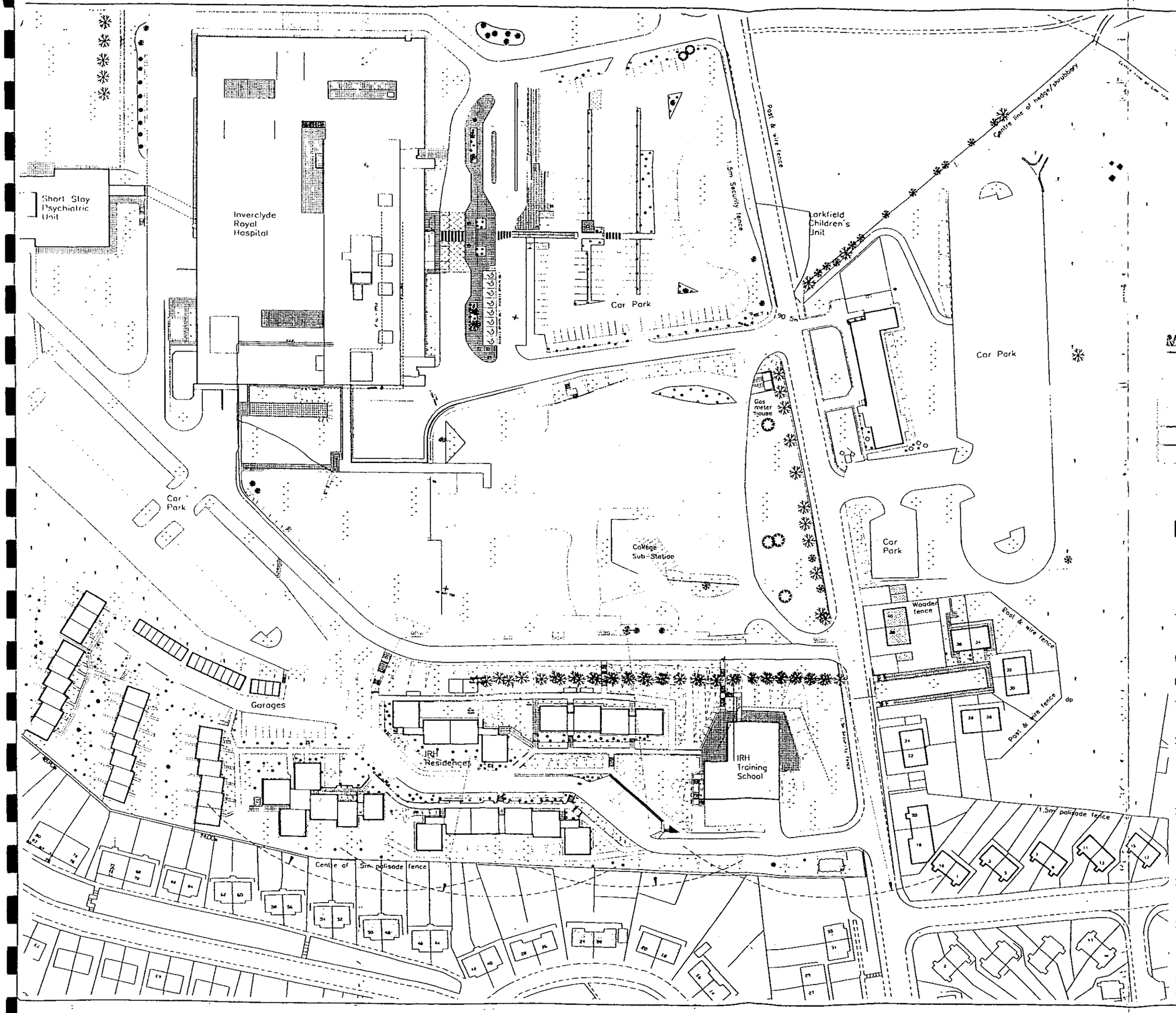
LARKFIELD P.F.I.

STRUCTURAL CROSS
SECTION

McLay Collier & Partners

1:100	JULY'98	3702/101
M.C.B.	D.M.	

Autocad drawing amendments must also be made on disc.
All dimensions in millimetres. Do not scale from this drawing.



Melvill... NO.

23 FEB 1999

Neighbour Notifications served on these properties

WYLIE SHANKS
Chartered Architects

■ 20a Royal Crescent, Glasgow G3 7SL Tel: 0141 332 8516 Fax: 0141 331 1565
☐ 2 Culduthel Road, Inverness IV2 4AB Tel: 01463 712425 Fax: 01463 717514

client
RENFREWSHIRE HEALTHCARE NHS TRUST

project
LARKFIELD P.F.I. DEVELOPMENT
GREENOCK

drawing
EXISTING SITE AND LOCATION PLAN

scale	date	drawn by	check by
1:1250	FEB 99	GCJ	

project code	sheet no	revision
(5)400030	AL(0)4	

☐ preliminary ☐ information ■ approvals ☐ billing
☐ tender ☐ construction ☐ as built ☐

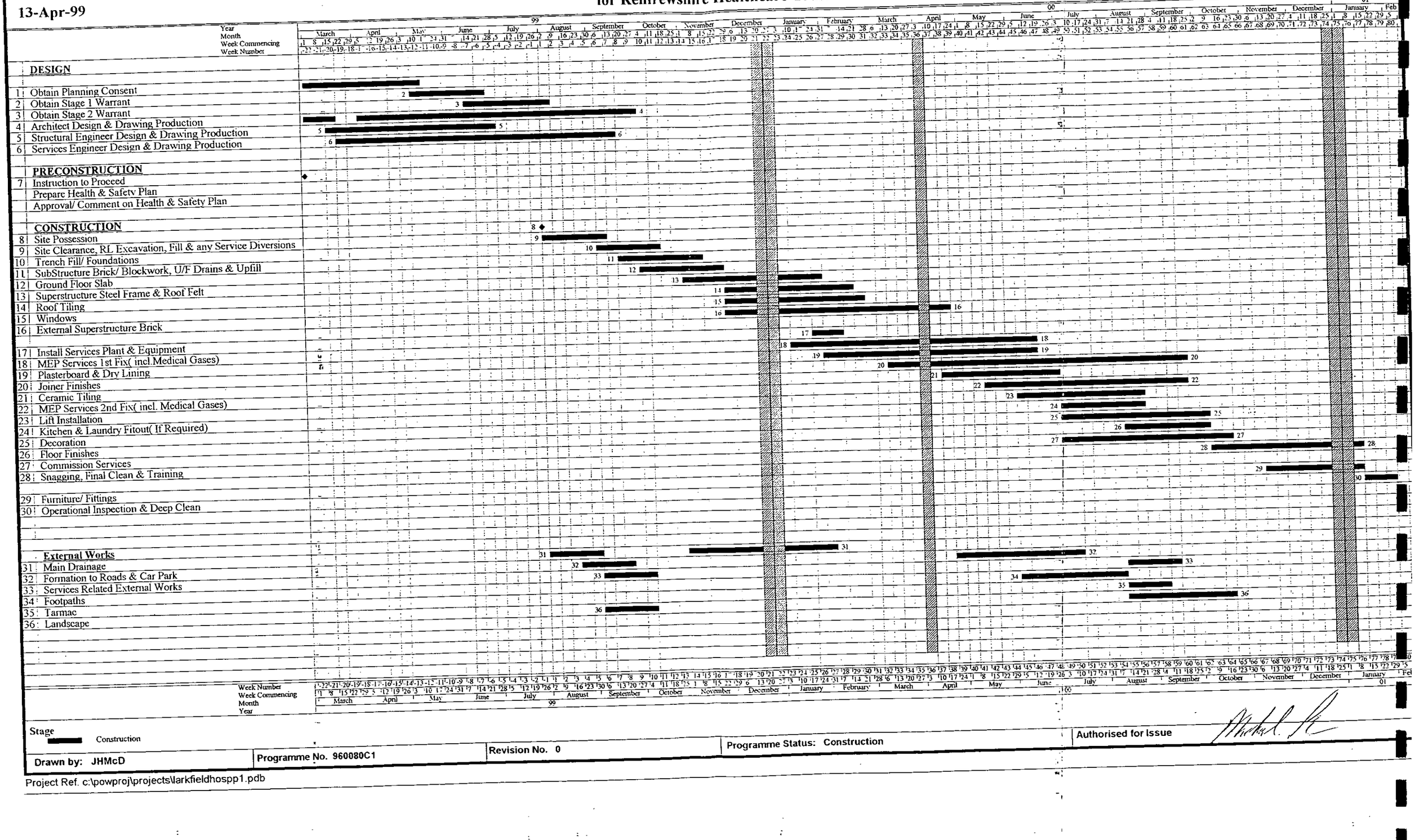
Larkfield Hospital, Greenock

Construction Programme

for Renfrewshire Healthcare Trust

13-Apr-99

Melville Dundas
CONSTRUCTION & ENGINEERING



Stage
Construction

Drawn by: JHMcD	Programme No. 960080C1	Revision No. 0	Programme Status: Construction

Authorised for Issue

Project Ref. c:\powproj\projects\larkfieldhospp1.pdb

LARKFIELD HOSPITAL , GREENOCK

THE ARGYLL AND CLYDE ACUTE HOSPITALS NATIONAL HEALTH SERVICE TRUST

LH PROJECT LTD

BUILDING SPECIFICATION

LARKFIELD HOSPITAL , GREENOCK

THE ARGYLL AND CLYDE ACUTE HOSPITALS NATIONAL HEALTH SERVICE TRUST

LH PROJECT LTD

PART A **ARCHITECTURAL SPECIFICATION**

PART B **CIVIL/STRUCTURAL SPECIFICATION**

PART C **MECHANICAL/ELECTRICAL SPECIFICATION**

LARKFIELD HOSPITAL , GREENOCK

PART A

ARCHITECTURAL SPECIFICATION

GENERAL

To be read in conjunction with general arrangement drawings.

All specifications assumed to current appropriate British Standard, and all installations in accordance with manufacturers recommendations.

Electrical works to latest Edition of IEE Regulations and BS 7671 : 1992.

All drainage to satisfaction of Local Authority.

Contractor to comply with current C.D.M. Regulations and Health and Safety Plan.

No asbestos products or high alumina cement to be used.

SITE PREPARATION

Demolitions to be carried out in accordance with Health & Safety guidelines, Approved Sequence and Method Statement and Code of Practice.

1. Excavate to reduce levels (600 minimum), trimming slopes of embankments and dispose unsuitable excavated material off site.

2. Make up levels with suitable excavated and imported materials.

3. Retaining wall at existing generator housing and N.W. boundary to be provided.

FOUNDATIONS

Trench filled pad and strip foundations including reinforcement to concrete (refer to Engineers details & spec.) Retaining wall foundation with reinforcement as necessary to areas where required. Concrete retaining walls including dpm/tanking.

STRUCTURE (See also McLay Collier Specification)

Two and single storey steel frame construction around 2 courtyards. Portalised steel frame at approx. 6m. centres on pinned base foundations, braced via diaphragm action of upper floor and roof transferring wind loads to stairwell and portalised/braced frames concealed at the courtyard elevations.

Upper floor pours controlled to eliminate permanent movement joints.

Cellform beams at 1st Floor level where necessary and maintain services access/flexibility.

FIRE PROTECTION

Columns and 1st floor beams to be protected to 1 hour fire resistance with intumescent paint.

All surfaces in ceiling voids to be Class O.

Cavity barriers formed by extending metal stud partitions to underside floor or roof. All penetrations to comply.

For locations of cavity barriers, compartment walls, fire doors and escape routes refer to drawings nos. AL(0)7 & 8.

EXTERNAL WALLS

1. Outer leaf: 102mm facing brickwork, stretcher bond with brick on edge cills, galvanised mild steel Catnic lintels or similar. Bucket handled pointing in coloured mortar. Weep holes with proprietary former above openings and at dpc. Dpc minimum 150mm above finished ground level.

2. Stairwells and plant: Masonry inner leaf: 80mm cavity, 100mm concrete blockwork with rigid partial fill cavity wall insulation. Stainless steel twist cavity wall ties with retaining clips for insulation.

EXTERNAL WALLS (cont'd..)

3. Inner leaf: 60mm cavity, breather membrane on plywood/metal studs to Engineers detail. 100mm insulation quilt stapled to studs. 500g. Visqueen fixed to inner face of studs. 12.5mm taper edge plasterboard with joints taped and filled. Skim coat plaster.

   DPC as detail. Stainless steel twist cavity ties.

4. Outer leaf (2): Dry dash render in three coats, with bellcast and angle beads, on 102mm common brickwork. Weep hole with proprietary former above openings and at dpc. Pre-cast concrete cills to windows. Inner leaf : Refer to Items 2 & 3. Smooth render ingoes.

5. DPC's to be lapped over d.p.m to form compression seal. Non-combustible cavity closers to jambs and insulating DPC below cills.

INTERNAL WALLS.

1. Metal stud partitions to Engineers details with 12.5mm plasterboard joints taped and filled, either side. Insulation butts and plasterboard type: to be arranged.

2. Compartment walls to be 140mm concrete blockwork with Dri-Wall lining either side.

3. Walls in stairwells and lift shafts to be in concrete blockwork to Engineers details and spec. with 12.5 plasterboard fixed to metal straps, joints taped and filled.

General - All partitions built off concrete floor slab and taken to underside of floor above. Fire sealing to underside of profiled soffits at wallhead.

STAIRWELLS

1. Pre cast concrete flights to include screeded half landings.

2. Balustrades - plastic coated mild steel to each side of stair and landings.

ROOF

1. Roof pitch 22½°, warm roof construction.

2. Dark grey smooth concrete interlocking tiles with 75mm lap on treated timber battens on Tyvek waterproof breather membrane on treated counter battens on structural steel liner tray on purlins. 80mm mineral fibre insulation quilt. PVC proprietary fascia and soffit boards on steel support. Deepflow PVC gutters, brackets and external downpipes to match.

3. Ridges and hips to have matching concrete ridge tiles, bedded and wired. Safety eyes at top of slope. Code 5 overlap lead flashings to abutments, and roof penetrations, with stepped cavity closers to suit.

4. Hip end gables to be powder coated aluminium louvres at ventilation outlet/inlet, complete with vermin guards and insulated blanking panels. Hip ends elsewhere to be as first floor infill window panel.

5. Flat roofed areas to be single ply membrane on rigid insulation, vapour barrier, sarking board and timber firring pieces to minimum 1:40 falls towards a central gutter also lined with membrane.

FLOOR SLABS

Ground - Steel trowelled mesh reinforced concrete in-situ slab on Visqueen 1200 dpm on blinded Type 1 hardcore. Existing foundations etc. removed and fitted to suit.

First - Steel trowelled 130mm thick in-situ composite metal deck/reinforced concrete floor on steel beams.

Loadings - 4kN/m² imposed, plus 1kN/m² for partitions.

FLOOR FINISHES.

1. Stairs, wet areas, corridors, treatment rooms etc; 2.5mm sheet vinyl safety flooring with welded seams, coved to wall; wall tile junction strips. Proprietary nosings and edgings to each step. Shower areas to have studded vinyl safety flooring.

2. Impervious backed carpet to patient areas.

3. Standard contract carpet to staff/admin. areas.

4. Matwells to entrance doors with "clean off zone" carpet inlays.

5. MDF skirting to carpet areas for painting.

6. Non slip floor paint to concrete floor in plant room.

7. Allow for 2 coats sealing agent and latex screed to floor slabs as required.

CEILING FINISHES.

1. Generally, 1200x600mm Ecophon tegular ceiling tiles in white lay-in grid (clipped) or equal approved.

2. WC/Shower/Bathroom/Kitchen/Laundry to have Ecophon Hygiene ceiling tiles laid in ceiling grid (clipped).

3. Corridors - full width Ecophon plank 600x600 Ecophon tegular system. (clipped)

4. All voids divided at 20mm centres with partition cavity barriers. All surfaces in void to be Class O and non-combustible.

5. Plant rooms etc. to have pre-finished liner sheet or - under slab.

INTERNAL WALL FINISHES/DECORATION.

1. Paper backed vinyl wallpaper below MDF dado rails. Patterned paper-backed vinyl above including soffits and ingoes of windows. (Corridors, Day Room, Waiting, Wards).

2. 1 undercoat and 2 coats eggshell paint to plasterboard walls and flush pointed blockwork walls.

3. 1 undercoat and 2 coats gloss paint to softwood frame of velux rooflights, MDF window cills, MDF door frames, facings etc. MDF skirtings and MDF dado rails.

4. No decoration to internal doors - "factory finished" veneers (matt varnish).

5. All access panels/ceiling hatches, exposed pipework to be decorated to match adjacent background areas (1 undercoat, 2 coats gloss).

6. 2 rows ceramic tile splashbacks to sinks in patient wards and medical rooms. Full height 200x100 ceramic tiles to showers and bathrooms.

   Refer to room finishes drawing for locations.

EXTERNAL FINISHES/DECORATION.

1. 3 coats of varnish to timber doors, timber louvres doors to plant room and all timber frames, facings etc.

   All other surfaces pre-finished.

OPEN EXTERNAL OPENINGS.

1. Main entrance doors: powder coated aluminium, double glazed automatic entrance doors.

2. External doors: solid core timber doors to stairwells.

3. Windows and external corridors power coated aluminium thermally broken with double glazing. Complete with restrictors and locks. First Floor windows to rotate for cleaning. All to have trickle vents.

4. Glazing: Kawneer 6mm clear glass external, 12mm cavity, 6mm clear glass internal. (6.4mm laminated internally on low level glazing below 1100mm). Inner panes to toilets and bathrooms to be obscured.

5. Roof: Velux rooflights.
   Extracts from WC/bathroom/shower/kitchens via wall louvres or roof vent.
   SWVP with Code 5 lead flashing.
   Roof outlet gutters on flat roof with grates.

INTERNAL OPENINGS.

1. Doors: Generally Shapland, or equal, solid core veneered. Factory finished doors with glazed vision panels, push/kick plates, handles. All fire doors fitted with intumescent and smoke seals. All ward doors to have smoke seals.

2. Internal glazed screens 6.4mm laminated glazing with softwood timber facings, painted.

3. Sliding folding doors to divide Physiotherapy Treatment Area and Occupational Therapy Workshop - Brockhouse modernfold.

4. Plant rooms, Kitchen, Laundry, Service areas - solid core doors for painting.

SANITARY FITTINGS AND FITTED FURNITURE.

1. Ceramic WCs, shower trays, WHBs and baths with fittings. Showers to be fitted with curtain rails, tip up seats, grab rails and towel rail.

2. Toilet cubicles and panel systems by Armitage Shanks or similar, using moisture resistant panels in wet areas.

3. Disabled WCs to have plastic coated grab rails and hinged support rail.

4. Kitchen, pantries, preparation etc. to be fitted with base and wall units with worktops, complete with stainless steel sink and drainer.

5. Spur shelving and racking to storage areas.

6. Bedhead services, wardrobe enclosures and nurses stations as details.

VENTILATION (See also Davie & McCulloch specification).

1. Natural ventilation via openable windows to be utilised where possible.

2. Mechanical extract system to be installed in toilet/shower/bathroom and kitchen areas.

3. Mechanical extract system for internal occupied areas to be provided.

SURFACE RAINWATER DRAINAGE (See also Davie & McCulloch specification).

1. UPVC Deepflow gutters (dark brown) on fascia brackets with stop ends, angles, outlets.

2. UPVC downpipes (dark brown) with brackets to brickwork, offsets etc. Rodding points before going underfloor or underground.

FOUL DRAINAGE (See also Davie & McCulloch Specification)

1. All new sanitary appliances will be suitably trapped before connecting into new foul drainage system.

2. All sections of drainage below building will be accessible for rodding purposes and will vent to atmosphere or air valves as required.

3. Floor gullies to be installed in shower areas.

4. All new foul drainage pipework and fittings shall be UPVC to B4660 : 1989 (below ground) and BS4515 : 1993 (above ground). Small diameter pipework to BS5255 : 1989. The entire foul drainage installation shall be installed in accordance with BS5572 : 1994 and BS8301 : 1985.

SERVICES

Refer to separate specification by Davie & McCulloch, Consulting Engineers.

EXTERNAL WORKS AND OUTBUILDINGS (See also McLay Collier Specification)

Generator Housing : Single storey facing brick enclosure, with mono pitch roof with concrete tiles. (Spec. as main building roof and plant rooms)

Link corridor : Existing link to be retained, partially demolished at East end and re-built to connect to new building. Existing structure to be refurbished and finishes replaced.

Entrance canopies : Projecting gable from roof construction, with vehicle canopy in patent glazing bars, polycarbonate sheeting and steel structure (galvanised and painted).

1. Kerbs: 225x125 half battered precast concrete kerbs to new road. Proprietary kerbs at entrances, disabled parking spaces, and road crossings. 200x50 precast concrete heel kerbs.

2. Roads, car parks, footpaths with rolled asphalt or d.b.m. wearing course. Concrete block paving (200x100x50) to entrance areas. 900x600 coloured paving slabs to form mowing strip.

3. Landscaping: import 150mm thick top soil as required for shrubs, grass seeding etc. Existing trees to east boundary retained. Courtyards landscaped with hard surfaces, planting beds and gazebo.

4. Accessories: road gullies, drainage channels etc. Traffic control bollards at pavement corners and entrances.

5. Reinstate existing roads as required where new foul and surface water drains connect into existing.

6. Retaining walls: reinforced concrete and reinforced brick retaining walls designed in accordance with BS8110, BS8002 and BS628.

7. Drainage: generally 150mm diameter UPVC pipe in granular bedding with trenches backfilled with compacted granular material. All new manholes constructed in engineering brick on 150mm thick mesh reinforcement slab bases with similar cover slabs. Grade Cast iron covers. All drainage to comply with BS8301.

LARKFIELD HOSPITAL , GREENOCK

PART B

CIVIL/STRUCTURAL SPECIFICATION

SECTION 1 BULK EXCAVATION AND MAJOR EARTHWORKS

PART 1 GENERAL

1/01/01 British Standard Specification

The recommendations of the relevant British Standards where referred to in this Specification shall be those listed in the British Standards Institution Catalogue (current edition at the date of Tender) applicable to the technical content of the works being described.

1/01/02 Codes of Practice

The recommendation of the relevant Codes of Practice where referred to in this Specification shall be those listed in the British Standard's Institution Catalogue (current edition of the date of Tender) applicable to the technical content of the works being described.

1/01/03 Specifications

This Specification is to be read in conjunction with other McLay Collier & Partners Standard Specifications where appropriate to the works described.

1/01/04 Contents and Scope

This Specification refers to the Excavation and Earthworks as applied to building and road works.

The recommendations of this Specification are "deemed to satisfy" various regulations and local by-laws. The Contractor shall nevertheless ensure that these requirements apply and fully satisfy the relevant regulations and local by-laws, and shall inform the Engineer of any variation whatsoever so that the amendments as may be necessary will be cleared by the Engineer and actioned in advance of any constructions.

1/01/05 Details, Drawings and Contents

All the works shall be carried out in accordance with the Drawings, Sketches, this Specification and Instructions which are issued to the Contractor by the Engineer at the start and during the course of the Contract.

Large scale details shall take precedence over small scale details. Scaling sizes from drawings shall not be permitted and in all cases figured dimensions shall be used.

The Contractor shall satisfy himself with all details before proceeding with the works and any inaccuracy shall be referred to and cleared with the Engineer.

1/01/06 Defective Work

Any materials or workmanship not conforming with the Specification shall be rejected and made good by the Contractor at his own expense to the Engineer's specification.

PART 2: CLASSIFICATION, DEFINITIONS AND USES OF EARTHWORKS MATERIALS

1/02/01 General Classification

Earthworks materials in the Specification shall fall into one or other of the following general classifications.

i) Acceptable material: material excavated from within the Site or imported on to the Site which meets the requirements of Table 1 for acceptability for use in the Permanent Works.

ii) Unacceptable material Class U1 or U2 as defined hereunder shall be material which shall not be used in the Permanent Works.

Unacceptable Material Class U1 shall be:-

i) Material which does not comply with the permitted constituents and material properties of Table 1 for acceptable material:

ii) Material or constituents of materials, composed of the following:

a) peat, materials from swamps, marshes and bogs.

b) logs, stumps and perishable material;

c) materials in a frozen condition

d) clay having a liquid limit determined in accordance with BS 1377 Test 2, exceeding 90 or plasticity index determined in accordance with BS1377 Test 4, exceeding 65.

e) material susceptible to spontaneous combustion including burnt and unburnt colliery spoil.

Unacceptable material Clause U2 shall be:-

material having hazardous chemical or physical properties requiring special measures for its excavation handling, storing, transportation, deposition and disposal.

1/02/02 Definitions

Chalk shall mean:-

i) any porous material of natural origin composed essentially of calcium carbonate and recognised as chalk in the Geological Survey of Great Britain.

ii) Material designated as Class 3 in the Specification.

Rock shall be defined as hard material which requires to be loosened by wedges, compressed air, or other special plant. Heavy clays (including boulder clay) shall not be regarded as rock even though mechanical spades are used for their removal. Unless items are specifically included in the Bill of Quantities covering these materials, any old concrete, brickwork, old foundations and the like (but not timber) encountered in the excavations shall be paid for as rock excavation.

Argillaceous rock shall mean shales mudstones and slates composed of clay and silt particles. It shall include unburnt colliery spoil.

Pulverised fuel ash shall mean the resultant ash from pulverised coal burnt at CEGB, South of Scotland Electricity Board or other power station approved by the Engineer. It shall have a maximum particle size of 3mm.

Furnace bottom ash shall mean agglomerated pulverised fuel ash obtained from the bottom of the power station furnace and having particle size no larger than 10mm.

Capping layer is the granular fill material below the pavement sub-base, the thickness of which varies as indicated on the drawings.

General Fill is the granular material below the structural ground floor/basement floor slabs, or between the reduced level excavation and the formation/sub formation as appropriate, the thickness of which varies as indicated on the drawings.

Formation shall be the top surface of capping. Where no capping is required formation shall be the top surface of earthworks at the underside of sub-base or the underside of blinding to structures, unless otherwise described in the Specification or drawings.

Sub-formation shall be the top surface of earthworks at the underside of capping.

Stabilisation shall mean the spreading of cement or lime on a layer of deposited or intact granular cohesive material and the subsequent process of pulverising and mixing followed by appropriate compaction to form the whole of a constituent layer of capping.

1/02/03 Use of Fill Materials

In addition to any grading requirements the maximum particle size of any fill material shall be no more than two-thirds of the compacted layer thickness except that cobbles having an equivalent diameter of more than 150mm shall not be deposited beneath verges or central reserves within 1.30m of the finished surface.

Materials with a soluble sulphate content exceeding 1.0 grams of sulphate (expressed as SO3) per litre when tested in accordance with BS 1377 Test 10, but using a 2:1 water soil ratio, shall not be deposited within 500mm, or other distance described in the Contract, of concrete, cement bound materials or other cementitious materials forming part of the Permanent Works.

Materials with a total sulphate content (expressed as SO3) exceeding 0.2% by mass, when tested in accordance with BS 1377 Test 9, shall not be deposited within 500mm, or other distances described in the Contract, of metallic items forming part of the Permanent Works.

Unburnt colliery spoil shall not be used in any circumstances. Burnt colliery spoil may only be usedif particularly specified bythe Engineer and in no other circumstances.

PFA shall not be placed within the dimensions described in the drawings, below sub-formation or formation.

Where pulverised fuel ash is used the Contractor shall, for each consignment, provide the Engineer with a record of the type and source of the material and the name ofthe power station from which it was obtained and a certificate of results of tests showing that the material complies with the requirements of Table 1.

PART 3: GENERAL REQUIREMENTS

1/03/01 The Contractor shall employ only that plant and working methods which are suited to the materials to be handled and traversed. He shall be responsible for maintaining the nature of the acceptable material so that when it is placed and compacted it remains acceptable in accordance with the contract. Acceptibility shall be determined in accordance with Table 1.

1/03/02 Haulage of material to embankments or other areas of fill shall proceed only when sufficient spreading and compaction plant is operating at the place of deposition to ensure compliance with Clause 1/12/01.

1/03/03 No excavated acceptable material other than that which is surplus to the requirements of the Contract shall be removed from the Site except on the direction, or with the permission, of the Engineer who may require material which is unacceptable only by reason of being frozen to be retained on Site when in that condition. Should the Contractor be permitted to remove acceptable material from the Site to suit his operational procedure, then he shall make good any consequent deficit of material arising therefrom.

1/03/04 If any acceptable material excavated from within the Site is, with the permission of the Engineer, taken by the Contractor for purposes other than for general fill, sufficient acceptable fill material to occupy, after full compaction, a volume corresponding to that which the excavated material occupied shall, unless otherwise directed by the Engineer, be provided by the Contractor from his own resources.

1/03/05 Acceptable material surplus to the total requirements of the Permanent Works and all unacceptable material shall, unless the Engineer permits otherwise, be run tospoil in tips provided by the Contractor. In the case of unacceptable material Class U2 the Contractor shall comply with any specific requirements for disposal.

1/03/06 Where the excavation reveals a combination of acceptable and unacceptable materials the Contractor shall, unless otherwise agreed by the Engineer, carry out the excavation in such a manner that the acceptable materials are excavated separately for use in the Permanent Works without contamination by the unacceptable materials. Unless otherwise described in the Contract, Classes of fill material required to be deposited separately shall be excavated separately without contamination by other Classes of material.

1/03/07 The Contractor shall make his own arrangements for stockpiling of acceptable materials, and unacceptable materials awaiting conversion into acceptable materials, and for the provision of sites for the purpose.

1/03/08 The Contractor shall ensure that he does not adversely affect the stability of excavations or fills by his methods of stockpiling materials, use of plant or siting of temporary buildings or structures.

1/03/09 Existing top soil material shall, except where it is to be left in place in the locations described in the Contract, be stripped to depths as described in the Contract for Class 5A material from all areas of cutting and from all areas to be covered by embankment or by other areas of fill.

1/03/10 Topsoil shall wherever practicable be used immediately after its stripping and if not shall be stored in stockpiles of heights not exceeding 2m or other heights stated on drawings.

Topsoil shall not be unnecessarily trafficked either before stripping or when in a stockpile. Stockpiles shall not be surcharged or otherwise loaded and multiple handling shall be kept to a minimum.

1/03/11 All topsoil arising from the Site, or impacted topsoil replacing material in accordance with sub-Clause 1/03/03 of this Clause, in excess of the requirements for topsoiling shall be deposited in the locations and in the manner described in the Contract or directed by the Engineer.

1/03/12 Excavation for foundations, pits and trenches shall be adequately supported at all times to protect from damage, arising from the Contractor's operations, to all pipes and other services in the area of the excavations and all adjacent buildings. The Contractor shall satisfy himself in advance of the works commencing of the nature of all adjacent pipes, services, buildings and theirfoundations. The Contractor shall submit to the Engineer for comment his proposals for carrying out the excavations and provisions of supports in accordance with this Clause. Except where specified by the Engineer sides of excavations shall not be battered. Sheeting and other excavation supports shall be removed as filling proceeds except where they are required by the Engineer to be left in position.

1/03/13 Excavations requiring backfilling shall remain open only for the minimum period necessary.

1/03/14 Excavations requiring backfilling in existing paved or other surfaces shall be carried out and reinstated in compliance with relevant clause in McLay Collier & Partners Specification for Road Pavements.

1/03/15 The Contractor shall keep earthworks free of water including:-

(i) arranging for rapid removal of water

(a) shed on to the earthworks

(b) entering the earthworks from any source

(ii) lowering and maintaining by appropriate measures, the water level in excavations sufficiently to enable the Permanent Works to be constructed.

1/03/16 In carrying out the requirements of 1/03/15 the Contractor shall:-

(i) form and maintain cuttings, embankments and other areas of fill with appropriate falls and gradient and sealed surfaces.

(ii) provide where necessary temporary watercourses, drains, pumping and the like;

(iii) discharge accumulated water and ground water into the permanent outfalls of the drainage system where practicable.

(iv) provide adequate means for trapping silt on temporary systems discharging into permanent drainage systems.

1/03/17 The Contractor shall carry out and maintain any ground water lowering or other treatments as shown on the Engineer's drawings.

1/03/18 Where materials are designated in the Contract as Clase U2 hazardous material the Contractor shall carry out any special requirements for their handling described on the Engineer's drawings. Where hazardous materials are encountered during the progress of the Works, the Contractor shall make all necessary arrangements for their safe handling and disposal as Class U2 material after consultation with the appropriate environmental health authority and, if necessary, the Health and Safety Executive.

PART4 REDUCE LEVEL EXCAVATIONS

1/04/01 Cuttings and bulk excavations shall be excavated to the lines and levels described on the Engineer's drawings.

1/04/02 Cutting slopes or toes of cuttings shall only be undercut when required in the Contract for trench or other excavations. Such excavations shall be restricted in extent as described on the Engineer's drawings and where they require backfilling shall remain open only for the minimum period necessary, so as to prevent risk to the Permanent Works.

1/04/03 Except where otherwise described on the Engineer'sdrawings, the Contractor is at liberty to halt bulk excavation and the excavation of cuttings at any stage providing at least 300mm of material as a weather protection is left in place above the formation, the sub-formation or the final reduced level subject to the requirements of Part 13 and Part 16 of this Specification.

1/04/04 Where pre-split blasting is specified on the drawings or is permitted by the Engineer, it shall comply with Part 7 of this Specification and any other requirements shown on the Engineer's drawings. Full details of the methods and arrangements to be adjusted shall be submitted to and cleared by the Engineer prior to commencement of drilling operations.

1/04/05 Final faces of cuttings which are not to receive topsoil shall:-

(i) wherever possible be left without scars or damage from construction plant and

(ii) to achieve a natural appearance, when the stratum permits and when pre-split blasting is not adopted, have the face left irregular within tolerances agreed with the Engineer and

(iii) have boulders or other rock fragments that can be moved by hand without tools, removed and

(iv) where required on the Engineer's drawings' have material that can be blown away by airline hose, having pressures no greater than those stated therein, so removed and

(v) have adequate access to enable inspection jointly with the Engineer to be carried out to determine the extent of work required by this sub-clause.

1/04/06 Where specified on the Engineer's drawings or where required by the Engineer faces of cuttings which are not required to receive topsoil shall have one or more of the following measures carried out as appropriate and as agreed by the Engineer.

(i) Isolated patches of soft, fragmented and insecure material shall each be excavated to a depth of at least 200mm unless otherwise required by the Engineer and replaced as soon as practicable with concrete Grade C10 well rammed into the cleaned out void.

(ii) Areas of cutting face requiring their surface to be made stable shall be trimmed back by a nominal 50mm or other amount specified on the Engineer's drawings or agreed with the Engineer and the resulting surface together with the area of any surrounding intact material as required by the Engineer, shall have an approved cement based grout or sprayed concrete, applied by pressure to form a total nominal thickness of 40mm or other thickness specified on the Engineer's drawings or agreed with the Engineer. Where specified on the Engineer's drawings or required by the Engineer reinforcement as described in the Contract shall be fixed to the surface before application of the concrete or grout. Weep holes using approved permanent formers shall be constructed in the locations specified on the Engineer's drawings or required by the Engineer.

(iii) Soft or insecure material, interlayed with rock shall be excavated to a depth behind the face as shown on the Engineer's drawings or as required by the Engineer. The resulting cavity shall be fitted with concrete Grade C10 or with masonry infill and provided with weep holes all in accordance with that specified on the Engineer's drawings or as required by the Engineer.

(iv) Netting or other sheet covering as specified and shown on the Engineer's drawings or rock bolts as specified and shown on the Engineer's drawings or either as required by the Engineer.

1/04/07 Where necessary the faces of cuttings which are to receive topsoil shall have one or more of the following measures carried out as appropriate and as agreed with the Engineer:-

(i) isolated patches of soft fragmented or insecure material shall be excavated and be either as required by the Engineer, or

(a) Filled by well ramming in a class of fill with similar characteristics as the surrounding material or

(b) Excavated and dealt with as for sub-clause 1/04/06(i)

(ii) other areas required to be made stable shall be dealt with as agreed with the Engineer.

1/04/08 The concrete, referred to in paragraphs (i) and (ii) above, which is to be permanently exposed on the face of the cutting shall have surface features as near as possible matching those of the adjacent intact face. Such concrete and the grout referred to in (ii) above shall have a consistent colour agreed by the Engineer as nearly as possible matching that of the adjacent intact face.

PART 5 EXCAVATION FOR FOUNDATIONS

1/05/01 Trench excavation or foundations shall be taken out to the levels shown on the drawings or as directed by the Engineer. Where there is any requirment for the sides of excavations to be taken out to a specific slope, this will be indicated on the drawings and the Contractor shall execute the excavation accordingly.

1/05/02 Before excavation proper is begun the area to be excavated shall be cleared of all buildings, walls and other obstructions, and all trees within the area shall be cut down, hedges cut down, and all bushes, scrub undergrowth and the like cleared. All roots shall be grubbed up, and the refuse resulting from the foregoing shall, unless otherwise directed, be removed from the site.

1/05/03 The Contractor shall be bound to excavate through all materials encountered to the required formation, and the methods used shall be to the approval of the Engineer. To complete the excavation the bottom shall be neatly trimmed off to the required dimensions and particular care shall be taken not to soften the formation by the operations of excavating equipment. Twenty-four hours notice shallbe given to the Engineer for inspection of the formation.

1/05/04 As soon as practicable thereafter the formation shall be covered by the permanent work or otherwise protected by approved methods. If at the time of inspection of the formation areas exist which are unsuitable for foundation purposes, these shall be further excavated to the Engineer's direction and refilled with materials directed by the Engineer.

1/05/05 If such additional work is necessitated through no fault of the Contractor, he shall be reimbursed accordingly. If, however, such additional excavation and filling arises in the Engineer's opinion through faulty workmanship, (including failure to deal with water) or if subsequent additional excavation is required through failure adequately to protect the formation after a successful inspection, then the Contractor shall execute such additional work at his own expense.

1/05/06 The Contractor shall at his own expense make up in a manner and using materials approved by the Engineer any excess excavation below the defined foundation levels or beyond the defined payment lines where such excess excavation has not been instructed by the Engineer.

1/05/07 Multiple handling of excavated material due to the Contractor's own method of operation shall not be paid for.

1/05/08 The Contractor shall be entirely responsible for supporting the sides of excavations and for supporting and protecting from damage arising from his operations all pipes and other services in the area of the excavations and all adjacent buildings. It shall be for the Contractor to satisfy himself, before beginning excavation, of the nature of all adjacent pipes and services, buildings (and their foundations) so that he can produce for the Engineer's comment his proposals for carrying out the excavations and providing support as described above. Such proposals shall take into account the practical method of carrying out subsequent construction work, notwithstanding any theoretical allowances for working space which may be given, and notwithstanding the insertion or omission in the Bill of Quantities of any special items for temporary works such as planking, strutting, special shoring or sheet piling.

PART 6: WATERCOURSES

1/06/01 The clearance and modification of existing, or the construction of new, watercourses, including ditches, streams, rivers, lagoons and ponds, shall be as described, where shown, on Engineer's drawings including any protection, lining, revetment or other works and shall comply with the following.

1/06/02 Clearance of existing watercourses shall include the removal of vegetation, vegetable matter and all other deposits within the watercourse profile. Materials resulting from this clearance shall be dealt with as unacceptable material.

1/06/03 New watercourses and cleared existing watercourses shall be maintained in a clear condition.

1/06/04 Redundant watercourses shall; where shown on the Engineer's drawings, be drained and cleared in accordance with this clause and material, outside of the watercourse profile excavated and dealt with as unacceptable material. The excavations shall be to the dimensions stated in the Contract or as directed by the Engineer and the whole filled with general or selected fills of the Class specified on Engineer's drawings or complying with Table 1 deposited and compacted in compliance with Parts 08 and 12 of this Specification. Where the surface is to remain exposedit shall be topsoiled and seeded, or receive other treatment, all as described in the Contract or directed by the Engineer.

PART 7: EXPLOSIVES AND BLASTING FOR EXCAVATION

1/07/01 Blasting for excavation shall not be employed unless permitted or as shown on Engineer's drawings and such blasting shall be confined to the locations and be carried out within the time limits stated therein.

1/07/02 The Contractor shall:-

(i) not carry out plaster shooting:

(ii) for each location where blasting is to be undertaken, obtain the written consent of the Engineer to theproposed programme of blasting, including trial explosions, at least 10 days before it commences. The Contractor shall also give written notice of each blasting event as described in (v) below, at least 12 hours beforehand.

(iii) Carry out trial explosions with reduced quantities of explosives in order to determine the size of the actual explosive charges and their disposition for use in the main blasting operations so as not to exceed the values for vibrational amplitude and vibrational peak particle velocity stated in (vi) below at the positions described therein.

(iv) Determine danger zones likely to be created by the blasting operations, including trial explosions within which blasted material may be projected and utilise suitable arrangements including Temporary Works, to retain such projectiles and subject and without prejudice to the provisions of the Conditions of Contract, ensure that no injury or damage is caused to persons or property therefrom.

(v) Limit blasting to a small number of events during permitted hours per day. An event shall comprise a single explosion or a group of explosions each separated by a short time interval, the group lasting less than a minute.

(vi) Ensure that:-

(a) Structures and earthworks, existing or under construction, on and off the Site, do not experience, during blasting operations including trial explosions, a vibrational amplitude exceeding 0.2mm and a resultant peak particle velocity exceeding 50mm per second, or other limits specified on Engineer's drawings at the same time or individually and

(b) peak over pressures of magnitude such as to endanger windows and glazed areas of structures do not occur.

(vii) Where appropriate, rigidly fix to structures and insert in earthworks described in (vi)(a) above, suitable instruments to measure the vibrational amplitude and resultant vibrational peak particle velocity, and peak overpressures, experienced during blasting operations including trial explosions. The contractor shall submit details of the proposed instrumentation within the Site and, unless otherwise specified on Engineer's drawings shall make his own arrangements for installing instruments on property off the Site including negotiating with landowners and other interested parties. The Contractor shall read such instruments and take measurements throughout the period of blasting operations, including trial explosions and, for those onstructures or earthworks on the Site and, shown on Engineer's drawings on property off the Site, report the results to the Engineer at the end of each day's blasting.

(viii) Take measurements of vibrational amplitude and peak particle velocity in each of three mutally perpendicular planes and the peak value shall be taken as the maximum resultant calculated by vector summation of the three components of amplitude and velocity respectively, measured as instantaneously as the resolution of the recording instrument permits.

(ix) Ensure that noise from blasting operations is controlled.

(x) Use explosives in the quantities and in the manner recommended by the manufacturer.

(xi) Store explosives in a licensed store or magazine provided with a separate compartment for detonators or use them under an immediate Use Certificate issued by the police.

(xii) Only permit explosives to be used or handled by or under the immediate control of a competent person in accordance with the Construction (General Provisions) Regulations (1961 Reg 19).

(xiii) Ensure there is no unauthorised issue or improper use of explosives brought on the Site and maintain a strict check on quantities issued and consumed.

(xiv) Comply with the requirements of BS 6656 and BS 6657 in respect of the use of electrical detonators in the vicinity of static and mobile radio transmitters,, including normal radio and television and broadcasting stations and radar units associated with aircraft movements, electricity generating plant and transmission lines.

PART 8: CONSTRUCTION OF FILLS

1/08/01 All fills, including embankments, shall be constructed:-

(i)in the locations shown on the Engineer's drawings to the lines and levels stated thereon:

(ii) of Classes of materials required or permitted by the Engineer compying with Table 1 with, unless otherwise shown on the Engineer's drawings, only Class 6A material deposited into open water.

(iii) By depositing, as soon as practicable after excavation, in layers to meet the compaction requirements of Part 12 as required for each Class of material in Table 1, except that:-

(a) material requiring end product compaction shall be deposited in layers not exceeding 250mm uncompacted thickness.

(b) Material placed into open water shall be deposited by end tipping without compaction.

(c) Material deposited in areas to receive dynamic compaction complying with Part 20 shall be deposited and compacted to the requirements therein.

(iv) To the requirements of this Clause and any other requirements to fill in this Series.

1/08/02 Starter layers of Classes 6B, 6C or 6D materials as shown on Engineer's drawings shall be deposited as the first layer or layers of fill above existing ground level or, if appropriate, above any ground improvement as shown on the Engineer's drawings. Starter layers below Class 2E pulverised fuel ash general fill shall be Class 6D material. Plant movement across starter layer material shall be restricted to that plant which is necessary for its deposition, spreading and compaction in compliance with this Clause and Part 12 and any plant required to carry out any ground improvement beneath it if required by Part 20. The Engineer may require lighter spreading plant or the reduction of the number of passes of the compaction plant, to prevent damage to the underlying strata.

1/08/03 Coarse granular material Classes 1C and 6B shall before compaction be spread in layers by a crawler tractor of not lessthan 15 tonnes total mass. After compaction each layer shall, if voids remain, be blinded with an approved Class of granular material complying with Table 1 so that all surface voids are filled before the next layer and before any capping or sub-base is constructed.

1/08/04 Embankments and other areas of fill shall, unless otherwise required on the Engineer's drawings or permitted by the Engineer, be constructed evenly over their full width and their fullest possible extent and the Contractor shall control and direct constructional plant and other vehicular traffic uniformly over the area. Damage by constructional plant and other vehicular traffic shall be made good by the Contractor with material having the same characteristics and strength as the material had before it was damaged.

1/08/05 Embankments and other areas of unsupported fills shall not be constructed with steeper side slopes, or to greater widths than those shown on Engineer's drawings, except to permit adequate compaction of the edges before trimming back, or to obtain the final profile following any settlement of the fill and the underlying material. However any oversteepening or increase in width shall not exceed any limits described as specified on Engineer's drawings and shall remain only for the minimum periods necessary to be consistent with the safety of the Permanent Works.

1/08/06 Staged construction of fills and any controlled rates of filling, shall be carried out, in accordance with any requirements as specified on the Engineer's drawings including installation of instrumentation and its monitoring in compliance with Part 19 of this Specification.

1/08/07 Where shown on Engineer's drawings the Contractor shall surcharge embankments or other areas of fill, as described therein for the periods stated. Unless the surcharge material is as specified on Engineer's drawings the Contractor shall submit to the Engineer, for his approval, details of materials he intends to adopt. If settlement of surcharged fill results in any surcharging material, which is unacceptable for use in the fill being surcharged, lying below the formation or, where there is capping, the sub-formation, the Contractor shall remove this unacceptable material and dispose of it in accordance with Part 3 above. He shall then bring the resultant level up to formation or sub-formation as appropriate with acceptable material.

1/08/08 Where pipes in embankments or in other areas of fill are permitted by the Engineer to be constructed other than in a trench the fill shall be brought up to and over them equally on both sides. The fill shall be deposited in even layers and shall not be heaped above the pipe. Spreading and compaction shall be carried out evenly without dislodging or damaging the pipe. Power rammers are not to be used within 300mm of any part of the pipe or joint.

1/08/09 Once a level 600mm below sub-formation or, where there is no sub-formation, below formation, is exceeded the construction of fills for the full width of embankments or other areas of fill, between the outer extremities of the verges, shall either:-

(i) be completed up to sub-formation or formation respectively in accordance with Clause Parts 13 and 16 of this Specification as appropriate and be followed immediately by the construction of the full thickness of capping, sub-base or blinding as applicable, or if specified on Engineer's drawings such lesser thickness of capping or sub-base as described therein, as a weather protection, all carried out in a continuous operation, or

(ii) where the Contractor wishes to delay placing of capping, sub-base or blinding as appropriate, fill in this zone shall be continously constructed with the same material to a level at least 300mm above sub-formation or formation as appropriate, to form a weather protection layer 300mm thick, compacted in compliance with Table 1. The weather protection layer shall be from the Contractor's own resources.

1/08/10 During construction of embankments and other fills exposed sides of Classes 2E and 7B pulverised fuel ash material shall be protected against scour and erosion from any source by methods approved by the Engineer.

1/08/11 Completed slopes of Classes 2E and 7B fill material shall be covered immediately by topsoil or turf or other material all as shown on Engineer's drawings.

1/08/12 Whenever fill is to be deposited against the face of a natural slope or sloping earthworks face including embankments, cuttings or fills and excavations, such faces shall be benched or otherwise shaped as specified on the Engineer's drawings immediately before placing the subsequent fill.

1/08/13 All permanent faces of side slopes of embankments and other areas of fill formed in Classes 2 or 7 cohesive materials other than pulverised fuel ash, shall, subsequent to any trimming operations, be re-worked and sealed to the satisfaction of the Engineer by tracking a tracked vehicle, considered suitable by the Engineer, on the slope or by another method approved by the Engineer.

PART 9: GEOTEXTILES USED TO SEPARATE EARTHWORKS MATERIALS

1/09/01 Geotextiles required as part of the Permanent Works to separate earthworks materials at locations as shown on Engineer's drawing shall be manufactured from synthetic or other fibres as required therein and be in the form of thin permeable membranes.

1/09/02 The Contractor shall provide evidence to the Engineer, before the geotextile is incorporated in the Permanent Works,that thegeotextile will be sufficiently durable, when installed in contact with the materials to be separated, as to maintain its integrity for at least the life period asspecified on the Engineer's drawings.

1/09/03 Geotextiles shall be protected at all times from mechanical or chemical damage. Those susceptible to damage by light shall not be uncovered, between manufacture and incorporation in the Permanent Works. Temporary exposure shall not exceed 5 hours.

1/09/04 The number of samples shall be as specified on the Engineer's drawings and jointly selected by the Contractor and the Engineer and shall be taken from the consignment of geotextile to be used in the Permanent Works. Samples and testpieces cut from them shall comply with Clause 1/09/07 and test pieces shall be tested at a laboratory approved by the Engineer to prove the geotextile meets thefollowing criteria or other criteria specified on the Engineer's drawings. The Geotextile shall:-

(i) sustain a tensile load of not less than 2.5KN/m at 5% axial strain determined in a 'wide strip' tensile test carried out in accordance with clause 1/09/08.

(ii) Allow water to flow through it, at right angles toits principal plane, in either direction, at a rate of not less than 10 litres/m²/s under a constant head of water of 100mm determined in accordance with Clause 1/09/09.

(iii) Have a size distribution of pore openings such that the 090 as defined in Clause 1/09/10 is between 100 μm and 300μm, determined in accordance with that Clause.

1/09/05 The geotextile shall be laid and lapped as described in this Clause or as shown on the Engineer's drawings and where lappingis employed adjacent sheets or strips of geotextile shall be overlapped by at least 300mm, or other dimension shown on the Engineer's drawings.

1/09/06 The layer of material on which the geotextile is to be placed shall not have protrusions or sharp projections which are likely to damage the geotextile during installation or in service. The method of installation shall ensure that the geotextile is in continuous contact with the surface on which it is to be placed and the geotextile shall not be stretched or bridged over hollows or humps. Operation of construction plant directly on the installed geotextile will not be permitted and its covering with fill material shall take place immediately after its laying.

1/09/07 All samples and test pieces cut from them shall be maintained in a clean and dry condition, except for normal contamination and wetting during testing, and shall be retained by the Contractor until completion of the Period of Maintenance when they shall be delivered to the Engineer. Prior to determination of pore size and tensile strength, test pieces shall be conditioned and brought into equlibrium to a temperature of 20 C+ or - 2 C and a relative humidity of 65+ or - 5%. The dry weight of the geotextile tested shall be quoted in g/m².

1/09/08 The 'wide strip' tensile strength test shall be carried out as follows by a method approved by the Engineer:-

(i) The test pieces shall be 200mm wide and have a gauge length of 100mm.

(ii) A minimum of five test specimens shall be taken and tested in each of the two principal directions within the geotextile relating to its mode of manufacture, in order to determine the characteristic strength of the geotextile.

(iii) The rate of strain shall be 10% + 3% per minute.

(iv) The characteristic strength shall be taken as the value of the strength of the material below which not more than 5% of the test results may be expected to fall. This represents the strength at 1.64 standard deviations below the mean strength.

1/09/09 Flow rate of water shall be determined as follows:-

(i) Geotextiles shall be tested in an unloaded condition under a 100mm constant head of water.

(ii) Flow shall be in a single direction.

(iii) The area to be tested shall be circular and of between 50mm and 100mm diameter.

(iv) Before testing the test piece shall be conditioned in clean water for one hour.

(v) The water used in the test shall:-

(a) be as free of air as possible and the apparatus shall be supplied from a still tank and not directly from a mains supply;

(b) not be contaiminated with detergents or other substances and there shall be no recycling of the water;

(c) have a temperature not less than 10C nor in excess of 25 C. The flow rate determined in the test shall be corrected to that applicable to a temperature of 15C using published data on variation in viscosity of water with temperature.

(vi) The quantity of flow to be collected shall be not less than 2 litres or alternatively the flow shall be collected for a period of time in excess of 15 s.

(vii) The number of test pieces shall be a minimum of 4 and the number of flow runs per test piece shall be a minimum of 4.

(viii) The flow shall be quoted in litres/m²/s. The standard deviationof the flow results shall be stated together with the mean.

1/09/10 Pore size distribution and determination of 090 shall be as follows:-

(i) The pore size distribution shall be obtained by determining the percentages of each of a number of different designated sizes of glass spheres complyin gwith BS 6088 (chosen so as to cover the range of pore sizes) which are retained on the geotextile when shaken through it employing the geotextile as a sieve.

(ii) Acumulative frequency graph of percentage of spheres retained against designated size shall be plotted and the size corresponding to 90% retained is the required 090.

(iii) For each sieving at least 100 g of the glass spheres shall be shaken for 10 min on a test piece of geotextile supported and clamped in place on a BS sieve of frame diameter 300mm and aperture size greater than 10mm.

(iv) The sieve apparatus shall have a vibrational frequency of 50 Hz and a maximum vertical amplitude of 0.75 mm.

(v) 5 test pieces having dimensions exceeding the dimensions of the sieve shall be taken to provide a mean of 090 pore size.

PART 10: FILL TO STRUCTURES

1/10/01 This Clause shall apply to fill to structures other than:-

(i) fill for reinforced earth structures, including associated drainage layers.

(ii) Fill for anchored earth structures including associated drainage layers;

(iii) Fill for surround and bedding of corrugated steel buried structures;

(iv) Fill above structural concrete foundations unless otherwise specified on Engineer's drawings.

1/10/02 Materials as required or specified on Engineer's drawings of Classes 6N, 6P and crusher run material and complying with Table 1 shall be used as fill to structures, in the locations shown on the Engineer's drawings.

1/10/03 The Contractor shall compact, in compliance with Part 12, end-product compaction, Class 6N & 6P, material to satisfy the compaction requirements for those Classes as listed in Table 1, but subject to the restriction noted hereunder in clauses 1/10/04 and 05.

The Contractor shall compact crusher run material in accordance with table 4, however the number of passes in column headed N = shall be doubled for all materials beneath the structure.

1/10/04 Where fill to structures is required to the same level on more than one side of a structural element it shall be maintained at heights not differing by more than 250mm after compaction on opposing sides of the structural element as filling proceeds, unless otherwise permitted by the Engineer.

1/10/05 The Contractor shall restrict compaction plant used on fill to structures, within 2m of a structure to the following items as described in Clause 1/12/02 and listed in table 4.

(i) Vibratory roller having a mass per metre width of roll, as determined by Clause 1/12/02 not exceeding 1,300kg with a total mass not exceeding 1,000 kg.

(ii) Vibrating plate compactor having a mass not exceeding 1,000kg

(iii) Vibro-tamper having a mass not exceeding 75kg.

The compacted level of the fill within this zone shall not differ during construction from the compacted level of the remainder of the adjoining fill to structures by more than 250mm.

1/10/06 Where specified on the Engineer's drawings, Classes 6N &6P material shall be shown by means of a test utilising not less than 20m³ of the material deposited and compacted in accordance with this Clause, that it is stable in the opinion of the Engineer, when it is trimmed to a slope of 1 vertical to 1½ horiztonal or other slope shown on the Engineer's drawings.

PART 11: FILL ABOVE STRUCTURAL CONCRETE FOUNDATIONS

1/11/01 Fill deposited above structural concrete foundations shall be, as shown on Engineers drawings, either:-

(i) Class b6N or 6P, material complying with Part 10 including compaction requirements or

(ii) another class of selected fill or general fill complying with Table 1 deposited and compacted in compliance with Parts 8 and 12 and in addition be subject to Clauses 1/10/04 and 1/10/05.

PART 12: COMPACTION OF FILLS

1/12/01 General

Except for dynamic compaction, unless otherwise specified on Engineer's drawings or agreed by the Engineer, the Contractor shall carry out compaction in compliance with this clause, as soon as practicable after deposition, on all those Classes of fill in Table 1 which require to be compacted.

Compaction shall be either method or end-product as required for the class of fill in Table 1 using plant appropriate to the Class of fill and the site conditions.

Subject to the provisions of the Conditions of Contract and in order that the Engineer may make proper provision for the supervision of compaction in the Permanent Works, the Contractor shall, not less than 24 hours before he proposes to carry out compaction outside normal working hours, apply in writing to the Engineer for permission to do so.

1/12/02 Method Compaction

Where method compaction is required to be adopted it shall comply with the following.

Except as stated hereunder, method compaction shall be undertaken using the plant and methods appropriate to the compaction requirements as listed in Table 1 for the Class of material being compacted.

Plant and methods not so included in table 4 shall only be used providing the Contractor demonstrates at site trials that a state of compaction is achieved by the alternative method equivalent to that obtained using the specified method. The procedure to be adopted for these site trials shall first be submitted to the Engineer for approval.

Earthmoving plant shall not be accepted as compaction equipment nor shall the use of a lighter category of plant to provide any preliminary compaction to assess the use of heavier plant be taken into account when assessing the amount of compaction required for any layer.

If more than one Class of material is being used in such a way that it is not practicable to define the areas in which each Class occurs the Contractor shall compact with plant operating as if only the material which requires the greater compactive effort is being compacted.

The Engineer may:-

(i) at any time carry out field dry intensity tests as described in Clause 1/12/03

(iv) On material compacted to method requirements.

(ii) If the results of the field tests in (i) above show densities which indicate when compared with the results of similar tests made onapproved work in similar materials carried out in accordance with this Clause and table 4 the state of compaction to be inadequate, then if this is held to be due to failure of the Contractor to comply with the requirements of the Contract, the Contractor shall carry out such further work as the Engineer may decide is required to comply with the Contract.

For the purposes of table 4 the following shall apply:-

(i) The minimum number of passes N is the minimum number of times that each point on the surface of the layer being compacted shall be traversed by the item of compaction plant in its operating mode, or struck by power rammers or falling weight compactors. D is the maximum depth of the compacted layer.

(ii) In column headed N ≠ the number of passes shown is to be doubled for material Classes 1A, 1B, 2A, 2B, 2C, 2D and crusher run when such materials occur within 600mm of sub-formation if a capping is required, or formation. Such extra compaction shall, unless otherwise specified on the Engineer's drawings, either be carried out for the full width of the embankment or, in other areas of fill which are to receive a pavement, between the outer extremities of the verges.

(iii) The compaction plant in table 4 shall be categorised in terms of static mass. The mass per metre width of roll is the total mass on the roll divided by the total roll width. Where a roller has more than one axle the category of the machine shall be determined on the basis of the axle giving the highest value of mass per metre width.

(iv) A grid roller is a machine with a compacting roll or rolls constructed of heavy steel mesh of square pattern.

(v) A tamping roller is a machine with a roll or rolls from which 'feet' project and where the projected end area of each 'foot' exceeds 0.01m² and the sum of the areas of the feet exceeds 15% of the area of the cylinder swept by the ends of the feet. The requirements for tamping rollers apply to machines that have 2 rolls in tandem. If only one tamping roll traverses each point on the surface of the layer on any one pass of the machine, the minimum number of passes shall be twice the number given in Table 4 plus any further doubling required to satisfy (ii) above.

(vi) For pneumatic-tyred rollers the mass per wheel is the total mass of the roller divided by the number of wheels.

(vii) For vibratory rollers the following shall apply:-

(a) Vibratory rollers are self-propelled or towed smooth wheeled rollers having means of applying mechanical vibration to one or more rolls except that vibratory rollers employed for Method 5 compaction shall be single roll types.

(b) The requirements for vibratory rollers are based on the use of the lowest gear on a self-propelled machine with mechanical transmission and a speed of 1.5-2.5km/h for a towed machine, or a self-propelled machine with hydrostatic transmission. If higher gears or speeds are used an increased number of passes shall be provided in proportion to the increase in speed of travel.

(c) Where the mechanical vibration is applied to two rolls in tandem, the minimum number of passes shall be half the number given on table 4 for the appropriate mass per metre width of one vibrating roll but if one roll differs in mass per metre width from the other the number of passes shall be calculated as for the roll with the smallest value. Alternatively the minimum number of passes may be determined by treating the machine as having a single vibrating roll with a mass per metre width equal to that of the roll with the right value.

(d) Vibratory rollers operating without vibration will be classified as smooth-wheeled rollers.

(e) Vibratory rollers shall be operated with their vibratory mechanism operating at the frequency of vibration which produced the highest measurement of amplitude unless the manufacturers recommend otherwise for the material being compacted.

(f) Vibratory rollers shall be equipped or provided with devices indicating the frequency at which the mechanism is operating and the speed of travel.

Both devices shall be capable of being read by an inspector alongside the machine.

(viii) Vibrating-plate compactors are machines having a base-plate to which is attached a source of vibration consisting of one or two eccestrically weighted shafts and:-

(a) The mass per square metre of the base-plate of a vibrating-plate compactor is calculated by dividing the total mass of the machine in its working condition by its area in contact with the material to be compacted.

(b) Vibrating-plate compactors shall be operated at the frequency of vibration recommended by the manufacturers. They shall normally be operated at travelling sepeds of less than 1km/h but if higher speeds are necessary the number of passes shall be increased in proportion to the increase in speed of travel.

(ix) Vibro-tampers are machines in which an engine-driven reciprocating mechanism acts on a spring system through which oscillations are set up in a base-plate.

(x) Power rammers are machines which are actuated by explosions in an internal combustion cylinder, each explosion being controlled manually by the operator.

(xi) Dropping weight compactors are machines in which a dead weight is dropped from a controlled height using a hoist mechanism and they include self-propelled machines with mechanical traversing mechanisms capable of compacting soil in trenches and close to structures.

(xii) Dropping weight compactors are machines in which adead weight is dropped from a controlled height using a hoist mechanism and they include self-propelled machines with mechanical traversing mechanisms capable of compacting soil in trenches and close to structures.

(iii) For items marked * in the Method 3 column the roller shall be towed by track-laying tractors. Self propelled rollers are unsuitable.

(xiv) Where combinations of different types or categories of plant are used, the following shall apply:-

(a) the depth of layer shall be that for the type of plant requiring the least depth of layer and,

(b) the number of passes shall be that for the type of plant requiring the greatest number of passes.

1/12/03 End Product Compaction

Where end-product compaction is required to be adopted it shall comply with the following.

(i) The Contractor shall at least 7 working days before commencement of end-product compaction submit the following to the Engineer for approval.

(a) The values of maximum dry density and the optimum moisture content obtained in accordance with BS 1377 Test 12 or 14 as appropriate for each of the fills he intends to use which fall within the Contract limits of the permitted Class or Classes. Where within any Class of material the fill contains material having different maximum dry densities and optimum moisture contents the Class shall be further sub-divided, by extending the identification system, in order to monitor the compacted density.

(b) A graph of density plotted against moisture content from which each of the values in (i) above of maximum dry density and optimum moisture content were determined and, for Class 7A material a plot of 5% air voids curve for each sub-division.

(ii) Once the information noted in (i) above has been approved by the Engineer, it shall form the basis for compaction.

(iii) Fill compacted to end-product requirements shall have a field dry density, measured in accordance with paragraph (iv) hereunder, equal to or greater than the percentage given in Table 1 of the maximum dry density for the relevant Class of fill previously submitted to and approved by the Engineer in accordance with paragraph (i) above.

(iv) The field dry density referred to in para (iii) above of this shall be measured in accordance with Test 15 of BS 1377 or, where specified on the Engineer's drawings or permitted by the Engineer, measured by a nuclear moisture/density gauge used in accordance with an agreed procedure based on ASTM D2922 Methods A or B and ASTM D3017. The gauge shall be calibrated to provide a result identical to that obtain from Test 15 of BS 1377

PART 13: SUB-FORMATION AND CAPPING

1/13/01 Capping shall be provided only in those locations, and to the extent, particularly stated in the Contract to be constructed with capping. It shall comply with this Clause and in addition, for stablised capping, with Parts 14 and 15 as appropriate.

1/13/02 Capping shall be constructed with Class 6F1, 6F2, 9A or 9B material as specified on Engineer's drawings and complying with Table 1.

1/13/03 Unless otherwise specified on the Engineer's drawings capping shall consist of one Class of material throughout its depth laid in one or more layers of compacted thickness complying with Part 12 or be formed of not more than two elements of different materials. Each element shall be formed of one or more layers of the same material, each of compacted thickness complying with Part 12 Class 9B stabilised capping material shall not be placed or constructed above Class 6 granular capping material.

1/13/04 Where specified on the Engineer's drawings before commencing the construction of capping in the Permanent Works, the Contractor shall demonstrate to the Engineer the methods, equipment and materials he proposes to use by constructing an area, or areas as appropriate of capping on a typical prepared sub-formation to the same thickness as required in the Permanent Works. The area of each trial construction demonstration shall be not less than 700 m^2.

1/13/05 The materials placed during the demonstration may form part of the Permanent works, provided they meet the requirements as specified or be carried out elsewhere on the Site as agreed by the Engineer. After completion of each demonstration area the Contractor shall allow a period of not greater than 5 working days, following acceptance by the Engineer, before commencing the main construction of the appropriate capping or general filling in the Permanent Works, to enable the Engineer to carry out tests on each demonstration area. Where required by the Engineer the Contractor shall provide sheeting, to protect the demonstration area.

1/13/06 The demonstration area shall, unless accepted by the Engineer as part of the Permanent Works, be removed and the area reinstated in accordance with this specification and Engineer's drawings.

1/13/07 The methods and materials used in the accepted demonstration shall not be changed during the course of the Works without the agreement of the Engineer.

1/13/08 Unless otherwise stated on the Engineer's drawings sub-formations shall have the same longitudinal gradient and cross fall as the formation.

1/13/09 The Contractor shall limit any unprotected area of sub-formation, which is to receive capping to suit the output of the plant in use and the rate of deposition of capping.

1/13/10 No unprotected sub-formation which is to receive a capping shall remain continuously exposed to rain causing degradation, nor, unless permitted by the Engineer, be left uncovered overnight.

1/13/11 In cuttings the Contractor shall, as permitted or as specified on the Engineer's drawings carry out one of the following procedures:-

(i) for Class 6F1 or 6F2 capping : excavate below formation level to a depth to accept the material, trim the surface to form the sub-formation and immediately compact with one pass of a smooth-wheeled roller having a mass per m width of roll not less than 2,100kg or a vibratory roller having a mass per m width of roll not less than 700kg or a vibrating plate compactor having a mass per m^2 of not less than 1,400kg, except that only smooth wheeled rollers shall be used on Class 3 chalk material and immediately deposit and compact above it a capping in Class 6F1 or 6F2 material or

(ii) for 9A or 9B capping material construct the cappingby stabilising the intact material, providing it complies with Class 6E or 7E material requirements, immediately below formation to form Class 9A or Class 9B material, respectively; or

(iii) excavate below formation to sufficient depth to enable stabilisationof intact Class 6E or 7E material to be carried out, to produce Class 9A or 9B material forming the lower element of the capping. After stabilisation of this element the capping shall be completed by depositing a further layer or layers of Class 6E or 7E material and stabilising it to form Class 9A or 9B capping or depositing and compacting Class 6F1 or 6F2 material to form the upper element of the capping or

(iv) excavate to sub-formation level and deposit material complying with Classes 6E and 7E to be stabilised to form a capping of Class 9A or Class 9B material in one or more layers.

1/13/12 On embankments and other areas of fill the Contractor shall, as permitted or as specified on Engineer's Drawings carry out one of the following procedures:-

(i) complete the embankment to form the sub-formation or remove any protection layer and trim the surface to form the sub-formation, and in both cases compact with one pass of a smooth-wheeled roller having a mass per m width of not less than 2,100kg or a vibratory roller of not less than 700kg per m width or a vibrating plate compactor having a mass per m^2 of not less than 1,400kg (except that only smooth-wheeled rollers shall be used on Class 3 chalk material) and immediately construct above it, in one or more layers, Class 6F1 and 6F2 capping or

(ii) construct the embankment to sufficient height and carry out stabilisation to form a capping of Class 9A or Class 9B material in one or more layers utilising where appropriate any protection layer previously constructed or

(iii) for multi-element capping, incorporating stabilised material, construct the embankment to sufficient height to carry out the work described in (ii) above and immediately construct above it one or more layers of Class 6F1 or 6F2 capping.

Where a stabilised layer is directly overlain by Class 6F1 or 6F2 material the stabilised layer shall be compacted as for a sub-formation in (i) above.

PART 14: CEMENT STABILISATION TO FORM CAPPING

1/14/01 Where capping is to consist, either wholly or in part, of cement stabilised material Class 9A, this Clause shall apply to the construction of those parts which are stabilised with cement.

1/14/02 Material to be stabilised with cement shall be Class 6E material complying with Clause 1/02/01 and Table 1. Unless otherwise specified in the Contract cement shall be Ordinary Portland Cement complying with relevant clauses in McLay Collier & Partners Specification for Road Pavements.

1/14/03 Class 6E material to be stabilised shall have added to it at least 2% of its dry weight of cement, or such other percentage determined on the demonstration area to meet the specified bearing ratio.

1/14/04 The appropriate quantity of cement shall be uniformly spread by an approved spreading machine on top of the layer to be processed. Using a collecting tray and balance the Contractor shall check, in the presence of the Engineer, the rate of spread of the machine once for every 500m² of cement spread.

1/14/05 Unless otherwise agreed by the Engineer, Class 6E material shall be stabilised in a single layer if its compacted thickness is 250mm or less. If its compacted thickness is greater, the material shall be stabilised in layers not less than 130mm and not more than 250mm thick, including any cutting-in required by Clause 1/14/09.

1/14/06 The Contractor shall not carry out cement stabilisation when the shade temperature is below 3C unless on a rising thermometer above 0 C. Cement stabilisation shall not be carried out during periods of rain or when rain is imminent. When cement is spread on material likely to cause premature hydration processing in accordance with Clause 1/14/07 shall follow immediately.

1/14/07 Unless otherwise agreed by the Engineer, Class 6E material forming the layer to be stabilised shall be processed by pulverising and mixing in the cement by means of a sufficient number of passes of an approved mobile stabilising machine until 95% of the silt and clay fraction is reduced to particles or lumps passing a BS28mm sieve and the pulverisation complies with Table 1.

1/14/08 During processing, only sufficient water shall be available in the material to facilitate mixing, and to hydrate the cement and enable satisfactory mixing to be achieved.

1/14/09 The stabilising machine shall be equipped with a device for controlling the depth of processing which shall be maintained at the correct setting at all times. An overlap of 150mm shall be made between adjacent passes of the stabilising machine. Where a subsequent layer of material is placed on a layer previously stabilised the tines or blades of the stabilising machine shall be set so that they cut into the previously stabilised layer below by at least 20mm.

1/14/10 Each layer of Class 9A processed material shall be compacted as soon as possible after the final pass of the stabilising machine. Compaction shall be completed within 2 hours following the mixing of the cement into the material to be stabilised.

1/14/11 The compaction of each layer shall comply with Part 12 table 4 method 6 except that if layers greater than 250mm thickness are constructed with the permission of the Engineer, the number of passes of the compaction plant shall be determined from the results of the demonstration area.

1/14/12 Class 9A material shall be cured in accordance with relevant clauses in McLay Collier & Partners specification for Road Pavements unless immediately covered by sub-base. During periods when the air temperature is forecast to drop below 3C or when ground frost is forecast, Class 9A material shall be protected to prevent freezing, for a period of 7 days from the time of completion of compaction. Such protection shall be sealed to prevent tne ingress of moisture.

PART 15: LIME STABILISATION TO FORM CAPPING

1/15/01 Where cappingis to consist, either wholly or in part, of lime stabilised material Class 9B, this Clause shall apply to the construction of those parts which are stabilised with lime.

1/15/02 Material to be stabilised with lime shall be Class 7E material complying with Part 2 and Table 1.

1/15/03 Lime for lime stablisation shall, as specified on Engineer's drawings be either quicklime or hydrated lime complying with BS 6463. Quicklime shall when sieved have 100% passing a BS 10mm sieve and at least 95% by mass passing a BS 5 mm sieve.

1/15/04 The Contractor shall provide for each source of lime a report of a chemical analysis for 'availabe lime' made in accordance with Clause 1/24/08. Such reports shall be submitted to the Engineer prior to the incorporation of lime in the Permanent Works at weekly or other intervals as agreed by the Engineer during periods when lime stabilisation is carried out.

1/15/05 Class 7E material to be stabilised shall have added to it a quantity of lime, that will provide at least 2½% by weight of 'available lime' as a percentage of the dry weight ofthe material to be stabilised.

1/15/06 Lime of quantity complying with Clauses 1/15/04 and 1/15/05 above shall be uniformly spread by an approved spreading machine on top of the layer to be stabilised. Using a collecting tray and balance the Contractor shall check, in the presence of the Engineer, the rate of spread by weight, once for every 500m² of lime spread. At the same time the Contractor shall collect samples of lime deposited on the tray and test them for available lime content in accordance with Clause 1/24/08.

1/15/07 Unless otherwise agreed by the Engineer, the material shall be stabilised in a single layer if its compacted thickness is 250mm or less. If its compacted thickness is greater, the material shall be stabilised in layers not less than 130mm and not more than 250mm thick, including any cutting-in required by Clause 1/15/12.

1/15/08 Unless otherwise agreed by the Engineer lime stabilisation shall be carried out only during the months of March to September inclusive and when the shade temrperature is not below 7 C. When the contractor proves to the satisfaction of the engineer on the demonstration area that the specified bearing ratio is attainable at a shade temperature less than 7C, lime stabilisation may be carried out at suchlower temperature. Lime stabilisation shall not be carried out during periods of heavy rain.

1/15/09 Unless otherwise agreed by the Engineer, the material forming the layer or layers to be stabilised shall be processed by pulverising and mixing in the lime by means of sufficient number of passes of an approved mobile stabilising machine until 95% of the Class 9B processed material passes a BS 28mm sieve after dry sieving and the pulverisation complies with Table 1.

1/15/10 During processing sufficient water shall be available in the material to slake the lime and to facilitate mixing.

1/15/11 If after 4 passes of the stabilising machine, the requirements of Clause 1/15/09 have not been met processing shall be interrupted for a period agreed by the Engineer of up to 72 hours to enable the lime to react with the soil. Before this period commences the surface of the layer shall be sealed with one pass of a smooth-wheeled roller having a mass per metre width of roll of not less than 2,700kg or a pneumatic tyred roller of not less than 1,000kg mass per wheel. At the end of this period the layer shall be reprocessed without the addition of further lime by a sufficient number of passes of the stabilising machine to comply with Clauses 1/15/09 and 1/15/13 adding water uniformly if necessary.

1/15/12 The stabilising machine shall be equipped with a device for controlling the depth of processing which shall be maintained at the correct setting at all times. An overiap of 150mm shall be made between adjacent passes of th estabilising machine. Where a subsequent layer of material is placed on a layer previously stabilised the tines or blades of the stabilising machine shall be set so that they cut into the previously stabilised layer below by at least 20mm.

1/15/13 Each layer of Class 9B processed material shall be compacted as soon as possible after the final pass of the stabilising machine. Immediately before compaction the processed material shall have a Moisture Condition Value (MCV) of not greater than 12 nor less than the figure specified on the Engineer's drawings for Class 9B lime stabilised material, both as determined in accordance with Part 22.

1/15/14 If there is a delay following the final pass and before commencement of compaction the surface shall be sealed by not less than 2 passes of a smooth-wheeled roller having a mass per metre width of not less than 2,700kg or of a pneumatic tyred roller of not less than 1,000kg mass per wheel. On recommencement and before compaction the layer shall be re-processed without the addition oflime, by a sufficient number of passes of the stabilising machine to meet the MCV requirements of Clause 1/15/13 of this Clause adding water uniformly if necessary.

1/15/15 The compaction of each layer shall comply with Part 12 table 4 method 6 except that if layers more than 250mm thick are constructed with the permission of the Engineer the number of passes of the compaction plant shall be those determined from results obtained on the demonstration area.

PART 16: PREPARATION AND SURFACE TREATMENT OF FORMATION

1/16/01 The formation shall, after completion of any subgrade drainage, and immediately before laying sub-base on areas of completed formation have a surface level tolerance within+ 20mm and-30mm relative to its designed level after completion of the following operations as necessary:-

(i) any protection layer shall be removed and any soft or damaged areas shall be rectified by excavating them and replacing with acceptable material having the same characteristics and strength as the surrounding material. The surface of the formation shall be trimmed and immediately cleaned free from mud and slurry which shall be dealt with as unacceptable material Class U1 and

(ii) the formation shall immediately be compacted in addition to the compaction required for the fill. This additional compaction shall for this purpose be assumed to be as for a layer of 250mm finished thickness compacted in compliance with Part 12 table 4 method 6 except for Class 3 materials where method 4 shall be used. Immediately after the additional compaction the formation shall be trimmed to achieve the tolerances of this sub-clause.

1/16/02 Where the tolerances in Clause 1/16/01 are exceeded the Contractor shall determine the full extent of the area which is out of tolerance and shall make good the formation as follows:-

(i) if the surface is too high it shall be re-trimmed and re-compacted in compliance with Part 12 and Clause 1/16/01 above.

(ii) If the surface is too low it shall be corrected by the addition of acceptable material complying with Table 1 having characteristics and strength matching the overlain material deposited and compacted in compliance with Parts 8 and 12 above and clause 1/16/01. In cohesive materials Classes 2 and 7 where this low surface is less than 150mm below formation, material shall be removed to a depth of at least 150mm below formation before the additional material is deposited and compacted.

1/16/03 After trimming or re-trimming if necessary, theformation shall be rolled with one pass of a smooth wheeled roller having a mass per metre width of roll not less than 2100kg or except for Class 3 material, a vibratory roller having a mass per metre width of vibrating roll of not less than 700kg or a vibrating plate compactor having a mass per m^2 under the base plate of not less than 1,400kg.

1/16/04 Where specified on Engineer's drawings or where in the opinion of the Engineer the tolerances in Clause 1/16/01 cannot be achieved in the preparation of formations in rock then one of the following shall be carried out so as to achieve the above tolerances:-

(i) the material shall be excavated below formation to the depth shown on Engineer's drawings or agreed by the Engineer. The excavated material shall be processed as specified on Engineer's drawings or agreed by the Engineer and re-deposited and compacted in compliance with Parts 8 and 12 and table 4 method 6 in compacted layers not greater than 250mm thick or

(ii) where the rock surface is tabular it shall be regulated by depositing and compacting cement bound material as specified on Engineer's drawing or agreed by the Engineer.

1/16/05 The Contractor shall limit any areas of completed formation to suit the output of plant in use and the rate of deposition of sub-base. No formation of cohesive material Classes 2 and 7 shall remain continuously exposed to rain causing degradation or, unless permitted by the Engineer, be left uncovered overnight.

PART 17: USE OF SUB-FORMATION OR FORMATION BY CONSTRUCTION PLANT.

1/17/01 Construction Plant and other vehicular traffic shall not be operated on the sub-formation, except that required for the construction of capping, unless adequate protection, if necessary in addition to any weather protection is provided.

1/17/02 Construction Plant and other vehicular traffic shall not be operated on the formation except for that required for preparation of the formation in compliance with Part 16 above unless adequate protection, if necessary in addition to any weather protection is provided. The Engineer may, however, permit Construction Plant for the supply and deposition of sub-base to use formations of capping or of materials having similar characteristics.

1/17/03 In addition to the requirements of Clauses 1/17/01 and 1/17/02 of this Clause, the Contractor shall submit and clear with the Engineer proposals for the protection of the sub-formation or formation in areas where they are within 300mm of the existing ground level after topsoil has been stripped before using Construction Plant or other vehicular traffic at or above sub-formation or formation.

PART 18: EARTHWORKS FOR CORRUGATED STEEL BURIED STRUCTURES OF SPAN EXCEEDING 900mm.

1/18/01 The construction of earthworks for corrugated steel buried structures of span exceeding 900mm together with assembly and erection of their components shall be in compliance with this clause and Section 19 Part 4.

1/18/02 Excavation shall be carried out in compliance with Part 5 above.

1/18/03 Fill for corrugated steel buried structures shall be of the following selected granular materials complying with Table 1 or as detailed on the drawings:-

(i) Lower bedding material Class 6K or type 1 material.

(ii) Upper bedding material Class 6L or type 1 material.

(iii) Surround material Class 6M or crusher run material.

1/18/04 In addition to the requirements of Clauses 1/18/05 to 1/18/11 Class 6K, 6L and 6M materials or the materials detailed on the drawings shall be deposited in compliance with Part 8 above and shall except for the upper bedding material which shall be uncompacted, be end-product compacted in compliance with Part 12 and Table 1 except that the compacted layers shall not exceed 150mm thickness.

1/18/05 The lower bedding material shall have its top surface shaped during compaction to match the steel structure profile. A uniform layer of uncompacted upper bedding material shall be deposited, before the placing of any part of the steel structure, over the whole width of the shaped lower bedding material and shall be of sufficient depth to fill the corrugations of the underside of the structure.

1/18/06 Surround material shall be deposited and compacted uniformly on either side of the structure.

1/18/07 Surround material under the structure shall be well compacted, to the satisfaction of the Engineer by hand using a suitably sized pole or length of rectangular timber between the corrugations, or by other approved methods.

1/18/08 Plant for compaction of the surround material within 1m of either side of the structure and up to a height of 1m or one fifth of the span if greater, above the crown, shall be restricted to the following items, as described in Clause 1/12/01 and listed in Table 4.

(i) Vibratory roller having a mass per metre width of roll not exceeding 750kg.

(ii) Vibrating plate compactors having mass not exceeding 750kg.

(iii) Vibro-tampers.

1/18/09 During all operations of filling compaction, road pavement construction and of any other traffic movements which affect the shape of the structure, the changes in the horizontal and vertical diameters of the structure shall not exceed + - 5% for circular structures and + 2% for structures of other cross sections. The longitudinal straightness over any 10m length of the structure shall not deviate by more than 10mm and the rotational displacement in any 10m length of structure shall not be greate than 10mm.

1/18/10 Only that compaction plant described in Clause 1/18/08 shall be used in the vicinity of the structure unless the depth of compacted surround material placed above the crown of the structure is more than 1m, or one fifth of the span, whichever is the greater. The structure shall not be subjected to a surcharge greater than the depth of fill shown on the Engineer's drawings with the exception of any protection layers approved by the Engineer.

1/18/11 No material shall be placed by tipping either onto the structure or within a distance on either side of the structure of 2m or half the span of the structure, whichever is the greater.

PART 19: INSTRUMENTATION AND MONITORING

1/19/01 Instrumentation other than that required in compliance with Part 7 shall be as specified on Engineer's drawings.

1/19/02 Monitoring of instrumentation shall be carried out as specified on Engineer's drawings and the results supplied to the Engineer.

PART 20 GROUND IMPROVEMENT

1/20/01 Dynamic Compaction

Dynamic compaction carried out to either method or end product as specified on Engineer's drawings and all as described in the Contract achieved by dropping falling heavy mass (pounder) a number of times at pre-determined spacings on the surface of the ground or fill shall be applied to the areas as specified on Engineer's drawings.

1/20/02 Other Methods

Other methods of ground improvement shall be carried out where specified and shown on Engineer's drawings.

PART 21 EARTHWORKS MATERIALS TESTS

1/21/01 Unless otherwise specified by the Engineer sampling and testing of earthworks materials shall be carried out in accordance with BS 1377.

PART 22 DETERMINATION OF MOISTURE CONDITION VALUE (MCV) OF EARTHWORKS MATERIALS

1/22/01 Where the Moisture Condition (MCV) as defined in Section 3 of TRRL Supplementary Report 522 is to be determined the determination shall be carried out in compliance with Appendix 3 of TRRL Research Report RR90.

1/22/02 The determination of the MCV/Moisture Content relation in accordance with Section 11.5 of TRRL Supplementary Report 522 shall be carried when required by the Engineer.

1/22/03 An alternative procedure is given in Section 11.4 of TRRL Supplementary Report 522. This rapid assessment procedure for material acceptability may be used when permitted by the Engineer.

PART 23 DETERMINATION OF UNDRAINED SHEAR STRENGTH OF REMOULDED COHESIVE MATERIAL

1/23/01 Where specified by the Engineer the undrained shear strength of cohesive soil in total stress conditions shall be determined from compression tests performed on specimens remoulded at their natural moisture content and tested under conditions in which the lateral pressure is maintained constant and there is no change in the total water content of the specimens. Unless otherwise specified by the Engineer the tests shall be made on specimens remoulded by compaction in the form of right cylinders of nominal diameter 100 mm and nominal height 200 mm by the procedure described in this Clause using a triaxial machine which shall be capable of:-

i) Applying axial compression at a rate of strain of 1%/min.

ii) Measuring the axial compression of the specimen to an accuracy of 0.025 mm over a range of 70 mm.

iii) Measuring the additional axial load to an accuracy equivalent to Grade B of BS 1610.

iv) Maintaining an internal pressure of up to 500 kN/m² to an accuracy of 10 kN/m².

v) Applying additional axial compressive force to the specimen by means of a loading ram.

1/23/02 The preparation of test specimens shall be carried out as described in Test 12 of BS 1377 except that the mould shall be 200 mm in height and 105 mm diameter, and be split in three segments to facilitate removal of the specimen. The soil sample shall be at its natural moisture content.

1/23/03 After compaction the split mould shall be dismantled and the specimen carefully removed. Its length and diameter shall be measured to an accuracy enabling the bulk density to be calculated to an accuracy of $\pm$ 1%.

1/23/04 The specimen shall be tested in the triaxial cell as described in Test 21 of BS 1377 at an operating cell pressure of 200 $\pm$ 10 kN/m² and a rate of axial strain of 1% per minute. The results shall be calculated and reported as described in Test 21 of BS 1377 and the undrained shear strength calculated by dividing the maximum principal stress difference (0 - 0) by 2. When values for C and 0 are to be obtained the test shall be modified to enable Mohr circles to be plotted and C and 0 reported.

1/23/05 Where specified or permitted by the Engineer other tests specified or agreed by the Engineer may be used during construction to supplement the test described above provided the results have been correlated to ensure compatibility.

PART 24 TESTS FOR PARTICLE SOUNDNESS

1/24/01 10% Fines Test

The 10% fines value shall be the value determined in accordance with BS 812 Part 111 except that the samples shall be tested in a saturated and surface dried condition. Before testing the selecting test portions shall be soaked in water at room temperature for 24 hours without previously having been oven dried.

The 10% fined test shall only be carried out on material which contained particles of sizes passing the 28 mm BS sieve and retained on the 2.36 mm BS sieve.

PART 25 DETERMINATION OF EFFECTIVE ANGLE OF INTERNAL FRICTION (O) AND EFFECTIVE COHESIVE (c') OF EARTHWORKS MATERIALS

The effective angle of internal friction 0' and effective cohesion c' shall be determined by shear box or triaxial tests as required in Table 1 and specified by the Engineer and as described in Clauses 1/25/01 to 1/25/05.

Shear Box Tests

1/25/01 For Classes 6N, 6I and 6J granular materials, the procedure shall be as follows:-

i) The undrained constant rate of strain shear box test shall be used. The plan size of the shear box shall be 300 mm with a depth of not less than 150 mm. The maximum particle size shall be not greater than 0.125 of the depth of the sample in the shear box.

ii) Three samples shall be tested, each sample occupying the full depth of the shear box and shall be compacted to 92% ± 2% of the maximum dry density which shall be determined in accordance with Test 14 of BS 1377.

iii) The normal stress shall be equal to the maximum vertical pressure in the fill, obtained from the design calculations, and shall be applied to the sample which shall be sheared within one hour of compaction. The rate of shearing shall be not greater than 1.2 mm/minute.

iv) The peak shear stress, corresponding with a particular normal stress shall be obtained from the measurement of the maximum shear value.

v) The tangent of the effective angle of internal friction of a sample is given by the ratio of the peak shear stress to the corresponding normal stress. The average of the three angles so obtained shall be reported as the effective angle of internal friction of the fill.

vi) The following additional information shall be recorded for each test:-

a) Normal stress applied kN/m^2
b) Peak shear stress kN/m^2
c) Strain at peak shear stress %

1/25/02

For Classes 7A, 7C and 7 D cohesive materials the procedure shall be as follows:-

i) The drained constant rate of strain shear test shall be used. The shear boxes shall be 300 mm square in plan by not less than 150 mm deep and 60 mm square in plan by not less than 40 mm deep. The maximum particle size shall be not greater than 0.125 of the depth of the sample in the shear box.

ii) For the initial determination of fill properties three samples shall be tested in each size of shear box. The samples shall occupy the full depth of the box and shall be compacted to 92% $\pm$ 2% of the maximum dry density which shall be determined in accordance with Test 13 of BS 1377. To allow the sample to soften, the shear box assembly shall then be immersed in water for a minimum period of 24 hours.

iii) Each of the three samples shall be subjected to a different effective normal stress equal to the maximum vertical pressure in the fill at the base, quarter height and mid height of the structure respectively. Normal stresses shall be applied to the softened sample for a minimum period of 24 hours prior to shearing.

iv) The rate of shearing shall be such that no pore water pressure is generated.

v) The peak shear stress for a particular normal stress shall be obtained from the measurement of the maximum shear value.

vi) For each size of shear box, a graph of the peak shear stresses shall be plotted against the corresponding normal stresses. The tangent of the effective angle of internal friction of the fill is given by the slope of the straight line drawn through the points of the graph and the effective cohesion is given by the shear stress ordinate corresponding with zero normal stress.

vii) The test results obtained using the 300 mm square box shall be taken as the properties of the fill. The initial test results obtained using the 60 mm square box shall be used for the subsequent quality control of the fill.

viii) The following additional information shall be recorded for each test:-

a) Normal stress applied kN/m²
b) Peak shear stress kN/m²
c) Strain at peak shear stress %
d) Moisture content after test

1/25/03 For the 7B pulverised fuel ash material the procedure shall be as the above except that:-

i) The maximum dry density shall be determined in accordance with Test 12 of BS 1377.

ii) The normal stress shall be applied and the sample shall be immersed as soon as the box has been filled and compacted.

iii) An additional sample shall be subjected to an effective normal stress equal to the maximum vertical pressure in the fill at three quarters of the height of the structure or the lowest attainable normal stress whichever is greater.

iv) The normal stress shall be applied concurrently with the immersion of the sample for a period of 24 hours. Shearing of the sample shall then be carried out without further delay.

1/25/04 The apparatus used shall be a commercially available shear box apparatus approved by the Engineer.

1/25/05 Triaxial Tests

Where Class 7A cohesive fill to structure is to be tested by a triaxial test it shall be carried out in accordance with Part 23 except that the test shall be carried out in two stages, a consolidation stage and a shearing stage and the specimen is allowed to drain during both stages at a sufficiently slow rate of strain to ensure that no excess pore water pressures develop.

PART 26 DETERMINATION OF RESISTIVITY (ρ) TO ASSESS CORROSIVITY OF EARTHWORKS MATERIAL

1/26/01 Where required and specified by the Engineer the resistivity of the material to be used in the permanent works shall be determined as specified by the Engineer.

PART 27 DETERMINATION OF REDOX POTENTIAL (E) TO ASSESS CORROSIVITY OF EARTHWORKS MATERIAL

1/27/01 Where required and specified by the Engineer the redox potential of the material to be used in the permanent works shall be determined as specified by the Engineer.

PART 28 DETERMINATION OF PERMEABILITY OF EARTHWORKS MATERIALS

1/28/01 Where required in Table 1 and specified by the Engineer the permeability of earthworks materials shall be determined as specified by the Engineer.

PART 29

DETERMINATION OF AVAILABLE LIME CONTENT OF LIME FOR LIME STABILISED CAPPING

1/29/01

The available lime content of lime for lime stabilised capping to be determined on site shall be carried out as described in BS 6463 Part 1 except that the sample increments shall be taken from the collecting tray used to check the rate of spread at intervals of one increment per 500 m^2.

The available lime content shall be determined as calcium oxide in accordance with BS 6463, Part 2, Method 20, and the results reported as:-

Available Lime (as CaO) = ...% by mass.

TABLE 1 : Acceptable Earthworks Materials: Classification and Compaction Requirements [See Footnotes]

CLASS				GENERAL MATERIAL DESCRIPTION	TYPICAL USE	PERMITTED CONSTITUENTS (All subject to requirements of Clause 601 and Appendix 6/1)	MATERIAL PROPERTIES REQUIRED FOR ACCEPTABILITY (In addition to requirements on use of fill materials in Part 2 and testing in Part 21)				COMPACTION REQUIREMENTS IN Part 12	CLASS		
							PROPERTY (see exceptions in previous column)	DEFINED AND TESTED IN ACCORDANCE WITH:—	ACCEPTABLE LIMITS WITHIN:— LOWER	UPPER				
GENERAL GRANULAR FILL	1	A	—	Well graded granular material	General fill	Any material, or combination of materials, other than material designated as Class 3 in the Contract. (Properties i, ii and iv in next column, shall not apply to chalk)	(i) grading	BS 1377 Test 7	Tab. 2	Tab. 2	Tab. 4 Method 2	1	A	—
							(ii) uniformity coefficient	BS 892	10	—				
							(iii) mc	BS 1377 Test 1	See dwgs	See dwgs				
							(iv) MCV	Part 22.	See dwgs	See dwgs				
	1	B	—	Uniformly graded granular material	General fill	Any material, or combination of materials, other than material designated as Class 3 in the Contract. (Properties i, ii and iv in next column, shall not apply to chalk)	(i) grading	BS 1377 Test 7	Tab. 2	Tab. 2	Tab. 4 Method 3	1	B	—
							(ii) uniformity coefficient	BS 892	—	10				
							(iii) mc	BS 1377 Test 1	See dwgs	See dwgs				
							(iv) MCV	Part 22	See dwgs	See dwgs				
	1	C	—	Coarse granular material	General fill	Any material, or combination of materials, other than material designated as Class 3 in the Contract. (Properties i and ii in next column, shall not apply to chalk)	(i) grading	BS 1377 Test 7	Tab. 2	Tab. 2	Tab. 4 Method 5	1	C	—
							(ii) uniformity coefficient	BS 892	5	—				
							(iii) 10% fines value	Part 24	50 kN	—				
GENERAL COHESIVE FILL	2	A	—	Wet cohesive material	General fill	Any material, or combination of materials, other than material designated as Class 3 in the Contract. (Properties i, ii, iii lower limit, and iv in next column, shall not apply to chalk)	(i) grading	BS 1377 Test 7	Test 6/2	Tab. 2	Tab. 4 Method 1 except: (i) for materials with liquid limit greater than 50, determined by BS 1377 Test 2, only tamping or grid rollers shall be used (ii) for chalk vibratory rollers of Categories over 1800 kg shall not be used	2	A	—
							(ii) plastic limit (PL)	BS 1377 Test 3	—	—				
							(iii) mc	BS 1377 Test 1	PL −4%	See dwgs				
							(iv) MCV	Part 22	See dwgs	See dwgs				
							(v) undrained shear strength of remoulded material	Part 23	See dwgs	See dwgs				
	2	B	—	Dry cohesive material	General fill	Any material, or combination of materials, other than chalk	(i) grading	BS 1377 Test 7	Tab. 2	Tab. 2	Tab. 4 Method 2	2	B	—
							(ii) plastic limit (PL)	BS 1377 Test 3	—	—				
							(iii) mc	BS 1377 Test 1	See dwgs	PL−4				
							(iv) MCV	Part 22	See dwgs	See dwgs				
							(v) undrained shear strength of remoulded material	Part 23	See dwgs	See dwgs				

GENERAL COHESIVE FILL	2	C	—	Stony cohesive material	General fill	Any material, or combination of materials, other than chalk	(i) grading	BS 1377 Test 7	Tab. 2	Tab. 2	Tab. 4 Method 2	2	C	—
							(ii) plastic limit (PL)	BS 1377 Test 3	—	—				
							(iii) mc	BS 1377 Test 1	See dwgs	See dwgs				
							(iv) MCV	Part 22	See dwgs	—				
							(v) undrained shear strength of remoulded material	Part 23	See dwgs	—				
	2	D	—	Silty cohesive material	General fill	Any material, or combination of materials, other than chalk	(i) grading	BS 1377 Test 7	Tab. 2	Tab. 2	Tab. 4 Method 3	2	D	—
							(ii) mc	BS 1377 Test 1	See dwgs	See dwgs				
							(iii) MCV	Part 22	See dwgs	See dwgs				
							(iv) undrained shear strength of remoulded material	Part 23	See dwgs	See dwgs				
	2	E	—	Reclaimed pulverised fuel ash cohesive material	General fill	Reclaimed material from lagoon or stockpile containing not more than 20% furnace bottom ash	(i) mc	BS 1377 Test 16	To enable compaction to Part 12		End product: 95% of maximum dry density Test 12 BS 1377	2	E	—
							(ii) bulk density	BS 1377 Test 1	See dwgs	See dwgs				
GENERAL CHALK FILL	3	—	—	Chalk	General fill	Chalk and associated materials all designated as Class 3 in the Contract	(i) mc	BS 1377 Test 1	—	See dwgs	Tab. 4 Method 4, or Method 1 or 2	3	—	—
				Crusher Run	General Fill	Crushed Rock	(i) grading	BS 1377 Test 7	Tab. 2	Tab. 2	Tab. 4 Method 6	4	—	—
							(ii) mc	BS 1377 Test 1	opt -2%	opt mc				
							(iii) 10% filler	Part 24	30 kN	-				
SELECTED GRANULAR FILL	6	A	—	Selected well graded granular material	Below water	Natural gravel, natural sand, crushed gravel, crushed rock other than argillaceous rock, crushed concrete, chalk, or any combination thereof. (Properties i and ii in next column, shall not apply to chalk)	(i) grading	BS 1377 Test 7	Tab. 2	Tab. 2	No compaction	6	A	—
							(ii) uniformity coefficient	BS 892	10	—				
							(iii) plasticity index	BS 1377 Test 4	Non plastic					

SELECTED GRANULAR FILL

6	B	—	Selected coarse granular material	Starter layer	Natural gravel, natural sand, crushed gravel, crushed rock, crushed concrete, chalk, slag, or any combination thereof. (Properties iii and v in next column, shall not apply to chalk)	(i) grading	BS 1377 Test 7	Tab. 2	Tab. 2	Tab. 4 Method 5	6	B	—
						(ii) uniformity coefficient	BS 892	6	—				
						(iii) plasticity index	BS 1377 Test 4	Non-plastic					
						(iv) 10% fines value	Part 24	50 kN	—				
						(v) mc	BS 1377 Test 1	See dwgs	See dwgs				
						(vi) MCV	Part 22	See dwgs	See dwgs				
			Well burnt colliery spoil may be used when particularly specified - See 1/02/03										
6	C	—	Selected uniformly graded granular material	Starter layer	Natural gravel, natural sand, crushed gravel, crushed rock other than argillaceous rock, crushed concrete, chalk, or any combination thereof. (Properties iii and vi in next column, shall not apply to chalk)	(i) grading	BS 1377 Test 7	Tab. 2	Tab. 2	Tab. 4 Method 3	6	C	—
						(ii) uniformity coefficient	BS 892	—	10				
						(iii) plasticity index	BS 1377 Test 4	non-plastic					
						(iv) 10% fines value	Part 24	50 kN	—				
						(v) mc	BS 1377 Test 1	See dwgs	See dwgs				
			Well burnt colliery spoil may be used when particularly specified - See 1/02/03			(vi) MCV	Part 22	See dwgs	See dwgs				
6	D	—	Selected uniformly graded granular material	Starter layer below pulverised fuel ash	Natural gravel, natural sand, crushed gravel, crushed rock other than argillaceous rock, crushed concrete, or any combination thereof.	(i) grading	BS 812 part 103	Tab. 2	Tab. 2	Tab. 4 Method 3	6	D	—
						(ii) uniformity coefficient	BS 892	—	10				
						(iii) plasticity index	BS 1377 Test 4	Non-plastic					
						(iv) mc	BS 1377 Test 1	See dwgs	See dwgs				
			Well burnt colliery spoil may be used when particularly specified - See 1/02/03			(v) MCV	Part 22	See dwgs	See dwgs				
6	E	—	Selected granular material	For stabilisation with cement to form capping	Any material, or combination of materials, other than colliery spoil and argillaceous rock. (Properties i, ii and iii in next column shall not apply to chalk)	(i) grading	BS 1377 Test 7	Tab. 2	Tab. 2	Not applicable	6	E	—
						(ii) liquid limit	BS 1377 Test 2	—	45				
						(iii) plasticity index	BS 1377 Test 4	—	20				
						(iv) organic matter	BS 1377 Test 8	—	2%				
						(v) total sulphate content	BS 1377 Test 9	—	1%				
6	F	1	Selected granular material (fine grading)	Capping	Any material, or combination of materials, other than colliery spoil. (Property i in next column shall not apply to chalk)	(i) grading	BS 1377 Test 7	Tab. 2	Tab. 2	Tab. 4 Method 6	6	F	1
						(ii) optimum mc	BS 5835	—	—				
						(iii) mc	BS 1377 Test 1	Optimum mc −2%	Optimum mc				
						(iv) 10% fines value	Part 24	30 kN	—				
6	F	2	Selected granular material (coarse grading)	Capping	Any material, or combination of materials, other than unburnt colliery spoil. (Property i in next column shall not apply to chalk)	(i) grading	BS 1377 Test 7	Tab. 2	Tab. 2	Tab. 4 Method 6	6	F	2
						(ii) optimum mc	BS 5835	—	—				
						(iii) mc	BS 1377 Test 1	Optimum mc −2%	Optimum mc				
						(iv) 10% fines value	Part 24	See dwgs					
6	G	—	Selected uniformly graded granular material	Gabion filling	Natural gravel, crushed rock other than argillaceous rock, crushed concrete or any combination thereof	(i) grading	BS 812			None	6	G	—
						(ii) 10% fines value	Part 24	50 kN	—				

SELECTED GRANULAR FILL	6	H	—	Selected uniformly graded granular material	Drainage layer to reinforced earth and anchored earth structures	Natural gravel, natural sand, crushed gravel, crushed rock other than argillaceous rock, crushed concrete, chalk, or any combination thereof. (Properties vi, vii, viii, ix and x in next column only apply when metallic reinforcing or anchor elements, facing units or fastenings are used.) (Properties ii and v in next column shall not apply to chalk)	(i) grading	BS 1377 Test 7	Tab. 2	Tab. 2	Tab. 4	6	H	—
							(ii) plasticity index	BS 1377 Test 4	Non-plastic				
							(iii) 10% fines value	Part 24	50 kN	—			
							(iv) mc	BS 1377 Test 1	See dwgs	See dwgs			
							(v) MCV	Part 22	See dwgs	See dwgs			
							(vi) pH value	BS 1377 Test 11	Tab. 3	Tab. 3			
							(vii) chloride ion content	BS 812	—	Tab. 3			
							(viii) total SO_3 content	BS 1377 Test 9	—	Tab. 3			
							(ix) resistivity	Clause 1/24/05	Tab. 3	—			
							(x) redox potential	Clause 1/24/06	Tab. 3	—			
	6	I	—	Selected well graded granular material	Fill to reinforced earth and anchored earth	Natural gravel, natural sand, crushed gravel, crushed rock other than argillaceous rock, crushed concrete, slag, chalk, or any combination thereof except that chalk shall not be combined with any other constituent. (Properties i, ii and v in next column shall not apply to chalk). (Properties viii, ix, x, xi and xii only apply when metallic reinforcing or anchor elements, facing units or fastenings are used)	(i) grading	BS 1377 Test 7	Tab. 2	Tab. 2	Tab. 4 Method 2	6	I	—
							(ii) uniformity coefficient	BS 892	10	—			
							(iv) mc	BS 1377 Test 1	See dwgs	See dwgs			
							(v) MCV	Part 22	See dwgs	See dwgs			
							(vi) effective angle of internal friction (Ø') and effective cohesion (c')	Part 24	See dwgs	—			
							(vii) coefficient of friction and adhesion (fill/elements)		See dwgs	—			
							(viii) pH value	BS 1377 Test 11	Tab. 3	Tab. 3			
							(ix) chloride ion content	BS 812	—	Tab. 3			
							(x) total SO_3 content	BS 1377 Test 9	—	Tab. 3			
							(xi) resistivity	Clause 1/24/05	Tab. 3	—			
							(xii) redox potential	Clause 1/24/06	Tab. 3	—			

SELECTED GRANULAR FILL	S	J	—	Selected uniformly graded granular material	Fill to reinforced earth and anchored earth	Natural gravel, natural sand, crushed gravel, crushed rock other than argillaceous rock, crushed concrete, slag, chalk, or any combination thereof except that chalk shall not be combined with any other constitutent. (Properties viii, ix, x, xi and xii in next column only apply when metallic reinforcing or anchor elements, facing units or fastenings are used). (Properties i, ii and v in next column shall not apply to chalk)	(i) grading	BS 1377 Test 7	Tab. 2	Tab. 2	Tab. 4 Method 3	6	J	—
							(ii) uniformity coefficient	BS 892	6	10				
							(iv) mc	BS 1377 Test 1	See dwgs	See dwgs				
							(v) MCV	Part 22	See dwgs	See dwgs				
							(vi) effective angle of internal friction (Ø ') and effective cohesion (c ')	Part 24	See dwgs	—				
							(vii) coefficient of friction and adhesion (fill/ elements)		See dwgs	—				
							(viii) pH value	BS 1377 Test 11	Tab. 3	Tab. 3				
							(ix) chloride ion content	BS 812	—	Tab. 3				
							(x) total SO_3 content	BS 1377 Test 9	—	Tab. 3				
							(xi) resistivity	Clause 1/24/06	Tab. 3	—				
							(xii) redox potential	Clause	Tab. 3	—				
	6	K	—	Selected well graded granular material	Lower bedding for corrugated steel buried structures	Natural gravel, natural sand, crushed gravel, crushed rock other than argillaceous rock, crushed concrete, or any combination thereof	(i) grading	BS 1377 Test 7	Tab. 2	Tab. 2	End product 90% of maximum dry density of Test 14 BS 1377	6	K	—
							(ii) uniformity coefficient	BS 892	10	—				
							(iii) plasticity index	BS 1377 Test 4	—	6				
							(iv) optimum mc	BS 1377 Test 14	—	—				
							(v) mc	BS 1377 Test 1	Optimum mc −2%	Optimum mc +1%				
							(vi) MCV	Part 22	See dwgs	See dwgs				
							(vii) 10% fines value	Part 24	100 kN	—				
							(viii) resistivity	Clause 1/24/05	2000 ohm.cm	—				
							(ix) redox potential	Clause 1/24/06	400 mV	—				
	6	L	—	Selected uniformly graded granular material	Upper bedding for corrugated steel buried structures	Natural gravel, natural sand, crushed gravel, crushed rock other than argillaceous rock, crushed concrete, or any combination thereof	(i) grading	BS 812	Tab. 2 (BS 882 Tab. 5)	Tab. 2	None	6	L	—
							(ii) resistivity	Clause 1/24/05	2000 ohm.cm	—				
							(iii) redox potential	Clause 1/24/06	400 mV	—				

SELECTED GRANULAR FILL	6	M	—	Selected well graded granular material	Surround to corrugated steel buried structures	Natural gravel, natural sand, crushed gravel, crushed rock other than argillaceous rock, crushed concrete, or any combination thereof	(i) grading	BS 1377 Test 7	Tab. 2	Tab. 2	End product 90% of maximum dry density of Test 14 BS 1377 unless otherwise stated in dwgs.	6	M	—
							(ii) uniformity coefficient	BS 892	10	—				
							(iii) plasticity index	BS 1377 Test 4	—	6				
							(iv) optimum mc	BS 1377 Test 14	—	—				
							(v) mc	BS 1377 Test 1	optimum mc −2%	optimum mc +1%				
							(vi) MCV	Part 22	See dwgs	See dwgs				
							(vii) 10% fines value	Part 24	100 kN	—				
							(viii) resistivity	Clause 1/24/05	2000 ohm.cm	—				
							(ix) redox potential	Clause 1/24/06	400 mV	—				
	6	N	—	Selected well graded granular material	Fill to structures	Natural gravel, natural sand, crushed gravel, crushed rock other than argillaceous rock, crushed concrete, slag, or any combination thereof	(i) grading	BS 1377 Test 7	Tab. 2	Tab. 2	End product 95% of maximum dry density of Test 14 BS 1377	6	N	—
							(ii) uniformity coefficient	BS 892	10	—				
							(iii) 10% fines value	Part 24	100 kN	—				
							(iv) undrained shear parameters (c and Ø)	Part 23	See dwgs	—				
							(v) effective angle of internal friction (Ø') and effective cohesion (c')	Part 24	See dwgs	—				
							(vi) permeability	Clause 1/24/07	See dwgs	—				
							(vii) mc	BS 1377 Test 1	See dwgs	See dwgs				
							(viii) MCV	Part 22	See dwgs	See dwgs				
							(ix) slope stability test (where required in dwgs)	Part 10	Part 10					
	6	P	—	Selected uniformly graded granular material	Fill to structures	Natural gravel, natural sand, crushed gravel, crushed rock other than argillaceous rock, crushed concrete, slag, chalk, or any combination thereof. (Properties i, ii and ix in next column shall not apply to chalk)	(i) grading	BS 1377 Test 7	Tab. 2	Tab. 2	End product 95% of maximum dry density of Test 14 BS 1377	6	P	—
							(ii) uniformity coefficient	BS 892	6	—				
							(iv) 10% fines value	Part 24	30kN	—				
							(v) undrained shear parameters (c and Ø)	Part 23	See dwgs	—				
							(vi) effective angle of internal friction (Ø') and effective cohesion (c')	Part 24	See dwgs	—				
							(vii) permeability	Clause 1/24/07	See dwgs	—				
							(viii) mc	BS 1377 Test 1	See dwgs	See dwgs				
							(ix) MCV	Part 22	See dwgs	See dwgs				
							(x) slope stability test (where required in App. 6/6)	Part 10	Part 10					

SELECTED COHESIVE FILL

7	A	—	Selected cohesive material	Fill to structures	Any material, or combination of materials, other than argillaceous rock and material designated as Class 3 in the Contract. If chalk is used it shall form 100% of constitutents. (Properties i and iii shall not apply to chalk)	(i) grading	BS 1377 Test 7	Tab. 2	Tab. 2	End product: 100% maximum dry density Test 12 BS 1377 or 5% air voids whichever gives lower dry density at field mc	7	A	—
						(ii) mc	BS 1377 Test 1	See dwgs	See dwgs				
						(iii) MCV	Part 22	See dwgs	See dwgs				
						(iv) undrained shear parameters (c & Ø)	Part 23	See dwgs	See dwgs				
						(v) effective angle of internal friction (Ø ') and effective cohesion (c ')	Part 24	See dwgs	See dwgs				
						(vii) liquid limit	BS 1377 Test 2	45	—				
						(viii) plasticity index	BS 1377 Test 4	25	—				
7	B	—	Selected conditioned pulverised fuel ash cohesive material	Fill to structures and to reinforced earth	Conditioned material direct from power station dust-collection system and to which a controlled quantity of water has been added	(i) mc	BS 1377 Test 1	To enable compaction to Part 12		End product 95% of maximum dry density of Test 12 BS 1377	7	B	—
						(ii) bulk density	BS 1377 Test15	See dwgs	See dwgs				
						(iii) undrained shear parameters (c and Ø)	Part 23	See dwgs	—				
						(iv) effective angle of internal friction (Ø ') and effective cohesion (c ')	Clause 1/24/02	See dwgs	—				
									—				
						(vi) permeability	Clause 1/24/07	See dwgs	—				
						(vii) angle of repose in slope stability trial (where required in App. 6/6)	Part 10	See dwgs					
7	C	—	Selected wet cohesive material	Fill to reinforced earth	Any material, or combination of materials, other than colliery spoil, argillaceous rock and chalk. (Properties vi, vii, viii, ix and x in next column only apply when metallic reinforcing elements, facing units or fastenings are used.	(i) grading	BS 1377 Test 7	Tab. 2	Tab. 2	Tab. 4 Method 1	7	C	—
						(ii) mc	BS 1377 Test 1	See dwgs	See dwgs				
						(iii) MCV	Part 22	See dwgs	See dwgs				
						(iv) effective angle of internal friction (Ø ') and effective cohesion (c ')	Clause 1/24/02	See dwgs	—				
									—				
						(vi) pH value	BS 1377 Test 11	Tab. 3	Tab. 3				
						(vii) chloride ion content	BS 812	—	Tab. 3				
						(viii) total SO_3 content	BS 1377 Test 9	—	Tab. 3				
						(ix) resistivity	Clause 1/24/05	Tab. 3	—				
						(x) redox potential	Clause 1/24/06	Tab. 3	—				

SELECTED COHESIVE FILL	7	D	—	Selected stony cohesive material	Fill to reinforced earth	Any material, or combination of materials, other than colliery spoil, argillaceous rock and chalk. (Properties vi, vii, viii, ix and x in next column only apply when metallic reinforcing elements, facing units or fastenings are used)	(i) grading	BS 1377 Test 7	Tab. 2	Tab. 2	Tab. 4 Method 2	7	D	—
							(ii) mc	BS 1377 Test 1	See dwgs	See dwgs				
							(iii) MCV	Part 22	See dwgs	See dwgs				
							(iv) effective angle of internal friction (Ø') and effective cohesion (c')	Clause 1/24/02		—				
										—				
							(vi) pH value	BS 1377 Test 11	Tab. 3	Tab. 3				
							(vii) chloride ion content	BS 812	—	Tab. 3				
							(viii) total SO_3 content	BS 1377 Test 9	—	Tab. 3				
							(ix) resistivity	Clause 1/24/05	Tab. 3	—				
							(x) redox potential	Clause 1/24/06	Tab. 3	—				
	7	E	—	Selected cohesive material	For stabilisation with lime to form a capping	Any material, or combination of materials, other than unburnt colliery spoil	(i) grading	BS 1377 Test 7	Tab. 2	Tab. 2	Not applicable	7	E	—
							(ii) mc	BS 1377 Test 1	See dwgs	See dwgs				
							(iii) MCV	Part 22	See dwgs	See dwgs				
							(iv) plasticity index	BS 1377 Test 4	10	—				
							(v) organic matter	BS 1377 Test 8	—	2%				
							(vi) total sulphate content	BS 1377 Test 9	—	1%				
MISC FILL	8	—	—	Class 1, Class 2 or Class 3 material	Lower trench fill	Any; except there shall not be any stones or lumps of clay > 40 mm nominal diameter	(i) mc	BS 1377 Test 1	See dwgs	See dwgs	Tab. 4	8	—	—
							(ii) MCV	Part 22	See dwgs	See dwgs				
STABILISED MATERIALS	9	A	—	Cement stabilised well graded granular material	Capping	Class 6E with addition of cement according to Part 14.	(i) pulverisation	BS 1924 Test 17	60%	—	Tab. 4 Method 6	9	A	—
							(ii) bearing ratio	BS 1924 Test 13	See dwgs	—				
							(iii) mc	BS 1924 Test 1	See dwgs	See dwgs				
	9	B	—	Lime stabilised cohesive material	Capping	Class 7E with addition of lime according to Part 15.	(i) pulverisation	BS 1924 Test 17	30%	—	Tab. 4 Method 6	9	B	—
							(ii) MCV immediately before compaction	Part 22	See dwgs	12				
							(iii) bearing ratio	BS 1924 Test 13	See dwgs	—				
							(iv) mc	BS 1924 Test 1	See dwgs	See dwgs				

TABLE 2: Grading Requirements for Acceptable Earthworks Materials

percentage by mass passing the size shown

CLASS	Size (mm)		Size (mm) B.S. Series													Size (μm) B.S. Series				Size (μm)	CLASS
	500	300	125	90	75	37.5	28	20	14	10	6.3	5	3.35	2	1.18	600	300	150	63	2	
1A			100																<15		1A
1B			100																<15		1B
1C	100		0-95													0-25			<15		1C
2A		100												80-100					15-100		2A
2B			100											00 100					15-100		2B
2C			100											15 80					15-80		2C
2D			100											00 100					15-100		2D
6A	100									0-100		0 85				0-45			0 5		6A
6B	100		0-10																		6B
6C			100			0-100					0 100		0-35	0-10		0-2					6C
6D										100		80 100		60-100	30-100	15 80	5-48	0-15 except 0-20 for crushed rock			6D
6E			100	85-100						25-100											6E
6F1					100	75-100				40-95		30-85				10 100			0-10		6F1
6F2			100	80-100	65-100	45-100				15-60		10-45				10 50			<15		6F2
6H								100				60-100			15 45	0 25			0-12		6H
6I and 6J			100		85-100				25-100					15-100		0-25		0-5			6I and 6J
6K								100								9-100			<15		6K
6L										100		80-100		60-100	30-100	15-100	5-70	0 15 except 0-20 for crushed rock	0-10		6L
6M					100																6M
6N and 6P					100														0-10		6N and 6P
7A					100														<15		7A
7C			100		85-100				83-100					80-100		60-100			15-100		7C
7D			100		85-100				40-90					15-79		15-75			15-45	0-20	7D
7E					100		95-100												15-45	0-20	7E
Crusher Run					100	70-100		53-100		37-77		26-53		15-34		6-20			15-100 0-7		

TABLE 3: Limits of material properties of fill for use with metal components in Reinforced Earth and Anchored Earth Structures for Class 6H, 6I, 6J, 7C and 7D material

Component material	Limits						
	pH value		Maximum chloride ion content	Maximum total SO_3 content	Minimum resistivity	Minimum redox potential	
	Classes 6H, 6I, 6J, 7C and 7D					Classes 6H, 6I and 6J	Classes 7C and 7D
	Min	Max	%	%	ohm–cm	volts	volts
Aluminium alloy	6	8	0.05	0.5	3000	0.40	0.43
Copper	5	9	0.05	0.5	2000	0.25	0.25
Hot-dip galvanized steel	6	9	0.05	0.5	5000	0.40	0.43
Stainless steel	5	10	0.03	0.5	3000	0.30	0.35

TABLE 4 : Method of Compaction for Earthworks Material Plant and Methods
(This Table is to be read in conjunction with Part 12)

Type of Compaction Plant	Ref No	Category	Method 1		Method 2		Method 3		Method 4		Method 5		Method 6			Ref No
			D	N‡	D	N‡	D	N‡	D	N	D	N	N for D=110 mm	N for D=150 mm	N for D=250 mm	
Smooth wheeled roller (or vibratory roller operating without vibration)		Mass per metre width of roll:—														
	1	over 2100 kg up to 2700 kg	125	8	125	10	125	10*	175	4	unsuitable		unsuitable	unsuitable	unsuitable	1
	2	over 2700 kg up to 5400 kg	125	6	125	8	125	8*	200	4	unsuitable		16	unsuitable	unsuitable	2
	3	over 5400 kg	150	4	150	8	unsuitable		300	4	unsuitable		8	16	unsuitable	3
Grid roller		Mass per metre width of roll:—														
	1	over 2700 kg up to 5400 kg	150	10	unsuitable		150	10	250	4	unsuitable		unsuitable	unsuitable	unsuitable	1
	2	over 5400 kg up to 8000 kg	150	8	125	12	unsuitable		325	4	unsuitable		20	unsuitable	unsuitable	2
	3	over 8000 kg	150	4	150	12	unsuitable		400	4	unsuitable		12	20	unsuitable	3
Tamping roller		Mass per metre width of roll:—														
	1	over 4000 kg	225	4	150	12	250	4	350	4	unsuitable		12	20	unsuitable	1
Pneumatic-tyred roller		Mass per wheel:—														
	1	over 1000 kg up to 1500 kg	125	6	unsuitable		150	10*	250	4	unsuitable		unsuitable	unsuitable	unsuitable	1
	2	over 1500 kg up to 2000 kg	150	5	unsuitable		unsuitable		300	4	unsuitable		unsuitable	unsuitable	unsuitable	2
	3	over 2000 kg up to 2500 kg	175	4	125	12	unsuitable		350	4	unsuitable		unsuitable	unsuitable	unsuitable	3
	4	over 2500 kg up to 4000 kg	225	4	125	10	unsuitable		400	4	unsuitable		unsuitable	unsuitable	unsuitable	4
	5	over 4000 kg up to 6000 kg	300	4	125	10	unsuitable		unsuitable		unsuitable		12	unsuitable	unsuitable	5
	6	over 6000 kg up to 8000 kg	350	4	150	8	unsuitable		unsuitable		unsuitable		12	unsuitable	unsuitable	6
	7	over 8000 kg up to 12000 kg	400	4	150	8	unsuitable		unsuitable		unsuitable		10	16	unsuitable	7
	8	over 12000 kg	450	4	175	6	unsuitable		unsuitable		unsuitable		8	12	unsuitable	8
Vibratory roller		Mass per metre width of a vibrating roll:—														
	1	over 270 kg up to 450 kg	unsuitable		75	16	150	16	unsuitable		unsuitable		unsuitable	unsuitable	unsuitable	1
	2	over 450 kg up to 700 kg	unsuitable		75	12	150	12	unsuitable		unsuitable		unsuitable	unsuitable	unsuitable	2
	3	over 700 kg up to 1300 kg	100	12	125	10	150	6	125	10	unsuitable		16	unsuitable	unsuitable	3
	4	over 1300 kg up to 1800 kg	125	8	150	8	200	10*	175	4	unsuitable		6	16	unsuitable	4
	5	over 1800 kg up to 2300 kg	150	4	150	4	225	12*	unsuitable		unsuitable		4	6	12	5
	6	over 2300 kg up to 2900 kg	175	4	175	4	250	10*	unsuitable		400	5	3	5	11	6
	7	over 2900 kg up to 3600 kg	200	4	200	4	275	8*	unsuitable		500	5	3	5	10	7
	8	over 3600 kg up to 4300 kg	225	4	225	4	300	8*	unsuitable		600	5	2	4	8	8
	9	over 4300 kg up to 5000 kg	250	4	250	4	300	6*	unsuitable		700	5	2	4	7	9
	10	over 5000 kg	275	4	275	4	300	4*	unsuitable		800	5	2	3	6	10
Vibrating plate compactor		Mass per m² of base plate:—														
	1	over 880 kg up to 1100 kg	unsuitable		unsuitable		75	6	unsuitable		unsuitable		unsuitable	unsuitable	unsuitable	1
	2	over 1100 kg up to 1200 kg	unsuitable		75	10	100	6	75	10	unsuitable		unsuitable	unsuitable	unsuitable	2
	3	over 1200 kg up to 1400 kg	unsuitable		75	6	150	6	150	8	unsuitable		unsuitable	unsuitable	unsuitable	3
	4	over 1400 kg up to 1800 kg	100	6	125	6	150	4	unsuitable		unsuitable		8	unsuitable	unsuitable	4
	5	over 1800 kg up to 2100 kg	150	6	150	5	200	4	unsuitable		unsuitable		5	8	unsuitable	5
	6	over 2100 kg	200	6	200	5	250	4	unsuitable		unsuitable		3	6	12	6
Vibro-tamper		Mass:—														
	1	over 50 kg up to 65 kg	100	3	100	3	150	3	125	3	unsuitable		4	8	unsuitable	1
	2	over 65 kg up to 75 kg	125	3	125	3	200	3	150	3	unsuitable		3	6	12	2
	3	over 75 kg up to 100 kg	150	3	150	3	225	3	175	3	unsuitable		2	4	10	3
	4	over 100 kg	225	3	200	3	225	3	250	3	unsuitable		2	4	10	4
Power rammer		Mass:—														
	1	100 kg up to 600 kg	150	4	150	6	unsuitable		200	4	unsuitable		5	8	unsuitable	1
	2	over 600 kg	275	8	275	12	unsuitable		400	4	unsuitable		5	8	14	2
Dropping-weight compactor		Mass of rammer over 600 kg height drop:—														
	1	over 1 m up to 2 m	600	4	600	8	450	8	unsuitable		unsuitable		unsuitable	unsuitable	unsuitable	1
	2	over 2 m	600	2	600	4	unsuitable		unsuitable		unsuitable		unsuitable	unsuitable	unsuitable	2

SECTION 4 STRUCTURAL LOADBEARING BRICKWORK, BLOCKWORK AND MASONRY

PART 1: MATERIALS AND WORKMANSHIP

4/01/01 General

Unless otherwise specified all structural loadbearing bricks or blocks shall be clean, hard and sound, and shall comply with the following British Standards as appropriate:

Clay Bricks	:	BS 3921 : 1985
Concrete Bricks and Blocks	:	BS 6073: Parts 1 and 2 : 1981

Calcium Silicate bricks shall not be used.

All loadbearing bricks or blocks shall be ordered from an approved manufacturer. Structural loadbearing walls shall be indicated in full on the Engineer's drawings

Bricks or blocks which are chipped or with broken arrises shall not be used in the works.

The term bricks or brickwork referred to in this Specification shall also be deemed to refer to blocks and blockwork as appropriate.

4/01/02 Design and Workmanship

The design and workmanship of brick and block masonry shall be in accordance with:

BS 5628 : Part 1 : 1978 (1985) Structural Use of Unreinforced Masonry
Part 2 : (1985) Structural Use of Reinforced and Prestressed Masonry.
Part 3 : (1985) Materials and Components, Design and Workmanship

and as specified on the Engineer's drawings.

The design and construction of stone masonry shall be in accordance with BS 5390 : 1976 (1984): Code of Practice for Stone Masonry.

4/01/03 Types of Bricks

Where noted bricks shall be of some, or all of the following types

Common Bricks

Shall be as specified on the drawings.

Facing Bricks

The facing bricks shall be as specified by the Architect's and/or as specified on the Engineer's drawings. When an agreed representative sample of the bricks has been approved, all deliveries to site shall be of the approved quality and appearance.

Load-bearing Bricks

Load-bearing bricks shall be classified in accordance with Clause 9 Table 4 of BS 3921:1985

Engineering Bricks

Engineering bricks shall be of Class A or B in accordance with Clause 9 Table 4 of BS 3921:1985 and as specified on the Engineer's drawings.

4/01/04 Properties of Bricks

Compressive Strength

Before placing bulk orders, the Contractor shall satisfy the Engineer that the load-bearing bricks to be used will be supplied to comply with the appropriate compressive strength classification indicated on the drawings and Manufacturer's Certificates provided.

Unless otherwise specified on the drawings, the crushing strength of the bricks shall not be less than 21 N/mm². But see also table on page 3 for brickwork below DPC level.

The Contractor shall produce evidence, to the Engineer's satisfaction, to show that an efficient method of quality control (per Appendix J of B.S. 3921: 1985) is in operation at the particular brickworks concerned. Alternatively, the Contractor shall make available to the Engineer, at regular intervals throughout the delivery period, the results of compressive tests on the bricks, conducted by an approved authority in accordance with Clauses 7 and 9 and Appendix D of B.S. 3921: 1985.

The testing intervals shall be specified by the Engineer.

In either case, the Contractor shall permit the Engineer, if he so wishes to arrange independent test samples periodically from the bricks delivered to site, or where special arrangements have been made from the allocation at the works.

Durability

The Contractor shall via a brick manufacturer provide evidence that the bricks under consideration have been in service under conditions of exposure at least as severe as those proposed for not less than 3 years in the locality of their proposed use, and that their performance, by inspection, has been shown to be satisfactory.

DURABILITY OF BRICKWORK IN EXTERNAL CONSTRUCTION

Category	Description of Condition or Situation	Min Quality of Unit Ref Table 3 BS3921 1985	Minimum Mortar Designation to BS5628 Part 1 1978 (1985)
A	All brickwork between foundation level and 150 mm below finished ground level	ML	Class (i)
B	All brickwork between dpc and 150mm below finished ground level.	FL	Class (i)
C	Unrendered External brickwork above dpc	FL	Class (ii)
D	Rendered External brickwork above dpc	ML	Class (iii)
E	Internal brickwork and inner leaves of cavity wall above dpc	ML	Class (iii)
F	Unrendered Parapets	FL	Class (i)
G	Rendered Parapets (other than cappings or copings)	ML	Class (ii)
H	Unrendered Chimney	FL	Class (i)
J	Rendered Chimney	ML	Class (ii)
K	All Capping/Coping and sills	FL	Class (i)
L	Freestanding Boundary and screen walls with coping	FL	Class (ii)
M	Earth retaining walls with coping/capping but no waterproofing on retaining side	FL	Class (i)

Efflorescence of Bricks and Blocks, and Sample Wall Panels

Unless otherwise specified by the Engineer, all brick and blocks for general use shall not, wher tested in accordance with Appendix C of BS 3921, 1985, develop efflorescence in excess o "moderate" intensity as described in Clause 6 : BS 3921 : 1985 Unless otherwise agreed, facing bricks (i.e. brick adopted for appearance reasons without rendering or plaster treatment) shall no when tested under the above procedure, be allowed to develop efflorescence in excess of "nil' category, in accordance with BS 3921 : 1985.

The Contractor is required to submit to the Engineer for comment, certificates of acceptability in this respect from his brickwork supplier. Facing bricks adopted must also be proven to be satisfactory by inspection of similar bricks which have been in service under similar conditions for at least 3 years in the constructed form. In addition, the Contractor is required, as early as possible, to build on site sample panels of brickwork as may be directed by the Engineer and using mortars with cements and sands from the sources proposed for the main works, and to carefully monitor these panels for signs of efflorescence, staining or weeping, all prior to ordering of bricks, sands and cements for the main works.

The Contractor will be held fully responsible for any efflorescence occurring in any elements of facing brickwork in the permanent works and in such a case he will require to replace any such defective brickwork at his own expense.

Shrinkage

Shrinkage in bricks must be less than 0.02% by volume.

4/01/05 Logistics

Whether or not prior reservations of bricks have been made, the Contractor shall make his own enquiries and arrangements with the suppliers of the bricks for the ordering and the delivery of bricks in quantities and at times to suit the progress of the work.

The Contractor shall hold sufficient stocks of bricks on site to ensure that they are not used in the works until the results of tests required by item 4/01/04 are known and approved. Should the results not be in conformity with those specified, the whole load from which the sample was taken shall be rejected. The rejected load shall be removed from the site as quickly as possible unless the test results show that the bricks are in compliance with the specification for other non-similar parts of the construction.

The Contractor shall ensure that facing bricks are mixed for colour and texture to ensure that the appearance of the brickwork is to the satisfaction of the Architect/Engineer.

4/01/06 Mortars

Cement

The cement used in mortars shall be:

Portland cement to BS.12 Class 42.5
Sulphate resisting cement to BS 4027 Class 42.5

Masonry cements shall not be used except with the express consent of the Engineer. Where they are so permitted (in lieu of cement and lime) they shall be tested in accordance with BS 4551 (1980) and in any event they shall not be permitted as sutstitutes for mortars stronger than Classification (iii) (see Table 1 of BS 5628 : Part 1)

High- alumina cement shall not be used.

Proportioning

Mortar shall be made in the proportions specified. It shall be easily workable. stiffen up quickly as the work proceeds, and shall bond strongly to the bricks.

For general work, the mix shall be lime/sand mortar attaining the specified strength for the work. No additives of any kind shall be incorporated in the mortar without the express approval, in writing, of the Engineer.

Lime Sand Mixture

Lime sand mixture shall be made up in the proportions specified by thoroughly mixing dry hydrated lime, sand and water and shall be protected from drying out. Ready-mixed lime: sand for mortar, delivered wet to the site and comply with BS 4721 : 1981 (1986), may be used.

Cement and Lime : Sand

Immediately before the mortar is to be used, cement and lime: sand mixture shall be thoroughly mixed together in the proportions specified with sufficient water to give the rquired workability. Wet ready-mixed retarded cement: lime: sand mixtures shall not be used.

Reconstitution Exclusion Clause

Prepared mortars shall be fully used before the initial set takes place, (this is within 2 hours of the cement and water being added). Any mortar left after this time shall be discarded; on no account shall mortars be reconstituted. Failure to comply will result in all such work being rejected.

Cleanliness

All plant and equipment used for mixing and transporting mortar shall be kept clean. All such containers shall be thoroughly washed out whenever mixing ceases, or whenever there is a change of mix.

Strength and Testing

The Contractor is to submit to the Engineer full details of the materials he intends to use for the manufacture of mortar and at least six weeks prior to masonry building commencing. Samples of the materials are to be delivered to a testing house approved by the Engineer and six 100 mm cubes made in a laboratory. The cubes are to be formed and cured in accordance with the procedures set out in B.S. 4551 : (1980).

Three of the test specimens may be tested at 7 days which will give an indication of what the 28 day result is likely to be. If the average of the 7 day strengths equals or exceeds two-thirds of the required 28 day strength then the mortar requirements are likely to be satisfied. If less, then the Contractor may choose to await the 28 day strength or have the tests repeated using a more suitable sand.

The mortar mix shall be deemed to be acceptable if the average of the three 28 day test results equals or exceeds the strength for Preliminary Tests given in Table I of B.S. 5628: Part 1: 1978 (1985) provided that no individual result within the batch of 3 tested at one time varies by more than + or - 15% from the average for the batch. Should one result fall outside the 15% this result shall be discarded and the average recalculated. If more than one result falls outside the whole of the results shall be discarded, and the above tests repeated using a more suitable sand.

Four 100mm cubes for each designation of mortar used are to be prepared on site for every 100 m^2 of wall or for each week's bricklaying or blocklaying whichever is the more frequent. Specimens are to be stored and tested in accordance with B.S. 4551 (1980).

The Contractor may test two of the samples at 7 days when the average strength shall exceed two-thirds of the appropriate 28 day strength given in Table 1 of B.S. 5628.

Should the 7 day test fall below the expected figure the Contractor may elect to await the 28 day test before submitting his proposals for remedial action.

The cubes will be deemed to have passed if the average of the 28 day test results from two cubes exceeds the appropriate value for works cubes given in Table 1 of B.S. 5628.

The 28 day test figures will be the only results on which the acceptability of mortar will be judged.

Lime

Lime used in mortar shall be high-calcium lime or semi-hydraulic lime to conform to the requirements of BS 890.
(1972).

Sand

Sand for mortar shall comply with the requirements of BS 1199 and 1200 : 1976 and the grading shall be as shown in Table 1 thereof. Sand which has been in contact with sea-water or have traces of deleterious salts shall be strictly forbidden.

Water

Water shall be clean and free from any harmful impurity. Where the quality of supply is doubtful the water shall be tested in accordance with BS 3148 (1980).

Admixtures

(i) Calcium chloride or additives based on calcium chloride, shall not be used.

(ii) Colouring agents: Pigments shall conform to the requirements of BS 1014 and shall be pre-mixed with the cement or the ready-mixed lime: sand, so as not to exceed 10% by weight of the cement in the mortar, care being taken to ensure that the specified strength of the mortar remains unimpaired.

Carbon black shall be limited to 3% by weight of the cement.

(iii) Plasticizers: Plasticizers shall conform to the requirements of BS 4887 Part 1 (1986), and shall be used only with the written approval of the Engineer.

Plasticizers shall be used strictly in accordance with Manufacturer's instructions.

4/01/07 Ancillary Components

Wall Ties

Cavity wall ties shall conform with B.S. 1243 and shall be stainless steel.

(i) For buildings up to two storeys high with cavity insulated wall tie type 4(b) - double triangular with insulation locating discs shall be used unless otherwise specified.

(ii) For all other buildings, wall tie type 4(c) - vertical twist shall be used unless otherwise specified.

Other brick/block connecting ties shall be to the details shown on the drawings and manufactured using stainless steel.

Damp-Proof Courses

If the locations of damp-proof courses are indicated on the Engineer's drawings, the material for these damp-proof courses shall be stated on the drawing, and no departure from the required materials will be permitted.

Airbricks and Gratings

Airbricks and gratings shall conform to the requirements of BS 493, or shall be of clay to similar dimensions.

Metal Anchors

Metal holding down anchors used to tie timber joists or precast concrete floor units to walls shall be of galvanised mild steel of the shape,length and section shown on the drawings.

All timber joist ends built into brickwork shall be pre-treated with preservatives and painted with Bituminous Paint over the embedded section.

Resin Anchors

All resin anchors to be installed in strict accordance with the manufacturer's written instructions.

After the minimum curing period and before the fixing of the structure to the resin anchors, every anchor should be non- destructively tested to a pull out load of 3 kN unless otherwise noted.

In addition one resin anchor from each floor level at each tying-in location should be tested to four times its working pull out load. Notwithstanding this the resin anchors may also require to be tested as directed and to the satisfaction of the Engineer.
The Contractor shall allow for the testing by the supplier and for the preparation and submission of written reports to the Engineer.

4/01/08 Storage of Materials

Bricks shall be carefully unloaded by hand or crane, and placed on the site in different stacks according to strength, and marked accordingly, on prepared hardstanding level areas free from clinker or ashes or sulphate-bearing soils. The stacks or packs shall be protected from rain and snow while allowing full circulation of air.

Stacks or pre-formed packs of bricks shall not be placed directly on to slabs without taking precautions to prevent overloading and/or excessive deflection.

Cement shall be stored off the ground in a dry structure so as to permit inspection and used in the order of delivery. Cement affected by dampness shall not be used.

Hydrated lime shall be similarly and separately stored and kept apart from other materials.

Sand shall be stored separately according to type where it will not become contaminated.

4/01/09 Laying Bricks

The standard of laying and workmanship is to be carried out to BS 5628 Part 3 : 1985.

All brickwork shall be set out and built to the required dimensions as indicated.

The surfaces bearing the brickwork shall be true to level and thoroughly cleaned of all debris, impurities and such like, before applying the bedding mortar.

Where directed on the drawings, coloured mortar shall be used for bedding and shall extend to the full depth of the beds and joints.

Brickwork shall be built in level, even and uniform courses with neat clean and regular joints 10mm in thickness. Unless otherwise directed by the Engineer all beds and joints shall be completely filled with mortar so that no voids remain and they shall be pointed smooth and flush on all exposed faces or as otherwise directed by the Engineer.

The courses shall be properly levelled and plumbed as work proceeds. The walls are to be carried up in uniform manner and no portion raised more than 1 metre above another at any one time, the open end being raked up and not toothed.

All perpends are to be kept strictly plumb and square and the whole properly bonded together so that there are no continuous vertical joints through any two courses of brickwork.

No half bricks of 'bats' shall be used except where necessary for bonding.

Overhand work will not be allowed and holes, etc., shall be made good with bricks and mortar to the satisfaction of the Engineer as the scaffolding is removed.

The brickwork shall be executed in English or Scottish bond or as indicated on the drawings for walls of full brick thickness or more and stretcher bond for half brick skins in cavity walls. Where Scottish bond walling is utilised, no more than three courses of stretchers shall be permitted between header courses.

No more than sixteen courses shall be built in a day without prior permission of the Engineer.

Cutting of bricks shall be kept to a minimum and special or standard-special bricks used to maintain bond. When cutting is necessary, a bolster shall be used in preference to a trowel. When bricks cannot be satisfactorily cut by bolster, a carborundum wheel shall be used.

4/01/10 Cavity Walls

In building hollow walls particular care must be taken to cut mortar perfectly flush on the face next to the cavity. The cavity shall be kept clear of mortar as the work proceeds, and particular care must be taken to remove mortar droppings from the cavity and from wall ties at the end of each day's work. Outer and inner leafs, and the width of the cavity, shall be as detailed on the drawings and the leafs shall be united, unless otherwise specified with 4.9 wall ties per square metre. This condition will be satisfied if the ties are placed at 450mm horizontally and 450mm vertically (staggered).

Additional ties shall be used within 150mm of the edge of openings, one per 225mm. The wall ties shall be set dead level or with a slight fall to the outer leaf. One leaf shall not be taken up more than 450mm beyond the other except with the Engineer's permission and wall ties shall be included in the higher leaf for incorporationin the adjacent leaf as it is built up. Wall ties shall be provided of adequate length to ensure that the ends are embedded in the mortar beds a minimum of 50mm.

Both leaves of a cavity wall should be raised at the same time. The difference between the heights of the two leaves should be:

a) About the vertical spacing of consecutive rows of ties, for vertical twist ties;

b) Not greater than six block courses, for double triangle and butterfly ties;

c) Not greater than 225 mm in a section of wall where pressed steel lintels are installed, to avoid twisting the lintel.

4/01/11 Mortar in Cavities

The cavity and ties shall be kept free from mortar droppings or debris of any kind and shall be cleaned at the end of each working day. Battens shall be placed at the bottom of cavity and holes left in at all angles for removal of battens during and at completion of walling. Additional timber battens shall be inserted into the cavity supported on the wall ties at working level, and these battens shall be progressively cleaned and raised as work proceeds.

4/01/12 Cavity Tops

Where concrete slabs, beams etc. are cast in situ over the cavities the cavity shall be sealed off with one course of slates, or approved equal permanent shuttering material.

4/01/13 Chases and Holes

Holes through walls for service pipework and the like shall generally be formed as work proceeds in accordance with details shown on the drawings. Where small holes are required to be formed through completed brickwork, these shall be commenced only after prior approval of the Engineer and shall be carefully broken out using hand chisel, masonry saw or light percussion tool all as agreed with the Engineer.

Subsequent to building, chases and cuts for electric conduits, heating pipes and similar services are to be carried out only with the Engineer's approval. When approval has been given, these shall in all cases be cut by machine.

All holes of width greater than 3/4 brick length shall be overlain by suitable concrete or steel plate lintols as directed by the Engineer and with suitable bearing areas on each side. Holes shall not be formed either below or in the vicinity of load bearing structural elements such as timber floor joists, beams or concrete floor plates unless authorised by the Engineer in writing.

4/01/14 Jointing and Pointing

Unless otherwise directed, the faces of the joints shall be worked to the profile shown on the drawing while the mortar is still green.
Where indicated on the drawings, the face joints shall be raked out to a depth not less than 12 mm nor more than 18mm and subsequently refilled and formed to the required profile with plain or coloured mortaras instructed and of the same proportions as the the original bedding mortar. In no circumstances shall joints be so formed as to expose the perforations or air holes of the bricks.

Joints shall not be subsequently raked out to give a key for plastering or rendering without the Engineer's written consent.

4/01/15 Work Below D.P.C.

The work shall be carried out utilising either:-

i) Solid built walls (without cavities).

or

ii) Cavities filled with concrete (10mm aggregate) to a level just above external ground levels, all as shown on the Engineer's and/or Architect's drawings.

4/01/16 Protection

During the course of erection the walls shall be adequately protected against rain and wind and at all times against scaffold splash, mortar droppings etc.

4/01/17 Cold Weather

Brickwork/blockwork will not be permitted to be built at temperatures below 0 C. Building will only be permitted below 5 C if approved measures are taken to preheat the materials so that their temperature does not fall below 5 C and subsequently the built brickwork/blockwork shall be suitably protected from frost and the temperature in and around the new work shall be maintained above 0 C for a minimum of 4 days. The bricks and blocks used must be completely dry.

4/01/18 Arching & Centering

Arching around pipes etc., shall have not less than two half brick rings to transmit loadings and centering must not be struck until brickwork is properly set.

4/01/19 Movement Joints

Movement joints shall be formed where shown on the drawings in accordance with the details given. Care shall be taken to ensure that the gap is kept free from debris by using compressible gap filler specified. On no account shall the edges be pointed with mortar.

4/01/20 Block Bonding

Block bonding or "toothing" of load bearing walls with other walls and partitions shall not be permitted other than with the written approval of the Engineer.

4/01/21 Non-Loadbearing Walls

Walls of bricks or blocks indicated as being non-loadbearing shall, when constructed at the same time as the load-bearing wall, be finished with a layer of at least 12 mm of easily compressible material to the Architects Specification.

This provision shall also apply to "non-contact" load-bearing walls where the floor (or roof) above spans parallel to the wall in question on to structural beams or the like, which in turn are supported by the wall. The sections of wall between load-bearing beams shall be treated as non-contacting with the soffit of the floor (or roof) slab over, and the gap treated as above. In such cases, and particularly where precast hollow floor units are adopted spanning parallel to walls, provision shall be made to prevent tearing stresses on the wall and ceiling finishes due to differential deflections between floor plate and wall.

Brick slips shall not be used unless specified by the Engineer and detailed on the drawings.

4/01/22 Infill Brickwork and Packing for Load Transfer Work and Underpinning

Unless otherwise specified, where brickwork is required to be built up or replaced to support and carry loads from existing structures (e.g. in underpinning wall construction, or infill above new lintol beams over slappings) such brickwork shall be built up to within 30mm of the existing structure and allowed to cure and gain its specified strength. This initial curing period will, unless otherwise specified, be such that the brick mortars attain their 7 day specified strength (i.e. 2/3 of mean compressive 28 day strength). The resulting gap shall then be packed tight with slates, or other packing material all as specified on the drawings, and the whole mortared solid using expandable mortar (i.e. mortar with an approved expanding agent additive).

Transfer of loads shall be allowed only after the new construction is sufficiently cured and strong and in accordance with the specified sequence of works all to the entire satisfaction of the Engineer.

4/01/23 Metal Reinforcement for Reinforced Brickwork

Reinforcement for brickwork shall be expanded fabric type ('Briktor' or approved equal) to BS 405 and be stainless steel.

4/01/24 Architect's Specification

Reference should be made to the Architect's Specification for full details on:

a) D.P.C.'s for all types of walling (load and non-loadbearing).

b) Non-structural brickwork.

c) Facing brickwork and exposed patterns and designs.

d) Exposed jointing and pointing.

e) Rendering applications, thicknesses and finishes.

4/01/25 Cavity Insulation

Where built-in cavity wall insulation is specified, a system of partial filling of the cavity using solid non-decomposable expanded polystyrene board or similar shall be used. Total filling of the cavity shall not be adopted unless otherwise specified by the Engineer in writing.

Workmanship shall generally be in accordance with the recommendations given in Building Research Establishments Digest No. 277 "Built-in Cavity Wall Insulation for Housing" - September, 1983.

To avoid problems with weather and rain bridging across nsulated cavities due to mortar debris, the maintained cavity width (outwith the insulation board) shall be 50mm. The overall cavity width will therefore be increased from the standard un-insulated width of 50mm to accommodate the insulation thickness (which thickness may vary from 25 to 50mm thick) and correspondingly longer wall ties will be adopted to maintain a minimum embedded length of 50mm in each masonry leaf.

The Contractor must ensure that insulation boards are firmly fixed against the face of the inside leaf. With clip fixings relying on wall ties, at least 4 No shall be provided to hold each board securely, giving wall tie spacings not greater than 600mm horizontally and 450mm vertically.

Displaced overlapping of loose boards will not be tolerated and only rigidly fixed work allowed.

Where fixings are wall-tie dependent, at areas around windows and other openings and at tops of walls and similar, loose edges will require to be secured using zinc-protected nails. All trimming of insulation boards should be neat and accurate to avoid cold gaps.

All insulation boards should be stored flat on site to avoid warping. Any warped or damaged boards will be rejected and replaced by the Contractor at his own expense.

PART 2 SPECIFIC REQUIREMENTS FOR LOADBEARING CONCRETE BLOCKWORK

4/02/01 General

The Clauses of Section 1 and the whole of this Specification shall be considered, where appropriate, to apply to loadbearing blockwork also.

The following clauses are specific requirements for loadbearing blockwork only.

Air entrained blocks shall not be used.

All concrete loadbearing blocks shall be in accordance with:

BS 6073: Part 1: 1981: Specification for Precast Concrete Masonry units

BS 6073: Part 2: 1981: Method for Specifying Precast Concrete Masonry Units.

4/02/02 Block and Mortar Density Strength and Shrinkage

Blocks for use within outer leaf of cavity walls shall have a minimum density of 1400 kg/m³.

Blocks for use within inner leaf of cavity walls and internal partitions shall have a minimum density of 1000 kg/m³.

All blockwork shall have an average compressive strength of not less than 7.0 N/mm² at 28 days unless noted otherwise.

Shrinkage of blocks shall not exceed 0.040% by volume.

Mortar shall be Class (iii) unless noted otherwise.

4/02/03 Co-Ordinating Sizes

Co-ordinating face dimensions shall be 450 long x 225 mm deep in 100 mm thicknesses. Maximum efficiency to be achieved by adopting building dimensions and details on the basis of this block size.

4/02/04 Bearing of Lintols and Beams

Lintols shall bear on to a full length block and the nominal bearing length shall be half a block length (220 mm). Under no circumstances shall cut blocks be used as bearing blocks.

All main structural beams and other elements shall be supported on to concrete padstones as shown on the drawings.

4/02/05 Cavity Closures

Vertical cavity closure shall be achieved using specially manufactured reveal blocks, and shall incorporate D.P.C. details as shown on the Architect's drawings.

4/02/06 Cutting of Blocks

All cutting of blocks on site shall be carried out using a mechanical saw.

4/02/07 Delivery, Storage and Protection of Blocks

Blocks shall be delivered to site on mechanical self off-loading vehicles and on to prepared dry, sulphate free hardstanding level landing areas. The Contractor must ensure that his storage provisions do not overload existing floors or other structures.

It is of paramount importance that the blockwork is kept dry, both in the stored condition and during and after in situ construction. Blockwork must not be wetted unnecessarily during any applied rendering processes. Blocks which are in a wet condition shall be rejected and removed from site at the Contractor's own expense.

4/02/08 Blockwork Where Water Saturation May Occur

Blockwork shall not be used in exposed areas likely to be water aggressive and where blocks may become saturated. Unless otherwise agreed in writing by the Engineer, blockwork shall not be used below D.P.C. level. Whenever necessary the Contractor shall confirm his use of blockwork with the Engineer.

4/02/09 Control of Shrinkage and Thermal Movements in Blockwork

Non-autoclaved blocks shall not be used until 28 days after manufacture and having attained the 28 day strengths and test certificates produced.

Movement joints consisting of 10mm wide continuous risband type shall be adopted at centres not exceeding 6 m unless otherwise specified. Such movement joints shall be treated as follows:

a) Contraction Joint - (At centres normally not exceeding 6 m) Infill with mortar and apply face sealants as specified.

b) Expansion Joints - (At centres normally not exceeding 30m for long elevations and corresponding to main movement joint provisions in the overall building structure). Infill with flexible filler board (Flexcell or similar) and seal with flexible mastic sealants as specified on the drawings.

Large unbroken panels of blockwork shall not be adopted and the effective length of any panel shall not generally exceed twice the height of the panel.

Where larger openings occur, for example around windows and doors, the blockwork beds shall be reinforced and suitable tensile reinforcement all as detailed on the drawings.

4/02/10 Propping of Walls

The Contractor shall ensure that all walls, and particularly gable walls, are adequately propped or otherwise temporarily supported as required during construction to ensure the complete stability of the works. This requirement is particularly relevant when constructing in lightweight blockwork.

4/02/11 Architectural Finishes

Finishes applied direct to blockwork and as specified by the Architect shall be jointed to correspond with the locations of the movement joints in the blockwork, so as to avoid cracking in the finishes due to shrinkage and thermal movements. Particular care shall be taken where blockwork abuts on to concrete columns, beams and such like to allow for relative differential movement between the blockwork and the structural concrete frame.

SECTION 5 CONCRETE

PART 1 GENERAL

5/01/01 Contents & Scope

This Specification refers to the structural application of reinforced concrete in building work. All work unless otherwise stated, shall generally conform with British Standard Code of Practice BS 8110, current at the date of tender.

The recommendations of this specification are "deemed to satisfy" various regulations and local byelaws. The Contractor shall nevertheless ensure that these requirements apply and fully satisfy the relevant Regulations and Local Byelaws, and shall inform the Engineer of any variation whatsoever so that the amendments as may be necessary will be approved by the Engineer and actioned in advance of any construction.

5/01/02 Details, Drawings & Instructions

All the work must be carried out in accordance with the Drawings, Sketches, Bar Bending Schedules, this Specification and Instructions which are issued to the Contractor by the Engineer at the start and during the course of the contract. Large scale details shall take precedence over small scale details. Scaling sizes from the drawings shall not be permitted and in all cases figured dimensions shall be used. The Contractor will satisfy himself with all the details before proceeding with the work and any inaccuracy shall be referred to, and cleared with, the Engineer in advance.

5/01/03 Defective Work

Any materials or workmanship not conforming with this Specification shall be rejected and made good by the Contractor, at his own expense, to the Engineer's satisfaction. Any load testing of the structure proposed by the Contractor at his own expense shall only be permitted with the prior written approval of the Engineer.

PART 2 MATERIALS

5/02/01 General

All materials to be used in the works shall comply with the requirements of the British Standard Specification current at the date of tender relating to such materials. Where no appropriate British Standard Specification exists the Engineer's approval must be obtained as to the source of supply or manufacture of all materials prior to any delivery being made to the site.

When manufacturer's instructions are relevant to the use of the materials in the works, these instructions shall be strictly adhered to, unless written instructions to the contrary are issued by the Engineer.

Once the contractor has been given approval for the source, quality, mixing plant and supplier of the materials for concreting purposes, these shall be adhered to throughout the works.

The Contractor shall ensure that adequate supplies of cement and aggregates will be available from the one source throughout the duration of the contract. An alternative source of supply will only be permitted in extreme circumstances, provided at the Contractor's responsibility, and approved by the Engineer in advance. The location of any concrete from the alternative source shall be clearly delineated and recorded on 'as built' drawings which shall be sent to the Engineer.

5/02/02 Cement

Except where otherwise specified by the Engineer all cement shall be Portland Cement - Class 42.5 complying with BS 12 1991.

All cement shall be certified by the manufacturer as complying with the requirement of the appropriate British Standard. The Contractor shall, if required by the Engineer obtain the manufacturer's test certificate for any consignment as soon as possible after delivery.

The following cements in accordance with the relevant B.S. shall be used, only if specified.

Portland Cement - Class 42.5 complying with BS 12 1991.
Portland Cement - Class 52.5 complying with BS 12 1991.
Sulphate-resisting Portland Cement - Class 42.5 complying with BS 4027 : 1991.

High Alumina Cement shall not be used.

5/02/03 Aggregates

Fine aggregate is to be clean river or pit sand to B.S. 882 or other approved material and the grading shall fall within zones C to M of B.S. 882 unless otherwise agreed by the Engineer.

The coarse aggregate is to be natural gravel, crushed stone, ballast, or other approved clean material to B.S.882 and shall be of the maximum sizes as stated in the mix table and graded in accordance with B.S. 882.

Gap grading either natural or artificial will not be permitted unless authorised in writing by the Engineer.
Samples, if required, shall consist of not less than 25 kg. of fine aggregate and not less than 50kg. of coarse aggregate, obtained in accordance with B.S. 812, and shall be delivered to a testing authority nominated by the Engineer.

Concrete made from the combined coarse and fine aggregates shall, when tested in accordance with the drying shrinkage test described in BS 812 Testing Aggregates Part 120 : 1989 Method of Determination of Drying Shrinkage exhibit drying shrinkages which must not exceed the limits stated in the following table except where stated otherwise in the contract documents.

(a) Concrete in foundation works, massive retaining walls, drainage works, and the like: 0.070%

(b) Concrete in all normal reinforced structural elements including slabs, ground floor slabs and retaining walls. 0.050%

(c) Concrete in ribbed and waffle slabs, beams over 10 metre span, thin precast panels, and in structural toppings used in conjunction with plate floor construction, and in slabs where heating coils are embedded. 0.040%

5/02/04 Water

Water shall be clean, fresh, free from all impurities, fit for drinking (i.e. potable) and from a source approved by the Engineer. If testing is required by the Engineer it shall be in accordance with BS. 3148.

5/02/05 Admixtures

Waterproofing agents plasticising agents or other admixtures are not to be used unless specified or authorised in writing by the Engineer. The use of calcium chloride in any form in concrete is not permitted. The Contractor shall strictly adhere to the manufacturer's instructions when using admixtures.

5/02/06 Water Bars

The Contractor shall obtain written approval from the Engineer for the use of proprietary P.V.C. or Rubber Water Bars. Water Bars shall be used as follows:-

a) Construction Joints

230mm P.V.C. 'Flat Dumbell Waterstop' or 240mm Heavy Duty 'Serviseal' or approved similar.

b) Expansion or Settlement Joints

230mm P.V.C. 'Centre Bulb Waterstop' or 240mm 'Expansion 'Serviseal' or approved similar.

Only simple butt joints shall be allowed to be manufactured on site. All other joints to be made in manufacturer's works. All joints to water bars shall be checked thirty minutes after completion by bending in two directions to ensure that they are free of imperfections.

5/02/07 Storage of Materials

Cement stored in bulk shall be held in weather-tight, dry, well ventilated containers so constructed as to ensure complete protection from the weather and from contamination by other materials.

Cement stored in bags shall be completely protected from the weather and from contamination by other materials, and shall stand on a raised boarded platform. If bagged cement is delivered to site in consignments exceeding one ton, a properly constructed storage shed will be required.

The cement shall be utilised in the progress of the works in the order in which it was delivered to site, and the cement storage arrangements must be such that this requirement can be achieved.

The Contractor is to erect suitable pens or bays for the storage of each type of aggregate. The walls of the pens or bays are to be constructed of timber, brick or metal sheeting in such a way as to prevent one type of aggregate mixing with the aggregate in adjacent pens or bays, or becoming contaminated by earth, oil or other deleterious matter. The floors of the pens or bays are to be of timber, metal sheeting or concrete of thickenss not less than 75mm. and shall be adequately drained.

Other materials which are liable to deteriorate if left exposed shall be stored in suitable covered weather-proof accommodation arranged in such a way as to allow inspection to be made from time to time.

PART 3 CONCRETE MIXES

5/03/01/a General

The Contractor shall employ on the site of the works competent and experienced personnel and/or an independent approved Testing Authority , who shall firstly supervise all stages in the preparation and placing of the concrete. They shall supervise the mixed concrete, carry out site tests and the casting of works test cubes. The Contractors attention is drawn to the requirements of Part 5.

The Contractor shall prepare sample mixes for the approval of the Engineer together with his proposals for weights of fine and coarse aggregates before site works are started. Water/cement ratio shall at all times be kept to a minimum to produce concrete of the workability and strength required. The Contractor shall notify the Engineer in advance and obtain his approval, on the water/cement ratio he intends to adopt and maintain at all times during the course of the work, allowance being made for the moisture content of the aggregates. The Contractor shall not be absolved from the responsibility of producing the specified concrete strength even after approved materials have been used.

5/03/01/b Alkali-Silica Reaction

Concrete mixes for use in the permanent works shall comply with one of the undernoted conditions. The Contractor shall notify the engineer which of the conditions it is his intention to adopt:-

i) The cementitious material shall have a reactive alkali content not exceeding a maximum value of 0.6% by mass when tested and certified by the manufacturers and expressed as the sodium oxide equivalent.

ii) The total mass of reactive alkali in the concrete mix shall not exceed 3.0 kg/m^3 of concrete when tested and calculated in accordance with procedures approved by the engineer. The measurement of the chlorideion contents of the fine and coarse aggregate shall be carried out in accordance with the provisions of BS 812.

iii) The aggregate shall be classed as non-reactive as noted hereunder.

The aggregate shall be classed as non-reactive if the Engineer is satisfied that the source does not contain opaline silica and one of the following sub-clauses is satisfied.

a) The fine and coarse aggregate each consist of at least 95% of one or more of the rock types or artifical aggregates listed in the attached table and provided that the Engineer is satisfied that the source does not contain a quantity of flint, chert or chalcedony that could cause damage from alkali-silica reaction.

Aircooled Blastfurnace slag, Andesite, Basalt, Diorite, Dolerite, Dolomite, Expanded clay/shale/slate, Feldspar, Gabbro, Gneiss, Granite, Limestone, Marble, Microgranite, Quartz, Schist, Sintered pfa, Slate, Syenite, Tuff.

Notes on rock types

1. Feldspar and quartz are not rock types but are discrete grains occurring principally in fine aggregate.

2. Not highly strained quartz and not quartzite.

b) The proportion of chert and flint in the sources of aggregate is such that the proportion of chert and flint in the total aggregate is greater than 60% by mass when the fine and coarse fractions are combined.

Fine and coarse aggregate material shall in addition comply with the requirements of clause 02/03 above.

5/03/01/c Creep in Concrete

The Contractor should note that the effects of 'creep' in concrete can become significant in structural elements of exceptional monolithic length and/or in high stress conditions. Care shall be taken by the Contractor in the consideration of temporary joints, construction procedures and mix quality (inclusive of additives) so as to regulate the incidence of such effects.

5/03/02 Structural Concrete

The grades of concrete to be used in the Works shall be as indicated on the drawings or described in the Bill of Quantities.

The concrete mixes shall be designed by the Contractor in accordance with BS 5328.

The Contractor's attention is also drawn to the necessity for producing a concrete which not only complies with the strength requirements as laid down in the Mix Table, but is of sufficient workability having regard to the types of member to be concreted and the surface finish required.

5/03/03 Workability

The concrete shall be of a consistency which will allow it to be readily worked into the corners and angles of the formwork (and in the case of reinforced concrete, around reinforcement) without segregation of the materials or bleeding of free water at the surface, and which will present a face on striking the formwork which fulfills the requirements of appearance (and any other requirements) laid down elsewhere in the Specification.

Tests for workability, where required in connection with the selection of suitable mix proportions or for any other purpose, shall be carried out in accordance with B.S. 1881 or such other procedure as may be approved by the Engineer.

The slump test shall be the normal method of checking and controlling workability of works concrete. The slumps for each grade of concrete used in the works shall be established and agreed at the trial mix stage if Design Mix procedure is adopted, but if a Prescribed Mix is adopted the slump shall accord with the figures for the slump given on the attached Prescribed Mix sheet.

Slump tests are to be made on the works contract at frequent intervals, and in particular whenever the grade of concrete is changed, or whenever the mix is varied, or whenever required by the Engineer. A slump test shall also be made on the samples of concrete used for making up works test cubes. The concrete used in this instance shall be re-mixed with the remainder of the sample, care being taken that no water is lost.

Where the slump called for is less than 75mm, the tolerance on the slump test taken in accordance with BS 5328 shall not vary from the slump ordered by more than + or - 13mm. Where the slump ordered is 75mm or greater, the acceptable tolerance shall be + or - 25mm.

5/03/04 Mixing

The batching and mixing of the concrete is to be carried out by mechanical means using equipment approved by the Engineer and in accordance with B.S. 1305.

The cement and aggregate are to be weighed separately by means of an approved mechanical weigh-batcher and the fine and coarse aggregate must themselves be weighed separately. The weight-batcher is always to be correctly maintained and calibrated, and the accuracy of the measuring equipment shall be within + or - 3%.

Solid admixtures shall be measured by weight and liquid or paste admixtures shall be measured by volume or weight.

The batching plant shall also include a water storage tank and a metering device of such design that no unauthorised person can vary the amount of water discharged into the mixer.

The total quantity of water used in each batch of each grade of concrete is to be agreed at the trial mix stage.

In measuring the quantity of water to be discharged into the mixer for each batch, however, allowance is to be made for the water content of the aggregates. The Contractor is to supply suitable apparatus for obtaining rapid estimates of this.

The concrete mixer shall be of the revolving drum type to B.S. 1305, and mixing shall proceed at the approved speed for the particular mixer for a minimum of fifteen revolutions of the drum after all the materials, including water, have been deposited in the drum.

5/03/05

Test Cubes

The strength of the concrete used in the Works shall be checked by means of 150mm test cubes made, cured and tested in accordance with the requirements of B.S. 1881. Eight groups of four cubes will be taken on the first five occasions that a particular grade of concrete is used in the Works, and thereafter one group of four cubes shall be taken on each of the succeeding six occasions that a particular grade of concrete is used. Of each group of four cubes, two cube will be crushed at seven days and two at 28 days.

Thereafter, groups of four cubes will be made at regular intervals from samples of the works concrete and crushed at the times laid down above.

Unless otherwise specified, or agreed by the Engineer, one group of four cubes shall be made for every 10 cu. metres of concrete placed in the Works, and at least one group shall be taken on each day that concrete of that grade is used. Groups of cubes shall also be taken whenever there is a change in concreting materials used, and in addition whenever required by the Engineer.

Whenever practicable, the sample of concrete for the cubes is to be taken, after the concrete has been deposited in the Works, but where this is impracticable the samples shall be taken at the point of deposition in the Works. In all cases a record must be kept by the Contractor of the location in the Works of the concrete from which the sample is taken, and the cubes must be adequately marked by the Contractor to the Engineer's satisfaction for identification, so that correlation between cube strengths and the corresponding location in the works of the concrete from which the cubes were made can be maintained.

The Contractor shall provide the Engineer at agreed intervals with copies of the location record and corresponding cube identification marks.

The crushing of test cubes shall be carried out in a laboratory approved by the Engineer, and the Contractor shall arrange for a test certificate bearing the identification mark of each cube to be sent direct to the Engineer by the Testing Laboratory as soon as possible after the cube has been crushed.

The concrete strength requirements will be considered to be attained if the 28 day works cube test results satisfy the conditions set out in B.S. 8110 Clause 6.4.

If the specified requirements are not met, the Contractor shall make such further tests as the Engineer may require, and shall take such remedial action as the Engineer may order, all at the Contractor's own expense.

The Engineer reserves the right to increase or decrease the frequency of the making of test cubes, if in his opinion such action is warranted.

5/03/06

Ready Mixed Concrete

The Contractor may, if he wishes, use ready-mixed concrete.

If ready mixed concrete is used the same requirements as for site-mix concrete regarding materials, additives, mix design, mix proportions, workability, sampling, testing, the taking of works cubes and strength requirements shall apply.

The name and address of the supplier, together with the location of the suppliers' works shall be submitted to the Engineer prior to permission being given for the use of ready-mixed concrete and the Contractor shall make arrangements for the supplier's works to be inspected by the Engineer, if at any time he considers this necessary.

Notwithstanding any inspection or approval by the Engineer, the Contractor shall take full responsibility that the concrete delivered to the site complies with the requirements of the Specification in all respects.

The Contractor shall make arrangements for a back-up supplier providing full information on same for approval.

Care shall be taken by the contractor when ordering ready-mixed concrete to provide the supplier with the necessary information to ensure that concrete of the grade required and corresponding with the requirements of the Specification is supplied including minimum cement content and maximum free water:cement ratio where otherwise specified by the Engineer. The Contractor shall, when ordering, inform the ready-mixed concrete supplier of the required slump and a slump test shall be carried out for each truck load before the concrete is placed in the works.

The provisions of B.S. 5328 - Part 3 - shall apply to all ready-mixed concrete delivered to the site, except that in the event of conflict with anything contained in this Specification the terms of this Specification shall rule.

A minimum of one set of four test cubes shall be taken each day on site and in the presence of the Engineer or his Representative with, if possible, the supplier's technical representative in attendance. Two cubes shall be tested at seven days and two at 28 days at a laboratory to be approved by the Engineer. The strength of the concrete will be judged on the 28 day results with the seven day results being taken as a guide. Further sets of four cubes may be ordered at any time by the Engineer or his representative.

The Concrete shall be continuously agitated and then deposited in its final position and left undisturbed within 1½ hours maximum of the time when the cement first came into contact with wetted aggregate. If the ambient temperature is less than 5 C or above 10 C, this period shall be reduced to 1 hour.

In cold weather, the minimum temperature of the concrete at the point and time of delivery shall be not less than 5C.

The delivery of concrete in non-agitating trucks shall not be permitted and no concrete which has partially hardened shall be deposited in the works, nor shall there by any unauthorised addition of water to the concrete delivered to site. A record book shall be kept on the site and it shall be the Contractor's responsibility to enter the following information for each truck load:-

(a) Time of arrival of lorry

(b) Registration No. of lorry

(c) Time and place of mixing concrete material

(d) Time and place of adding water to dry materials

(e) Water/cement ratio

(f) Mix

(g) Time concrete is placed

(h) Position where concrete is placed

(i) Slump

(j) Whether test cubes were taken and, if so, the serial nos. of the test cubes.

All the above information shall be made available continuously to the Engineer or his Representative.

In the event of permission being given to the use of site-mixed concrete and ready-mixed concrete on the same site, they shall not be placed together in the same pour, and, in the case of fair-faced concrete, concrete from one source only shall be used throughout. All test cubes made with ready-mixed concrete shall bear a distinguishing mark.

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5/04/01 Transport of Concrete

Concrete shall be transported from the mixers to the place of final deposit as rapidly as is practicable by means which shall be approved by the Engineer and which shall prevent adulteration, segregation and loss of ingredients. It shall be deposited as closely as possible to the final position to avoid re-handling or the flowing of the concrete inside the formwork.

Chutes for transporting the concrete will only be permitted in special circumstances, where it is impracticable to use any other means of transporting the concrete.

5/04/02 Depositing Concrete

The concrete shall be placed in the position and to the sizes indicated on the drawings or described in the Specification or Bill of Quantities. If any particular sequence of placing is specified, this sequence shall be strictly adhered to and not varied unless by written agreement of the Engineer. Similarly, if any special locations are indicated for joints of contraction gaps, these must be adhered to and not varied unless with the written agreement of the Engineer.

Fresh concrete shall not be placed against insitu concrete which has been in position for more than 30 minutes unless a construction joint is formed in accordance with clause 04/05 of this specification.

It shall be the Contractor's responsibility to ensure that, prior to any concrete being placed, the formwork or other containing surfaces are clean, free from shavings, pieces of wood, wire, dirt or other rubbish, and are true to size, alignment and of a suitable nature. It shall also be his responsibility to ensure that any reinforcement to be embedded in the concrete is properly positioned, fixed and clean, and any boxing-out for holes, chases, and the like properly positioned and fixed so as not to move during the placing of concrete. The Contractor's attention is drawn to the fact that holes, chases and the like for small service pipework etc may not necessarily be shown on the structural drawings, and that he should examine all other drawings pertaining to the section of the Works being constructed to ensure that all such openings are allowed for.

The Contractor shall provide adequate facilities, including adequate notice of the time of concreting, to allow the Engineer or his representative to inspect the formwork, reinforcement, and the like in any or all sections of the work prior to the deposition of concrete. The minimum period of notice shall be 24 hours.

The concrete shall be placed by approved methods in such a manner as to avoid segregation of the concrete and displacement of the formwork, reinforcement, or other embedded items. When placed against concrete which has already set, the joint with that concrete shall be prepared as later specified.

The concrete shall not fall freely more than 3.0m except in special circumstances for which the Engineer's specific approval is required.

Concrete shall not be placed in standing or running water unless so specified and approved.

Concreting of any member shall proceed in one continuous operation between the day-work joints. It is imperative that the work be done quickly as well as efficiently and adequate labour must be employed to ensure this.

The interval between adding the water to the dry materials in the mixer and the completion of the placing and compaction of the concrete shall not exceed 45 minutes, except where the concrete is transported by truck mixers or agitators when the time can be increased to 1½ hours but notwithstanding this time limit, no concrete that has partially hardened shall be deposited in the works.

5/04/03 Compaction of Concrete

After deposition, the concrete shall be thoroughly compacted by mechanical vibration throughout the full extent of the pour. It shall be thorougly worked against the formwork or other containing surface and around any reinforcement and other embedded items without displacing them so that a solid compact mass is obtained entirely free from voids or honey combing. Successive layers of the same lift shall be thoroughly worked together.

Vibrators shall be either internal or external and shall be of an approved type suitable for their intended purpose and used in a proper manner.

Care must be taken to avoid segregation by other vibration of the materials during compaction, and to avoid disturbance of concrete which has already begun to set. No concrete shall be subject to vibration between 4 and 24 hours after compaction.

The finished surface of the concrete shall be free from cavities and other imperfections upon removal of the formwork. Any defects in this respect shall be made good at the Contractor's expense by methods approved by the Engineer, which shall have regard to the extent of the imperfection and the duty performed by the member.

In concrete described as "fair-faced" the Contractor should allow for extra special care in placing and compacting the concrete in order to obtain a dense homogeneous mass entirely free from voids, pitting, honey-combing or other surface blemishes (including any bubbles). The finished surface of the "fair-faced" concrete shall be at least as good as the standard laid down elsewhere in this Specification. Rubbing-down or otherwise making good concrete described as "fair-faced" shall not be permitted under any circumstances unless expressly authorised by the Engineer.

5/04/04 Attendance of Tradesmen

During all concreting operations a competent steel fixer shall always be in attendance on the concretors to adjust and correct the position of the reinforcement immediately before the concrete is placed. Competent shuttering carpenters shall also be immediately available during concreting operations to correct any misalignment or other fault in the formwork which arises during concreting.

5/04/05 Construction Joints

All construction joints in solid slabs, beams and walls shall be formed by inserting temporary vertical stopping-off boards against which concrete can be properly consolidated or to such profile as shall be intimated by the Engineer. The joint shall be formed such that the face of the concrete forming one side of the joint shall be truly vertical or horizontal across the full section of the concrete.

All previous work against which new concrete is to be placed shall be thoroughly cleaned and roughened. Wherever possible all loose and foreign matter and laitance shall be removed while the concrete is still green and no further roughening shall then be required.

Before placing new concrete against previous work the surface of the previous work, after cleaning and roughening, shall be thoroughly wetted, and in the case of vertical joints shall be coated with neat cement grout immediately before concrete is placed against the joint.

In the case of horizontal joints, a layer of sand-cement mortar of the same proportions as the sand and cement in the concrete mix shall be spread to a thickness of 13mm. immediately before concrete is placed against the joint. In all cases, care must be taken to work the concrete thoroughly against the previous work so as to form a sound neat joint.

Where the locations of construction joints are indicated on the drawings, they shall be strictly adhered to unless otherwise agreed by the Engineer. Where locations of construction joints are not indicated on the drawings, the Contractor shall, before undertaking any concreting work, timeously submit his proposals for positioning construction joints to the Engineer for his approval.

The position and detail of any construction joints not described in the contract documents shall be so arranged as to minimise the possibility of the occurrence of shrinkage cracks and be located at places of low shear stress.

In order to avoid cracking the pour areas and sizes shall be limited in accordance with the following table.

Construction Element	Maximum Pour Size	Concrete Proportion
Ground Floor In accordance with Table 5 of Slabs "Concreting Ground Floors (C & CA) Latest Edition"		
Suspended slab	100m²	Length to breadth ratio not exceeding 1.5
Retaining walls	6m length	Storey height up to 3m
Other walls	7/5m length	Storey height up to 5m
Columns	-	Storey height up to 5m

Proposals for pour sizes in excess of the sizes noted in the table should be submitted in writing to the Engineer along with details of the proposed curing method. The Engineer's written approval must be obtained for any pour sizes in excess of those noted in the table.

No horizontal construction joints shall be allowed in downstand beams except where stated below.

Any beams of a thickness of 150mm or less and of an overall depth exceeding 1 metre are to be shuttered and concreted in two separate lifts with a horizontal construction joint provided at mid-height.

The Contractor is to exercise adequate care and control during the concreting operations to ensure that the concrete in projecting nibs and beams is uniform and sound and to the cross sectional dimension shown on the drawings.

An all-in aggregate with a maximum size of 10mm is to be used in concrete for all beam sections of 150mm width or less.

The Contractor is to provide adequate support systems to the formwork of all edge beams to ensure that the line and level of the beams and projecting nibs indicated on the drawings is maintained at all times during all the construction operations.

5/04/06 Holes in Concrete

The Engineer shall be notified by the Contractor of the locations of all openings, chases, holes or other voids not shown on the documents and the Engineer's approval shall be obtained prior to their being formed. No cutting of concrete shall be permitted except by prior agreement in writing by the Engineer.

If, after permission is given by the Engineer to cut concrete, reinforcement is encountered it is to be reported to the Engineer and no reinforcement is to be cut without the written approval of the Engineer.

5/04/07 Holding Down Bolts & Other Fixings in Concrete

The Engineer shall be notified by the Contractor of the details of all fixings to be permanently built into the concrete where these are not shown on the documents.

The Contractor shall arrange to take delivery of and store until required, all holding down bolts and any other fixings to be supplied by others for casting into concrete work.

The Contractor shall supply and fix all templates necessary to set out accurately all holding down bolts and other fixings in position and projection as shown on the documents.

Unless otherwise specified, holding down bolts shall be cast in tapered timber boxes. Alternatively approved polystyrene or expanded metal bolt boxes may be used. The Contractor shall ensure that the projecting ends of the bolts have freedom for 25mm horizontal movement all round within the hole formed by the bolt box. The projecting ends of bolts shall be well greased and wrapped, and this protection shall remain undisturbed until steelwork erection commences.

Following casting-in of bolts and other fixings the Contractor shall again check their location and projection for accuracy and report any discrepancies to the Engineer. No modification of the steelwork or fixings, bending of holding down bolts, or the use of an excessive number of washers to accommodate errors in position and projection of bolts or fixings shall be made except with the prior agreement of the Engineer.

No fixings shall be inserted into the structural concrete by means of shot-fired methods without the Engineer's prior agreement in writing, and all such fixings shall comply with the following conditions:-

(a) The size and positions shall be notified.

(b) Such fixings shall not be used in positions where they are in direct tension or where they are subject to rusting.

(c) The Contractor shall be responsible for making good any damage to the permanent structure which may be caused by such fixings.

(d) The fixings shall be installed strictly in accordance with the manufacturer's instructions.

All resin anchors to be installed in strict accordance with the manufacturer's written instructions.

After the minimum curing period and before the fixing of the structure to the resin anchors, every anchor should be non- destructively tested to a pull out load of 3 kN unless otherwise noted.

In addition one resin anchor from each floor level at each tying-in location should be tested to four times its working pull out load.

Notwithstanding this the resin anchors may also require to be tested as directed and to the satisfaction of the Engineer.

The Contractor shall allow for the testing by the Supplier and for the preparation and submission of written reports to the Engineer.

5/04/08 Grouting & Dry Packing for Structural Purposes

In all cases any space to be filled shall be thoroughly clean and temporary formwork shall be provided as necessary. Where steel packing has been provided by a Specialist it shall not be disturbed.

For spaces not exceeding 25mm and for holding-down bolt-holes, a neat Portland Cement grout shall be used, unless otherwise specified by the Engineer The grout shall be mixed as thickly as possible, but shall be sufficiently workable to ensure that the space can be completely filled.

For spaces not less than 25 mm and not exceeding 50mm a Portland Cement mortar, 1 part of cement to 2 parts of fine aggregate shall be used unless otherwise specified by the Engineer. The mortar shall be mixed as dry as possible but shall be sufficiently workable to ensure that the space can be completely filled using mechanical or hand ramming as necessary.

For spaces in excess of 50mm concrete Grade 30 using 10mm maximum size aggregate shall be mixed as dry as possible, and shall be compacted by thoroughly ramming with a suitable blunt rammer against properly fixed supports until the space has been completely filled.

The Contractor may be permitted to use expanding agents provided that the Engineer's prior agreement in writing is obtained.

5/04/09 Kickers for Walls & Columns

In order to provide proper positioning and bottom support to formwork for walls and columns, the Contractor may if he wishes, and if approved by the Engineer, cast a concrete kicker as a separate operation prior to the wall or column to be concreted, unless stated to the contrary on the drawings. Separately cast kickers will not be permitted in watertight construction.

Such kickers shall be of the same mix as the wall or column of which they form a part, and shall be a minimum of 75mm deep. The same precautions as apply when casting new concrete against previous work are to be taken when casting such kickers. Care must be taken to compact thoroughly the concrete in the kickers, so as to ensure a smooth even surface against which the formwork for the wall or column can be properly and tightly drawn up.

5/04/10 Curing of Concrete

During the initial stages of hardening, all concrete shall be protected from harmful effects of sunshine, drying winds, cold, rain and running water. The protection shall be applied as soon as practicable after completion of placing by one or more of the following methods:-

(a) The concrete shall be covered with a layer of sacking canvas, hessian, straw mats, or similar absorbent material, or a layer of sand, kept constantly wet for 7 days.

(b) After thoroughly wetting, the concrete shall be covered with a layer of approved waterproof paper or plastic membrane kept in contact with the concrete for 7 days.

(c) Approved spray application of curing membrane.

5/04/11 Concreting in Cold Weather

In cold weather, concreting operations will be permitted provided the following requirements are complied with. The requirements are in addition to those detailed elsewhere in this Specification All materials used to make the concrete shall be free from snow, ice and frost. Suitable means shall be provided to warm the aggregate and/or the mixing water so as to ensure that the temperature of the concrete leaving the mixer shall not be lower than 10 C nor higher than 32 C.

The mixing water shall not be heated to a temperature higher than 60 C but if the temperature of the mixing water is in the range 32 C to 60 C then the water and the aggregates shall be mixed first before adding the cement. Salt, chemicals, or other additives intended to prevent freezing or to accelerate hardening must not be used in the mix unless specifically approved by the Engineer.

Cement shall not be heated. Before placing concrete, the surfaces of all formwork, reinforcement, adjacent concrete, and other surfaces (including the ground) likely to come in contact with the concrete shall be free of ice, snow and frost, and the methods employed to ensure this shall be to the Engineer's approval.

The temperature of the concrete at the time of deposition shall not be less than 5 C, and suitable means shall be provided for maintaining this temperature until the concrete has attained a minimum strength of 5.0 Newtons per sq.mm. The means employed to maintain this temperature shall not be such as to cause drying of the concrete.

Thereafter the concrete shall be protected from frost until a minimum of 72 hours have elapsed from completion of the pour, during which time the temperature of the concrete must not fall below 2 C. If the Contractor elects to use rapid-hardening cement (see clause 02/02 - Cement) then the period during which the concrete must be protected shall reduce from 72 hours to 48 hours after completion of the pour.

The Contractor shall provide facilities for checking the temperature of the concrete at the mixer, at the time of deposition, and during hardening and curing. Facilities shall also be provided for checking the temperatrue of the aggregates and mixing water. The strength of the concrete during hardening and curing may be checked by crushing test cubes made from the concrete used in the pour and stored under the same conditions as the concrete in the pour.

If no provision is made for heating aggregates and/or mixing water, and for defrosting formwork, reinforcement and the like, then no concreting shall be permitted until the shade temperature reached 2 C on a rising thermometer, nor shall concreting be continued when the shade temperature drops below 3 C on the falling thermometer. In all cases, however, the requirements stated above for minimum temperature of concrete at time of deposition, minimum hardening and curing temperatures, and minimum periods for protection against frost shall be adhered to on the approach of and during the currency of frosty weather.

5/04/12 Concreting in Hot Weather

i) Mixing

In hot weather suitable means shall be provided to either shield the aggregate stock piles from direct rays of the sun or to cool the aggregates by fine spraying with water and to insulate the mixing water tank and pipelines to ensure that the temperature of the concrete when deposited shall not exceed 32 C.

ii) Placing

In hot dry weather suitable means shall be provided to avoid premature stiffening of concrete placed in contact with hot dry surfaces. Where necessary the contact surfaces, including reinforcement, against which the concrete is to be placed shall be shielded from the direct rays of the sun and shall be sprayed and cooled with water to prevent excessive absorption of mix water from the concrete.

5/04/13 Watertight Construction

All work shall be constructed in accordance with BS 8007 the Code of Practice for the structural use of concrete for retaining aqueous liquids.

The Contractor's attention is drawn to the concrete described as watertight where the Contractor is responsible for ensuring that the resulting construction is free from running or percolating water. In the event of any leakages the Contractor must carry out at his own expense any remedial work required by the Engineer.

The cement to be used in concrete described as watertight shall be approved by the Engineer. Consideration will be given to proposals put forward by the Contractor for the use of ordinary portland cement with a suitable densifying admixture, which must be clearly and fully described as regards its composition and action.

All concrete described as watertight shall be carefully compacted using internal vibrators to ensure a dense impermeable concrete.

Where walls to basements and elsewhere are constructed in watertight concrete, kickers shall be provided and shall be cast in one operation with the floor and foundation members. The height of the kicker will depend on the size of waterstop used, but in all cases will be of sufficient height to allow the waterstop in the kicker to be set clear of the reinforcement in the floor or base slab.

Waterstops as described on the drawings or in the Bill of Quantities shall be provided in all construction and other joints. The waterstop shall be firmly located in the joint in the position appropriate to the type of waterstop used, and concreting shall be carefully carried out so that the joint line occurs at the precise position relative to the waterstop shown on the drawings or in the manufacturer's instructions. Particular attention shall be paid to placing and compacting concrete around the waterstop, both to ensure a sound joint and to avoid damage to the waterstop.

Before starting operations involving concrete described as watertight the Contractor shall agree with the Engineer the number and sequence of concrete pours. Where the position of joints is not shown on the drawings, these shall be determined so as to reduce the number of pours to the minimum practicable, having regard to the need to minimise concrete shrinkage and to achieve maximum compaction.

Waterstops have been measured to allow a maximum area of floor slab between construction joints of 45 sq. metres and a maximum length of wall between construction joints of 6 metres.

Special intersection pieces shall be used for intersections of identical sections of waterstop and special connection places shall be used for connections of differing sections of waterstop. Junctions in waterstops shall be made using heat-welding equipment in accordance with the manufacturer's recommendations. All centrally placed waterstops shall be of the eyeletted type and shall be securely wired to the reinforcement to keep them in place during concreting.

Ties used to secure and align formwork for walls to be of the type that remain embedded. The ends of the embedded ties should have cover of at least 40mm and the gap left from the end of the tie to the face of the concrete shall be effectively sealed with 1:3 cement/sand mortar, the hole being primed with an approved bonding agent. The surface finish to the plug shall accord with that specified for the wall surface.

PART 5 SAMPLING AND TESTING

5/05/01 General

In respect of materials for use in the works, the Engineer shall be entitled to ask for lists of proposed suppliers and for such reasonable certificates and samples as may be necessary to determine the suitability of the materials for this purpose.

The Engineer shall also be entitled to ask at any time for such tests to be made on materials or items of workmanship as may reasonably be necessary to check this conformity with the Specification.

All sampling or testing shall be carried out in accordance with the procedures set out in the appropriate issue of the British Standard Specification relating to such testing or sampling, or in the event of no British Standard being applicable shall be carried out in a manner and using equipment approved by the Engineer.

The Engineer shall have the right to order that any material which does not comply with the Specification shall not be used in the Works and shall be removed from the site, at no cost to the Employer.

The Engineer shall also have the right to require any item of workmanship which does not accord with the requirements of the Specification to be taken down and replaced to his satisfaction, at no cost to the Employer.

5/05/02 Cement

The Contractor shall make available to the Engineer the manufacturer's Certificate of Quality. Samples required for testing shall each weigh 5kg and shall be tested in accordance with BS.12

5/05/03 Aggregates

The quantities submitted for testing shall be not less than

2kg for fine aggregates
10kg for coarse aggregates
12kg for all-in aggregates

Aggregate grading tests shall be carried out at least twice per week throughout the duration of concreting.

Tests for shrinkage, water absorption and aggregate strengths may be taken from recent laboratory certificates (not older than 6 months) and these should be repeated and updated at 6 monthly intervals throughout the contract.

5/05/04 Water

The Contractor shall produce analytical reports on the water to determine the absence of any substance damaging to the cement or reinforcement.

5/05/05 Reinforcement

The Contractor shall supply Test Certification stating the origin of the material, and stating its compliance in all respects with the relevant standards.

Make available to the Engineer, test certificates in accordance with cluase 16 of BS 4449 and BS 4461 or clause 13 of BS 4483.

If required, make available test pieces of all materials selected by the Engineer.

PART 6 AIR ENTRAINED CONCRETE FOR YARDS AND ROADS

5/06/01 General

Concrete to be Grade 40/20 with a minimum cement content of 360 kg/m³ and to be air entrained.

Maximum free water-cement ratio shall be 0.50.

5/06/02 Admixtures

An air-entraining admixture complying with BS 5075, Part 2, shall be used in concrete. Admixtures containing calcium chloride shall not be used. Other chloride free admixtures complying with BS 5075 may be used with the approval of the Engineer.

5/06/03 Air Content

The total quantity of air in air-entrained concrete as a percentage of the volume of the mix shall be as follows within the tolerances given in BS 5328.

Nominal Aggregate Size	Air Content %
20 mm	5

The air content shall be determined at the point of delivery to the paving plant by a pressure type air meter in accordance with BS 1881, at the rate of one determination per 300 m² of slab or at least 6 times per day, whichever is the greater, in conjunction with tests for workability and strength. For areas less than 300 m² the rate shall be at least one determination to each 20 m length of slab or less constructed at any one time or at least 3 times per day. If the air content is outside the specified limits a further test shall be immediately on the next available load of concrete before discharging. If the air content is still outside the limit the Contractor shall immediately adjust the air content of the concrete or improve its uniformity, before any further concrete is used in the works.

The air-entraining agent shall be added at the mixer, by an apparatus capable of dispensing the correct dose within the limits given in BS 5328, and so as to ensure uniform distribution of the agent throughout the batch during mixing.

5/06/04 Density

The density of concrete grade C40 shall be such that without air-entrainment the total air voids are not more than 3%. With air-entrainment, the total air voids shall be not more than 8% for 20 mm aggregate.

The air voids shall be derived from the difference between the theoretical maximum dry density of the concrete calculated from the specific gravities of the constituents of the mix and the average value of three direct density measurements made in accordance with BS 1881 on cores, at least 100 mm diameter taken in accordance with BS 6089. Where different concrete mixes are used in separate layers, the density of each layer shall be separately determined by splitting or cutting the cores between the layers.

Cores shall be taken as instructed by the Engineer for trial bays and at the rate of at least three per 1200 m length of pavement layer being constructed in any single width during normal working or at a lesser rate as directed by the Engineer. If the average of any two consecutive measurements of density of the cores is below the minimum required, the extent of defective concrete shall be determined by additional cores or other means approved by the Engineer and the concrete shall be removed and replaced with new material in accordance with the Specification. Additional cores may be ordered by the Engineer and taken at locations decided by him, to check the depth or density of concrete slab, or the position of reinforcement.

In calculating the density, allowance shall be made for any steel in the cores.

Core holes shall be reinstated with compacted concrete with mix proportions of 1 part of Class 42.5 cement : 2 parts of fine aggregate : 2 parts of 10 mm nominal single sized coarse aggregate by mass.

Ordinary prescribed concrete in accordance with BS 5328

Grade (Ring one)	C7.5P C10P C15P	C20P C25P C30P
Permitted type(s) of cement (ring those permitted	BS 12 (OP) BS 12 (RH)	BS 12 (OP) BS 12 (RH)
	BS 12 in combination with pulverised fuel ash complying with BS 3892: Part 1	BS 12 in combination pulverised fuel ash complying with BS 3892 Part 1
	BS 12 in combination with ground granulated blast furnace slag complying with BS6699.	BS 12 in combination with ground granulated blast furnace slag complying with BS6699.
	BS 146	BS 146
	BS 6588	BS 4027
	BS 6588	
Permitted type(s) of Coarse: BS 882		BS 882
	BS 1047	BS 1047
Fine:	BS 882	BS 882
Reconstituted	BS 882	N/A
All-in:	BS 882	N/A
Nominal maximum size of aggregate (mm) (ring one)	40 20 14	40 20 10
Workability (ring one)	medium high	medium high

Any additional information

Schedule of Specific Requirements for mixes to be used

CONTRACT		Mix description used in bill of quantities
Type of mix (P, SP or D)		
Type of cement		BS no.
Type of aggregate Coarse		BS no.
	Fine	BS no
Nominal aggregate maximum size (mm)		
Grade		
Minimum cement content		(kg/m³)
Sampling rate		(m³)
Workability Slump		(mm)
		VB(s)
	Compacting factor	
Maximum free-water/cement ratio		
Maximum cement content		(kg/m³)
Special cement		
Special aggregate	Coarse:	
	Fine:	
Fine aggregate		(%)
Admixtures	Specified	
	Prohibited	
	Amount	
Air content		
Temperatures of fresh concrete	Maximum (C)	
	Minimum	
Density of concrete (kg/m³)	Maximum	
	Minimum	

Additional requirements
on attached schedule
COMPRESSIVE STRENGTH

CONCRETE GRADE	C2.5	C5	C.7.5	C10	C12.5	C15	C20	C25	C30	C35	C40
CHARACTERISTIC COMPRESSIVE STRENGTH) N/mm² AT 28 DAYS	2.5	5.0	7.5	10.0	12.5	15.0	20.0	25.0	30.0	35.0	40.0

SECTION 7 REINFORCEMENT

PART 1 GENERAL

7/01/01 British Standards

Mild steel and high yield steel reinforcement are to conform in all respects with BS 4449.

Fabric reinforcement shall conform in all respects with B.S. 4483.

7/01/02 Testing and Samples

The Contractor shall furnish the Engineer with copies of Mill Test Certificates and Laboratory Analysis Reports of the various types, sizes and batches of reinforcement supplied to the contract, to prove conformity with the above standards.

Samples of the reinforcement delivered to the site shall be taken under the supervision of the Engineer and tested by an independent laboratory selected by the Engineer.

PART 2 WORKMANSHIP

7/02/01 Condition of Reinforcement

Reinforcement shall be stored by type, size and lengths either off the ground or on clean surfaced areas.

The steel shall be free from oil, dirt, paint, loose rust, mill-scale or other deleterious matter immediately before placing the concrete.

7/02/02 Welding

No weld shall be allowed in any reinforcement without the permission of the Engineer.

7/02/03 Fixing of Reinforcement

The reinforcement shall be temporarily fixed in position to avoid displacement before and during concreting. All intersections of reinforcement shall be securely tied by 1.6mm diameter malleable iron wire or any other method approved by the Architects or Engineers before concreting is commenced. All reinforcement shall be maintained accurate in position during and after concreting.

When fixing reinforcement the Contractor shall provide all necessary tying wire, chairs, spacers and hanger bars in order to rigidly maintain the reinforcing bars and fabric in their correct positions. Spacers shall be of fine concrete, mortar, nylon or plastic or other approved material. Where a concrete surface is to remain exposed, no spacers shall be used to that face and the correct cover shall be achieved by other approved means

7/02/04 Spacers, Blocks and Chairs

Where blocks are used to ensure the correct cover to the reinforcement these shall be made of mortar, or of fine concrete, not leaner than one part of cement to three parts of aggregate. The blocks shall have tying wire cast in and projecting for tying to the reinforcement.

All chairs, cradles and like spacers and supports detailed on the Bending Schedules and on the Drawings shall be provided in addition to those required by the Contractor to maintain the rigidity of the reinforcement

Care shall be taken when placing and fixing the reinforcement to avoid damaging any tanking or damp-proof membranes, or formwork for surfaces which will remain exposed.

The insertion of bars into concrete already placed shall on no account be permitted.

7/02/05 No placing of concrete shall commence until the Engineer has inspected the reinforcement in place and passed it as being satisfactory.

7/02/06 Cutting and Bending

Mesh reinforcement, where necessary shall be cut to size, bent and laid by the Contractor.

In contracts where the Engineer undertakes to provide bending schedules, the Contractor will be provided with a list giving the cut length, size, bending and location of each bar in the work. The length and bending will be deduced as accurately as possible but the Contractor must check them before placing them in position in the work.

Unless otherwise noted on the lists, all bending of bars shall be in accordance with BS 4466. The Contractor will not be permitted to substitute a different size of bar from that indicated in the detailed drawings without the approval of the Engineer.

No reinforcement is to be re-bent without the approval of the Engineer.

SECTION 8 FORMWORK

PART 1 GENERAL

8/01/01 Design and Formwork

All formwork is to be of approved materials and erected in true alignment, adequately stayed and braced, for rigidly supporting the weight of the concrete and all temporary loads including dynamic effects during the period of pouring, setting and hardening, to the satisfaction of the Engineer. The joints of the formwork in all cases shall be sufficiently close to prevent loss of liquid from the concrete. The faces of the formwork shall be constructed using materials appropriate to the finish required.

All formwork and falsework design shall be the responsibility of the Contractor.

Designs and detailed drawings shall be submitted to the Engineer for examination prior to the commencement of the formwork erection.

Particular care is to be taken with the supporting, strutting and shoring of formwork for concrete which is to be vibrated during the compacting process.

Any side formwork which carries a double beam vibrating compactor must be accurately set for level along its entire length and fully restrained in position in order that the finished slab is within the required tolerances (+ or - 2 mm/metre). The formwork must be true, clean and square edged at all times and in no way rounded or defective at any section along its total length.

8/01/02 Fixings

The materials and position of any ties passing through the concrete shall be approved by the Engineer. Except where corrosion of a metal tie is unimportant, it shall be possible to remove a tie so that no part of it remaining embedded in concrete shall be nearer to the finished surface of the concrete than the specified thickness of cover to the reinforcement. Any holes left after the removal of ties shall be filled with concrete of the same mix proportions as the concrete in the member, or with mortar having the same proportions of sand to cement as in the concrete mix used in the member. This clause shall be read in conjunction with 5/04/07.

8/01/03 Camber

The Contractor shall make allowances for any settlement or deflection of formwork that is likely to arise during construction, so that the hardened concrete conforms accurately to the required shape, position and level. The Contractor shall also make allowance in the formwork for any camber specified by the Engineer, for the elastic deflection of structural members and deflections due to shrinkage and creep of the concrete.

In the absence of any specified camber, the soffit of all beams and slabs greater than 5 metres span, other than pre-stressed beams shall be laid to a camber, the amount of which shall be 2mm per one metre of span. The depth of the beam at all points in the span shall be as specified on the drawings.

8/01/04 Striking Formwork

Formwork shall be so constructed that it may be removed without shock, vibration or damage to the concrete. All formwork for beams and allied members shall be constructed so that the sides may be removed without interference with the remainder of the formwork. No formwork shall be removed until a minimum of one day has elapsed after concrete has been placed.

The use of mould oil or other material to facilitate the striking of formwork shall be subject to the approval of the Engineer.

The following table gives the minimum interval of time which shall be allowed between the placing of the concrete and the striking of the shuttering. The number of days which the temperature has fallen below freezing point shall be added to these times.

Removal of Shuttering	Portland Cement Class 42.5		Portland Cement Class 52.5	
	Cold Weather (about freezing)	Normal Weather (about 16 C)	Cold Weather (about freezing)	Normal Weather (about 16 C)
	Days	Days	Days	Days
Beam sides, walls and columns (unloaded)	3	2	2	1
Slabs (props left under)	10	4	10	3
Removal of props to slabs	35	28	14	5
Beam soffits (props left under)	14	8	12	5
Removal of props to beams	35	28	21	14
Cantilever (props removed)	35	28	21	14

The times stated in the above table for "Removal of Props to Slabs" are for slabs without superimposed constructional loadings. Where it is the Contractor's intention to use a slab as a working platform, either to support a subsequent floor or for storage of materials or similar, then the contractor shall agree the sequence of operations and cycle of propping with the engineer prior to work being undertaken.

During construction, soffits of slabs shall be propped through two floors at least. The time lapse between adjacent floors being at least 7 days and at all times the lower unsupported floor shall be at least 28 days old

8/01/05 Special Formwork

Where the surface finish to concrete is specified to a standard of F.3 or higher the Contractor shall allow for additional care and attention in the construction, assembly and striking of the formwork. Particular attention shall be paid to the tightness of the formwork at construction joints, as the formation of any fins, leakage of grout or other imperfections will not be acceptable. It is important that a perfectly straight joint shall be obtained at the soffit of beams and slabs at the junction with the heads of columns. The Contractor shall submit to the Engineer, for his approval, proposals for ensuring that these column head joints are tight.

All returns to formwork shall be furnished with solid corners. Where ties are required between faces of the formwork, "Rawlties" and Rawlcones" or similar and approved types of ties shall be used, and shall be positioned in a regular pattern which shall be agreed with the Architect. After the concrete has thoroughly hardened the plugs at the ends of the ties shall be carefully removed and the cavities neatly filled with a sand-cement mortar in the same proportions as these materials exist in the concrete mix. If the plug filling is to be recessed from the general face of the concrete, this work shall be executed to the Architect's requirements.

The materials used in forming the surfaces of the formwork against which the concrete shall be placed shall be approved by the Architect and Engineer.

Only mould oils which have been approved by the Architect and/or Engineer shall be used. Extreme care must be taken to ensure that no staining of the exposed surface of the concrete results from the use of mould oils or from any other source.

After the formwork has been removed the Contractor shall protect the edges and corners of columns, beam and walls so as to avoid damage to these items. Such protection shall be approved by the Architect and the Engineer and it shall be securely fixed in position and maintained until the end of the contract.

8/01/06 Steel Forms for Concrete Floor Slabs

The edge shutters shall be of heavy gauge purpose made steel with stiffened ribs equal to, or more than the full depth of the concrete slab, of channel section and of a weight not less than 17.88 kg/m. The top corner shall be square edged and the shutter shall have a minimum of 50mm width of base. It shall be securely fixed along its length by approved steel fixing pins, and shall be drilled where necessary for the location and fixing of dowel bars.

The shuttering shall be true to line and level and firmly fixed with double wedges to the pins such that there is no displacement during the placing and compaction of the concrete. Joints in the shuttering shall be by the use of 75mm deep sliding plates.

No shuttering shall be removed until one day has elapsed after the placing of the concrete against them and every care shall be exercised during their removal to ensure that the concrete is not damaged in any way. A 'Tirfor' pulling machine, or other equal machine approved by the Engineer, must be used for the removal of the shutters. The edge of the slab shall be rubbed by hand with a carborundum stone to remove any excess concrete and to ensure a clean sharp right angle. All shutters shall be thoroughly cleaned and oiled before use.

8/01/07 Samples

Where sample panels of fair-faced concrete or other special surface finishes are called for, these sample panels shall be such that wall panels are not less than 2 metres long, actual site panel height x actual site panel thickness. Beam and column samples shall not be less than 2 metres long and shall be constructed to the appropriate cross section, as shown on the drawings. The concrete mixes used in the casting of the sample panels shall be the same as those to be used in the actual work.

8/01/08 Tolerances

The Contractor is referred to the Specification for Permissible Deviation.

8/01/09 Permanent Forms

Permanent formwork, where required, shall be constructed of brickwork/blockwork or other approved materials.

8/01/10 Checking of Formwork

Before each section of concrete is placed, the Contractor is to give due notice to the Employer's supervisory staff of his intention to place concrete in that section so as to allow the supervisory staff the opportunity to check the formwork for accuracy of setting out, plumbness, rigidity and general soundness of construction also to check the placing of the reinforcement. Such checking by the site supervisory staff shall in no way relieve the Contractor of his responsibility under the Contract of the accuracy of setting out and soundness of construction. The minimum notice for checking formwork shall be 24 hours.

PART 2 SURFACE FINISHES

8/02/01 Imperfections & Blemishes

Honeycombing or any similar imperfection of a structural nature will not be permitted, and any concrete member which displays such defects, which in the Engineer's opinion are likely to affect the member's structural performance, shall be taken down and replaced at the Contractor's expense. If the extent of the imperfection is limited, however, the Engineer may permit the member to be repaired by methods which shall have been approved beforehand. No remedial work shall be carried out unless agreed to by the Engineer.

8/02/02

Formed Surface

Type F1 Finish

This finish is obtained by the use of forms consisting of sawn boards, sheet metal, or any other suitable material (including brickwork or blockwork) which will prevent the loss of grout when the concrete is compacted within it.

Type F2 Finish

This finish is obtained by the use of properly designed forms of closely jointed wrought boards. The surface will be imprinted only with the slight grain of the wrought boards and their joints. Steel or other suitable materials approved by the Engineer may be used for the forms. The surface should be plane, free of voids, honeycombing or other large blemishes.

Type F3 Finish

This finish can only be achieved by the use of high quality concrete and by using properly designed forms having a hard smooth surface. The concrete surfaces should be plane and smooth with true clean arrises which shall be chamfered. 20mm x 20mm. There should be no staining or discolouration from the release agent or contamination unless otherwise noted.

Type F4 Finish

This finish is obtained by first producing a Type F2 finish on thoroughly compacted high quality concrete cast in properly designed forms. The surface is then finished by carefully removing all fins and other projections and if required thoroughly washing down then filling the most noticeable surface blemishes with a cement and fine aggregate paste. Every effort shall be made to match the colour of the concrete. Care should be taken in the choice of any release agent used, to ensure that the finished concrete surface is not permanently stained or discoloured. All arrises shall be chamfered 20mm x 20mm.

Type F5 Finish

This finish is obtained by first producing a Type F3 finish and then if required while the concrete is still green, filling all surface blemishes with fresh, specially prepared cement and fine aggregate paste. Every effort shall be made to match the colour and texture of the concrete surface. After the unit has been properly cured, the faces should be rubbed down where necessary to produce a smooth and even surface.

Type F6 Finish

This finish is obtained by producing formwork to the standard of Type F3 finish and applying an approved surface concrete retarder to the soffit and side forms prior to fixing the reinforcement. On striking the formwork the retarded surfaces shall be cleaned back to give a clean exposed aggregate surface to provide an adequate bond between the concrete base and an applied finish. It is also permissible to provide this surface texture by omitting the retarder and bush hammering those surfaces which are to receive an applied finish.

Where the retarder is used care shall be taken to ensure that it is compatible with the finishes to be applied to the surface treated.

Type F7 Finish

This finish is obtained by the use of hollow mould forms which shall be set out from the centre of each bay so that any tolerance is absorbed equally at each end of the bay. The Contractor's proposals for the support system, stripping procedure and maintenance of concrete cover to the reinforcement shall be submitted to the Engineer for examiantion prior to the commencement of the work.

The standard shall be in conformity with the remainder of the Specification.

8/02/03

Unformed Surfaces

Type U1 Finish

This finish is obtained by levelling the concrete to the required level by shovel or timber battens worked over and compacting the surface. The finish level shall be within 13mm of the required level.

Type U2 Finish

This finish is obtained by levelling and screeding the concrete to produce a uniform plain surface, surplus concrete being struck off by a straight edge immediately after compaction. In the case of roads, pavings and hard standings the surface shall be ridged as the final part of the screeding operation, unless otherwise specified by the Engineer.

Type U3 Finish

This finish is obtained by first producing type U2 finish using a vibratory tamper. Once the concrete has hardened sufficiently the surface shall be float finished by machine or by hand. Care shall be taken that the concrete is worked no more than is necessary to produce a uniform surface free from screed marks and ready to receive an applied floor finish. The maximum permissible deviation from the design level is $\pm$ 5mm.

Type U4 Finish

This finish is obtained by first producing type U3 finish. When the concrete has hardened sufficiently and the surface moisture film has disappeared the surface shall be troweled with a smooth steel trowel to give a smooth level surface finish.

The surface shall be troweled under a firm even pressure and left free from trowel marks or other blemishes.

The finished surface so produced shall be proected at all times from the effects of weather and/or mechanical damage.

Type U5 Finish

This finish is obtained by first producing a type U3 finish. The area will then be treated by a system of vacuum de-watering following by power floating and/or power trowelling.

The surface should be free from abrupt irregularities and gradual irregularities shall not exceed 3mm from a 3m straight edge placed in any position.

A sample panel of this type of finish shall be prepared prior to the commencement of the main work. This sample panel shall be prepared by the contractor using the same materials and methods as will be employed in the contract. Approval of both the Architect and Engineer of this sample shall be obtained. the approved sample shall be regarded as the standard for all the work to this type of finish.

The finished surface so produced shall be protected at all times from the effects of weather and/or mechanical damage.

Type U6 Finish

This finish is obtained by first producing a type U3 finish. Remove any free water or laitance from the surface. Apply first application of sprinkle coat and power float into the concrete in strict accordance with the manufacturer's written instructions. Apply a further application of the sprinkle coat and again power float into the concrete in strict accordance with the manufacturer's written instruction to produce a dense highly polished finish.

The timing of the application of the sprinkle coat is crucial to the operation and the works must therefore be carried out by operatives skilled in this type of concrete finish. Great care shall be taken in ensuring that both sprinkle coats are well worked into previous layers. Under no circumstances, shall the sprinkle coat be spread over deep "footprints" in the concrete as this may lead to localised delamination.

The surface should be free from any abrupt irregularities and gradual irregularities shall not exceed 3 mm from a 3 m straight edge placed in any position.

A sample panel of this type of finish shall be prepared prior to the commencement of the main work. This sample panel shall be prepared by the specialist contractor using the same materials and methods as will be employed in the Contract. The approval of both the Architect and Engineer of this sample panel shall be obtained, the approved sample being regarded as the standard for all work to this type of finish.

The finished surface so produced shall be protected at all times from the effects of weather and/or mechanical damage.

8/02/04 Laser Laying

Unless agreed otherwise with the Engineer, surface finish type U6 shall be achieved exclusively by a laser guided screeding machine and by operatives skilled in this technique. The laser(s) shall be accurately levelled into position and located such that "blind spots" are not encountered. The works shall be carried out in a methodical manner, with regular concrete deliveries, working backwards towards the main access. All laser screeding works shall be supervised by an Engineer or Foreman with substantial experience in the method of working and technique.

Long Strip Floors

Such floors shall be paved on the "strip" principle, that is for the length of the section at a width not exceeding 4.5 metres.

Alternate strips shall be cast to allow tamping of the infill strip from the hardened concrete and/or underbuilding walls. Infill strips may be cast not earlier than 3 days after adjacent concrete strips.

To permit shrinkage without deleterious effects upon the slab, saw cuts or shrinkage inserts shall be provided whre indicated on the drawings, to a depth as shown.

The shrinkage slot shall be cleaned and filled with an approved bituminous pouring filler, finished flush with the slab.

Concrete shall be vibrated by internal poker means and/or a vibratory compacting beam to the engineer's approval.

Concrete Slump

The slump of the concrete shall be within the range 25mm to 65mm to suit the requirements of the floor finish specified.

Formwork

Formwork shall be of approved square topped sections.

Protection

The contractor shall include in his rates for providing suitable protection to the floor slab against damage from inclement weather.

Where the whole concrete floor, including all thickenings, pockets, edge steps etc, are cast before any super-structure work is commenced, the contractor shall include for any measures necessary to protect the finished floor from damage due to subsequent operations.

Power Trowelling

Where power trowelling is required, this must be carried out at the optimum stage of hardening of the concrete. Only an experienced trowel operator shall be permitted to carry out this work.

The standard of finish achieved must meet the tolerance and finish standards required for subsequent flooring overlays, including any necessary allowance for approved latex screeding.

Surface Hardeners

Manufacturer's instructions shall be observed.

Curing

The terms of the main concrete specification shall be complied with.

The contract programme shall allow for the long term drying out of the floor slab concrete, where impervious overlaps, screeds or finishes are specified, at the rate of one month per 25mm of slab thickness, subject to protometer checking on site.

SECTION 10 PERMISSIBLE DEVIATIONS

PART 1 GENERAL

10/01/01 Unless particularly noted otherwise hereunder or elsewhere in the specification the dimensions of a new structure, or extension to an existing structure, shall comply with the limits and tolerances noted in the BS 5606 : 1978 (Code of Practice for Accuracy in Building) Tables 2 and 3.

10/01/02 The appended table 10/01/02T is concerned solely with the permissible deviations connected with reinforced concrete and associated work. Where applicable, for example, Section 12, paragraph 12/03/02 should be consulted for erection tolerances on structural steelwork.

PERMISSIBLE DEVIATIONS 10/01/02T

ELEMENT OF STRUCTURE	RELATIONSHIP OF TOLERANCES TO LENGTHS OF COMPONENT				
	Up to 300mm	300-1200mm	1200-3650mm	3650-7600mm	Over 7600mm
A. FOUNDATIONS					
1. Variation in plan dimensions of R.C. foundations.	6	10	16	25	38
2. Variation in thickness	5	6	10	16	25
3. Departure from alignment and levels	3	5	6	10	16
4. Abrupt change	not to exceed 12 mm				
5. Variation in plan dimensions of mass concrete foundations	10	16	25	38	50
B. SUPER STRUCTURE					
1. Variation in levels or grades from established datum. (i) in floors, including slab foundations used as floors, in beams, soffit and stair.	3	3	3	5	6
(ii) in floor slabs to receive screed finishes.	3	5	6	10	16
2. Variation in cross sectional dimensions of columns and beams and in the thickness of slabs and walls.	5	6	10	16	25

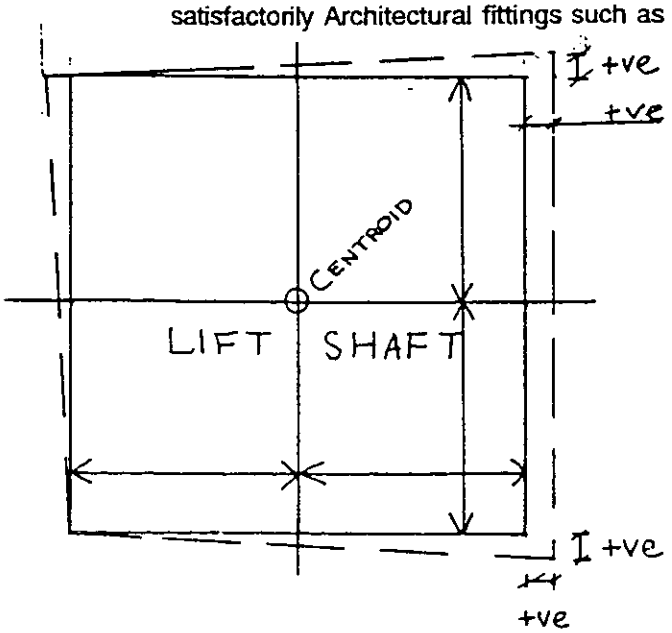
3. Variation from plumb or specified batter in the lines and surfaces of column encasures, stairs, walls and in arisses and controlled joints.	3	3	5	6	10
4. Setting out of linear building lines from established position in plan.	3	3	3	5	6
5. Height between floors after due allowance has been made for any cambers.	-	-	8	13	-
6. Centroid of member relating tc theoretical centroid	3	5	6	10	16
7. Distance between members, lengths of beams or walls	3	5	6	10	16
8. Overall length/width of building	not to exceed 20mm				

9. Lift shafts/opening in slabs for lift shafts.

Position of centroid of opening	±0
Position of edge of slab	+12.5 -0
Inside faces of lift shaft in full building height (per wall)	+2.5 -0

Notes

1. All dimensions are in millimetres unless otherwise noted.
2. Tolerances are not cumulative.
3. Nothing in the above table shall over-ride the need for structural members to be positioned to accept satisfactorily Architectural fittings such as window frames, doors and the like.



SECTION 11 PRECAST CONCRETE AND PRESTRESSED CONCRETE

PART 1 GENERAL

11/01/01 British Standards, Codes of Practice, Etc.

British Standards and Codes of Practice quoted in these specifications include all amendments made on or before the Date of Tender.

11/01/02 General

The manufacture and all materials shall be in accordance with BS 8110 to suit the requirements laid down in the Bill and the drawings. Where manufacturers' instructions are relevant to the use of materials in the work, those instructions shall be strictly adhered to unless written instructions to the contrary are issued by the Engineer.

11/01/03 Inspection

Facilities shall be afforded to the Engineer for the inspection of materials and workmanship at all times and during all stages of manufacture and delivery.

11/01/04 Samples and Testing

In respect of materials for use in the works, the Engineer shall be entitled to ask for lists of proposed suppliers and for such reasonable certificates and samples as may be necessary to determine the suitability of the materials for their purposes. The Engineer shall also be entitled to ask at any time for such tests to be made on materials or items of workmanship as may be necessary to check conformity of the work with the specification.

All sampling and testing shall be carried out in accordance with the procedure set out in the appropriate issue of the B.S.S. relating to such testing or sampling, or in the event of no B.S.S. being applicable, shall be carried out in the manner and using equipment approved by the Engineer.

Any material that does not comply with the Specification shall not be used in the works and shall be removed from the site at no cost to the Employer.

Similarly any finished units whether erected in position or not which do not comply with the specification shall be removed and replaced with new units to the Engineer's satisfaction at no cost to the Employer.

All costs involved in sampling and testing shall be included in the prices for the precast concrete elements.

11/01/05 Shop Drawings

When requested the Engineer shall be provided with shop drawings of all components.

PART 2 MATERIALS

11/02/01 Water

The water used in making concrete must be clean and fit for drinking and shall be obtained from a source approved by the Engineer.

11/02/02 Cement

Except where otherwise specified by the Engineer all cement shall be Portland Cement - Class 42.5 complying with BS 12 1991.

All cement shall be certified by the manufacturer as complying with the requirement of the appropriate British Standard. The Contractor shall, if required by the Engineer obtain the manufacturer's test certificate for any consignment as soon as possible after delivery.

The following cements in accordance with the relevant BS shall be used, only if specified.

Portland Cement - Class 42.5 complying with BS 12 1991.
Portland Cement - Class 52.5 complying with BS 12 1991.
Sulphate-resisting Portland Cement - Class 42.5 complying with BS 4027 : 1991.

11/02/03 Aggregates

Fine aggregate is to be of clean river or pit sand or other approved material and the grading shall fall within zones C to M of B.S. 882 unless otherwise agreed by the Engineer. Coarse aggregate shall comply with B.S. 882 and shall be obtained from a source approved by the Engineer.

11/02/04 Drying Shrinkage

Concrete made from the combined coarse and fine aggregates shall, when tested in accordance with the drying shrinkage test described in B.S. 812 Testing Aggregates part 120 Method of Determination of Drying Shrinkages exhibit drying shrinkages which must not exceed 0.040%.

11/02/05 Alkali-Silica Reaction

Concrete mixes for use in the permanent works shall comply with one of the undernoted conditions. The Contractor shall notify the Engineer which of the conditions it is his intention to adopt.

i) The cementitious material shall have a reactive alkali content not exceeding a maximum value of 0.6% by mass when tested and certified by the manufacturers and expressed as the sodium oxide equivalent.

ii) The total mass of reactive alkali in the concrete mix shall not exceed 3.0 kg/m³ of concrete when tested and calculated in accordance with procedures approved by the Engineer. The measurement of the chlorideion contents of the fine and coarse aggregates shall be carried out in accordance with the provision of BS 812.

iii) The aggregate shall be classed as non-reactive as noted hereunder.

The aggregate shall be classed as non-reactive if the Engineer is satisfied that the source does not contain opaline silica and one of the following sub-clauses is satisfied.

a) The fine and coarse aggregate each consist of at least 95% of one or more of the rock types or artificial aggregates listed in the attached table and provided that the Engineer is satisfied that the source does not contain a quantity of flint, chert and chalcedony that could cause damage from alkali-silica reaction.

Aircooled Blastfurnace slag, Andesite, Basalt, Diorite, Dolerite, Dolomite, Expanded clay/shale/slate, Feldspar, Gabbro, Gneiss, Granite, Limestone, Marble, Microgranite, Quartz, Schist, Sintered pfa, Slate, Syenite, Tuff.

Notes on rock types

1. Feldspar and quartz are not rock types but are discrete grains occurring principally in fine aggregate

2. Not highly strained quartz and not quartzite.

b) The proportion of chert and flint in the sources of aggregate is such that the proportion of chert and flint in the total aggregate is greater than 60% by mass when the fine and coarse fractions are combined.

11/02/06 Reinforcement

Mild steel and high yield steel reinforcement are to conform in all respects with BS 4449.

Fabric reinforcement shall conform in all respects with BS 4483.

The Contractor shall furnish the Engineer with copies of Mill Test Certificates and Laboratory Analysis Reports of the various types, sizes and batches of reinforcement supplied to the contract, to prove conformity with the above standards.

Samples of the reinforcement taken from the works shall be taken under the supervision of the Engineer and tested by an independent laboratory selected by the Engineer.

PART 3 WORKMANSHIP

11/03/01 Concrete

1. It shall be the precast concrete manufacturer's responsibility to design the concrete mix using the approved coarse and fine aggregates to give the required strength having regard to the workability required to suit his mould arrangement and to suit the drying shrinkage requirements of the specifications.

2. Before proceeding to manufacture any units, the precast concrete manufacturer shall supply evidence to the Engineer, in the form of certified results of previous cube tests or by the crushing of three standard cubes of age 28 days of the intended mix, that the mix intended for use will meet the strength requirements. Test cubes shall be taken as required by the Engineer for curing under the same conditions as the precast units are cured, and for testing at appropriate times to verify concrete strengths for demoulding, period of curing (including cold weather concreting) and strength at transfer in prestressed units.

3. All cubes shall be made at the point of deposition of the concrete. Cubes shall be tested in an approved laboratory, which may include the manufacturer's own laboratory, subject to clearance from the Engineer. All manufacture, curing (where appropriate) and testing will be carried out in accordance with B.S. 1881. Copies of all test results will be lodged direct with the Engineer, immediately after the tests are carried out.

The acceptability of concrete strength will be adjudged on the 28 day works control cube test results, the 7 day strength being taken as a guide.

All costs involved in making, curing and testing cubes, shall be deemed to be covered by the rates and prices for the precast units.

4. All concrete shall be batched by weight due allowance being made for any moisture being contained in the aggregates.

The material shall be mixed in a suitable mechanical mixing plant, and the concrete shall be placed in the moulds as soon as practicable after discharge from the mixer and not later than 45 minutes after the addition of water to the materials in the mixer except where the concrete is transported by truck mixer or agitators when the time can be increased to 1½ hours.

No concrete that has partially hardened shall be deposited in the moulds.

Additives (and in particular calcium chloride) shall not be permitted unless specifically agreed by the Engineer.

5. Welding of reinforcement for purposes of stress transfer between bars shall not be permitted.

Concrete shall be placed in the mould by methods which ensure no segregation of the constituents and shall be compacted in the moulds using approved mechanical vibratory equipment. Where the established production process for the manufacture of proprietary flooring units involves other methods of compaction the precast concrete manufacturers shall demonstrate to the Engineer, if required, the effectiveness of the methods of compaction used. In all cases, however, compaction shall be carefully controlled so as to ensure the formation of a solid mass of concrete free from voids.

6. Care shall be taken during compaction to ensure that the concrete is thoroughly worked around the reinforcement, tendons, duct-formers, and such other inserts and components specified for incorporation in the units, and that these are not disturbed in the process.

11/03/02 Placing and Compacting

Concrete is to be placed in the moulds and compacted by approved mechanical vibrators so as to produce a homogeneous dense mass free from honeycombing and other imperfections, in a single operation without construction joints. The concrete shall be mechanically compacted so that the cast surfaces are perfect, free from all cavities and of uniform colour.

11/03/03 Curing and Maturing

All units shall be kept moist for 7 days after casting, care being taken to prevent damage from frost. Steam curing shall not be permitted without approval in writing of the Engineer.

No units shall be delivered to the site until they have matured under normal conditions of temperature and humidity for a period of not less than 28 days from the date of casting. Shorter periods may be allowed where special methods of curing or special types of cement are used.

11/03/04 Moulds

All moulds shall be of adequate strength and stiffness to carry without deformation the loads and pressures of wet concrete during the casting and compaction operations. Moulds shall be sufficiently tight to prevent leakage of the concrete and shall be adequately supported, braced and maintained so as to produce units within the specified tolerances.

11/03/05 Finishes to Units

Units exhibiting any of the following defects shall not be accepted for building into permanent works.

(a) No cracked units will be acceptable.

(b) No repaired units will be acceptable.

(c) No units shall have broken edges whether reinforcement is exposed or not.

(d) No units shall have any reinforcement visible on the surfaces.

(e) No units shall have any surfaces impaired by honeycombing.

(f) No fair-face surfaces shall have fins, pitting, discolouration or other belmishes.

(g) No unit outwith the dimensional tolerances will be acceptable.

11/03/06 Dimensions and Tolerances

The members shall also be manufactured strictly in accordance with the approved drawings and within the following tolerances unless otherwise specified by the Engineer.

Length : + 6mm - 6mm

Depth : + 3mm - 3mm

Width : + 0mm - 6mm

Unless otherwise indicated on the drawings, or specified the minimum land for the members shall be 75mm where bearing on concrete or steel surface, and 100mm, where bearing on brickwork or blockwork.

11/03/07 Demoulding Storage and Transportation of Units

The precast concrete units shall be demoulded, stacked, stored and transported in such a manner that no undue or unintended stress comes on any part and that they do not become damaged. The units shall be stored on a firm and level site in such a way that the units can be inspected by the Engineer or his representative during the curing period prior to the despatch from the precast concrete factory. The precast concrete manufacturer is to allow for all lifting hooks, and fixing devices built into the units which are required for handling, lifting and erecting the units in position and for the removal of any hooks, etc. and making good.

11/03/08 Erection on Site

No units shall be cut, drilled, chased or repaired without the approval of the Engineer. All units shall be erected in the positions indicated on the drawings, and shall be properly bedded, packed and grouted so as to allow them to transmit evenly to the bearing surface the loads carried by them.

No unit shall be lifted into its final position on site until the specified "28 day cube strength" has been attained.

The Contractor shall design provide and allow for all temporary bracing required to maintain all precast units during erection. Proposals for temporary bracing,their sequence and timing of erection and removal shall be submitted in advance to the Engineer.

11/03/09 Structural Grouting of Precast Units

When precast members require to be grouted a 1:1 cement : crushed granite sand structural grout shall be used. The position of the units shall be secured until the grout has fully hardened. The grout shall be introduced in strict accordance with the details shown on the Engineers drawings, so that air pockets are expelled and all voids are fully filled. The strength of the structural grout should be greater than that of the precast concrete units.

11/03/10 Concreting in Cold Weather

In cold weather, concreting operations will be permitted provided the following requirements are complied with. It shall nevertheless be the precast concrete manufacturer's responsibility to ensure that the precast concrete units manufactured in cold weather meet the requirements of the specification in all respects.

All materials used to make the concrete shall be free from snow, ice and frost. Suitable means shall be provided to warm the aggregates and/or the mixing water so as to ensure that the temperature of the concrete leaving the mixer shall not be lower than 10 C nor higher than 32 C.

The mixing water shall not heated to a temperature higher than 60 C but if the temperature of the mixing water is in the range of 32 C to 60 C then the water and the aggregates shall be mixed first before adding the cement. Salt, chemicals or other additives intended to prevent freezing or to accelerate hardening must not be used in the mix unless specifically approved by the Engineer. Cement shall not be heated.

Before placing concrete, the surfaces of all moulds, reinforcement, and other surfaces likely to come in contact with the concrete shall be free of ice, snow and frost.

The temperature of the concrete at the time for deposition shall not be less than 50 C and suitable means shall be provided for maintaining this temperature until the concrete has attained a minimum strength of 5.0 N/mm^2. The means employed to maintain this temperature shall not be such as to cause drying of the concrete.

Thereafter, the concrete shall be protected from frost until a minimum of 72 hours have elapsed from completion of the casting operation, during which time the temperature of the concrete must not fall below 2 C. If the Contractor elects to use Class 52.5 Cement, then the period during which the concrete must be protected shall reduce from 72 hours to 48 hours after completion of casting.

The precast concrete manufacturer shall provide facilities for checking the temperature of the concrete at the mixer, at the time of deposition, and during hardening and curing. Facilities shall also be provided for checking the temperature of the aggregate and mixing water. The strength of the concrete during hardening and curing shall be checked by means proposed by the manufacturer and approved by the Engineer.

If no provision is made for heating the aggregate and/or mixing water and for defrosting moulds, reinforcement and the like, then no concreting shall be permitted until the shade temperature reaches 2 C on a rising thermometer nor shall concreting be continued when the shade temperature drops below 3 C on a falling thermometer. In all cases, however, the requirements stated above for minimum temperature of concrete at time of deposition, minimum hardening and curing temperatures and minimum periods for protection against frost shall be adhered to on the approach of and during the currency of frosty weather.

PART 4 PRECAST CONCRETE FLAGS

11/04/01 General

Precast concrete flags shall be hydraulically pressed and shall comply with the requirements of BS 7263. The flags shall be 50mm thick unless otherwise noted and except where cutting is necessary, be of a uniform width of 600mm and a minimum length of 450mm and a maximum length of 900mm.

PART 5 PRECAST CONCRETE KERBS, EDGINGS AND QUADRANTS

11/05/01 General

Precast concrete kerbs and edgings shall be hydraulically pressed. They and precast quadrants shall comply in all respects with the requiremens of BS 7263.
For all kerb radii of 12m or less, kerbs of appropriate radius shall be used.

Any unit of kerb channel edging and quadrant deviating more than 3mm in 3m from line and level shall be made good by lifting and relaying.

PART 6 PRESTRESSED CONCRETE

11/06/01 General

Prestressed concrete shall be in accordance with the foregoing Specification for precast concrete and with the following clauses, unless otherwise specified by the Engineer.

11/06/02 Jacking

a) The jacking force shall not exceed 70% of the characteristic strength of the tendon, and in determining the force, consideration shall be given to the efficiency of the anchorage, which is to be determined in accordance with BS 4447.

b) The assessment of the force in the tendons shall take account of the loss in prestress resulting from:

i) Elastic deformation of the concrete

ii) Shrinkage of the concrete

iii) Creep of the concrete

iv) Relaxation of the prestressing steel

v) Steam curing, if used

vi) Transferance of prestressing force from tensioning equipment to anchorage in post tensioning system.

vii) Frictional losses

11/06/03 Prestressing Tendons

Prestressing tendons shall comply with the requirements of BS 5896 and BS 4486.

11/06/04 Handling and Storage of Prestessing Tendons

All prestressing tendons shall be protected from any source of heat, the weather, mechanical damage or work hardening.The tendons shall not be subject to welding operations, site heat treatment or metallic coating such as galvanising.

Cutting shall be carried out by a mechanical method approved by the Engineer.

Tests shall be carried out, to the approval of the Engineer, on tendons that have been stored on site for more than six months to ensure that their quality has not been impaired.

All tendons, ducts and bearings shall be thoroughly cleaned before incorporation in the structure.

The Contractor shall ensure that prior to stressing the tendons are not twisted, bent or kinked in any way.

Tendons and ducts shall be accurately located and secured in position so that they are not displaced during construction operations: the maximum permitted deviation of a tendon or duct shall be 5mm.

11/06/05 Tensioning the Tendons

The tensioning apparatus shall comply with the following requirements.

a) Gauges shall be fitted to the apparatus so that measurements can be made of the force in the tendon, the extension of the tendon, and the movement of the tendon in its gripping device.

b) The method of attaching the tendon to the tensioning device shall be safe and secure, and all possible precautions shall be taken to safeguard persons from injury both during and after tensioning.

c) The degree of variation in length of two or more strands or wires that are to be stressed simultaneously shall be less than 15% of the expected tension.

d) The tensioning apparatus shall apply the force in such a way that secondary stresses are not induced in the concrete tendons or anchorage.

11/06/06 Pre-Tensioning

The pretensioning apparatus shall be capable of fully maintaining the tension in the tendons between tensioning and transfer. The stress shall be transferred slowly to minimise shock.

In the long line method of prestressing the tendons shall be held in position by locator plates, and precautions shall be taken to ensure that the prestressing force is transferred to all the units in the line. Where the tendon is deflected due allowance shall be taken

11/06/07 Post-Tensioning

Tendons shall be arranged so that they do not pass around sharp bend or corners capable of rupturing them when under stress.

Anchorages shall comply with BS 4447 and the anchorage system shall evenly distribute the stress in the concrete at the end of the member, and shall be capable of sustaining the prestressing force under sustained and fluctuating load and under the effect of shock.

The Contractor shall submit to the Engineer for approval his proposed method of tensioning.

11/06/08 Grouting of Prestressing Tendons

The properties of the grout shall be such that in the plastic state it has good fluidity and low sedimentation, and in the hardened state durability and low shrinkage.
The cement shall be Class 42.5 complying with BS 12 1991.

Sand shall only be added to the grout for ducts with a diameter greater than 100mm and it shall pass a 1.18mm sieve.

Admixtures shall only be used with the prior approval of the Engineer and shall not contain chloride, nitrate, sulphides or sulphites.

The water/cement ratio shall not exceed 0.40 by weight.The compressive strength of 100mm cubes made of the grout shall exceed 20 N/mm² at 7 days. The cubes shall be made and tested in accordance with BS 1881.

Air vents shall be provided at crests in the duct profiles and at 10m centres in long ducts.

The mixing equipment shall be capable of producing a grout of colloidal consistency.

The injection equipment shall be capable of maintaining a constant delivery pressure not exceeding 1 N/mm². The pump shall be filled with a 1.18mm sieve strainer.

The injection of the grout shall be continuous and to ensure that the duct is completely filled the net volume of the duct shall be compared with the quantity of grout injected. The grout shall be allowed to flow from the free end/air vents of the duct until its consistency is similar to that of the injected grout.

The injection tubes shall be sealed under pressure until the grout has set.

PART 7 PERFORMANCE SPECIFICATION FOR PRESTRESSED CONCRETE FLOORING UNITS AND PRESTRESSED/REINFORCED CONCRETE STAIR FLIGHTS

Note : Throughout this specification, the Contractor shall be held to be the prestressed flooring and prestressed/reinforced stair flights unit manufacturer unless the manufacture of the units is the subject of a nominated supply contract, in which case the nominated supplier shall be regarded as the prestressed flooring unit and prestressed stair flights manufacturer.

Note: In the following 'flooring unit' refers to both flooring units and stair flights.

11/07/01 General

The units shall comply with the foregoing specification for precast concrete in respect of materials and workmanship.

11/07/02 Scope

This specification covers the design manufacture and erection of prestressed concrete flooring units.

The provisions of BS 8110 and this specification shall be deemed to apply.

11/07/03 Design

The general arrangement of the flooring units shall be as shown on the Architect's and Engineer's drawings. Where the Engineer's drawings indicate the requirement for continuity reinforcement over supports the prestressed flooring unit manufacturer shall so arrange his units to allow for the provision of same within the joints between units.

The prestressed flooring unit manufacturer shall design the flooring units which shall be considered as simply supported slabs in accordance with BS 8110 and this specification. The design shall cover the areas of flooring units indicated on the drawings. Any areas indicated on the drawings as insitu concrete shall be designed and detailed by the Engineer and are consequently excluded from the flooring unit design save that the prestressed flooring unit manufacturer shall make due allowance for any loading coming onto the flooring units from the insitu areas. The prestressed flooring unit manufacturer shall include in his design detailing and manufacture for all holes indicated on the Architect's and Engineer's drawings. The prestressed flooring unit manufacturer should also take full account of the support arrangements indicated on the Engineer's drawings.

The zone permitted for the slab thickness is 200mm maximum unless noted otherwise.

The loadings to be sustained by the flooring units should be as indicated on the Engineer's drawings.

The camber to the flooring units at 28 days (excluding the application of finishes) shall not exceed 12mm. The predicted long term change in camber under full dead and live loadings arising from elastic deflection, shrinkage and creep shall not exceed 10mm. The difference in camber between adjoining units shall not exceed 3mm.

The prestressed flooring unit manufacturer shall provide general arrangement drawings relating to the layout of the flooring units together with detailed shop drawings indicating "inter alia" edge details, surface finish and the disposition of the prestressing tendons.

The prestressed flooring unit manufacturer is at liberty to propose, in submitting his shop drawings, modifications to the general arrangement indicated on the Engineer's drawings in order to utilise to best advantage his expertise. The Engineer however reserves the right not to adopt such proposed modifications if in his opinion the overall requirements of the design are not achieved, and no additional expense will fall on the Employer in the event of the proposed modications not being adopted.

The prestressed flooring unit manufacturer shall prepare full design calculations to support his drawings. The drawings and calculations shall be particular to the contract. Unedited computer printouts will not be acceptable. The drawings and calculations shall be submitted to the Architect and Engineer for approval which approval is required to ensure the adequacy of the floor structure and its compatibility with the remainder of the works.

11/07/04 Approval Times

The following minimum requirements are specified for Contractors in respect of approval times by the Architect and Engineer.

Design Calculations : The Engineer shall require 2 weeks from the date of receipt of design calculations from the Contractor to initial comments in reply thereto.

Shop/Fabrication Drawings : The Architect/Engineer shall require 2 weeks from the date of receipt of construction drawings to initial comments in reply thereto.

The foregoing is based on reasonable packages of information being submitted by the Contractor, which information must be submitted via the Contractor; direct liaison between Sub-Contractors and Architect/Engineer shall not be permitted, unless so required by the Architect/Engineer and all discussions confirmed in writing to the Main Contractor.

All submissions by the Contractor in respect of the above must be made through the Architect and all instructions/ approvals etc., by the Engineer or Services Engineer will be made through the Architect.

Manufacture of the flooring units shall not begin until comment has been obtained from the Architect and Engineer.

Notwithstanding any comments given by the Architect or Engineer, the prestressed flooring unit manufacturer shall be responsible for the correctness and completeness of his drawings and calculations.

11/07/05 Finishes to Units

The underside of the prestressed units are to be finished to a Class F3 "Smooth Finish" suitable for direct decoration. The edges of all units are to be chamfered as indicated on the drawings and to have a "Smooth Finish" as above.

11/07/06 Erection

All units shall be carefully handled into their final position without causing disturbance to their support arrangement. When units are partially or totally supported on blockwork or brickwork, under no circumstances shall they be "pinch barred" or "slid" into position. The units shall be either laid dry on their support arrangement or on a bed of 1:3 mortar so as to allow them to transmit evenly the loads carried by them to the bearing surface. If the units are laid dry, any remaining interstices shall be either dry packed or resin injected to give an even bearing on all walls, beams etc. All joints between adjacent units shall be well filled with a tamped grade 35/10 concrete.

No units shall be cut, drilled, chased or repaired without the approval of the Engineer. All units shall be erected in the positions indicated on the drawings.

PART 8 PERFORMANCE SPECIFICATION FOR REINFORCED CONCRETE 'PLATE FLOOR' PERMANENT SHUTTER UNITS

Note : Throughout this specification, the Contractor shall be held to be the "plate floor" manufacturer unless the manufacture of the units is the subject of a nominated supply contract, in which case the nominated supplier shall be regarded as the plate floor manufacturer.

11/08/01 General

The units shall comply with the foregoing specification for precast concrete in respect of materials and workmanship.

11/08/02 Scope

This specification covers the design manufacture and erection of reinforced concrete "Plate Floor" permanent shutter units. The provision of BS 8110 and this specification shall be deemed to apply.

11/08/03 Design and Drawings

The general arrangement of the plate flooring units shall be as shown on the Architect's and Engineer's drawings.

The plate floor manufacturer shall design the reinforced concrete plate flooring units as part of a composite slab comprising permanent shutter units and insitu concrete topping in accordance with BS 8110 and this specification. The overall slab thickness and plate thickness is as shown on the Engineer's drawings. The composite action shall be obtained by the provision of lattice type shear connectors and a suitably prepared top surface to the plate flooring units. The plate floor manufacturer shall assume that the composite slab structure is simply supported between the supports shown on the Engineer's drawings.

Notwithstanding the foregoing design assumption, the Engineer shall provide details of reinforcement that requires to be incorporated within the structural topping and if appropriate additional reinforcement to be included within the plate floor units. All of this additional reinforcement will be included in the appropriate sections of the Bills of Quantities and consequently does not require to be included within the plate floor manufacturer's design other than to satisfy himself that the additional reinforcement will not impair his units nor affect his design.

The plate floor manufacturer should note the strength and cover requirements which are indicated in the Engineer's drawings.

The plate floor manufacturer shall include in his design, detailing and manufacture for all holes indicated on the Architect's and Engineer's drawings. The plate floor manufacturer shall also take full account of the support arrangements indicated on the Engineer's drawings.

The loadings to be sustained by the composite slab shall be as indicated on the Engineer's drawings.

The plate floor manufacturer shall provide general arrangement drawings relating to the layout of the units together with detailed shop drawings including "inter alia" edge details, surface finish disposition of reinforcement location and type of lattice shear connectors.

The plate floor manufacturer shall provide full design calculations to support his drawings including long term deflection calculations. The drawings and calculations shall be particular to the contract. Unedited computer printouts will not be accepted. The drawings and calculations shall be submitted to the Architect and Engineer for approval which approval is required to ensure the adequacy of the floor structure and its compatibility with the remainder of the works.

The plate floor manufacturer is at liberty to propose, in submitting his shop drawings, modifications to the general arrangement indicated on the Engineer's drawings in order to utilise to best advantage his expertise. The Engineer however reserves the right not to adopt such proposed modifications if in his opinion the overall requirements of the design are not achieved, and no additional expense will fall on the Employer in the event of the proposed modications not being adopted.

11/08/04 Approval Times

The following minimum requirements are specified for Contractors in respect of approval times by the Architect and Engineer.

Design Calculations : The Engineer shall require 2 weeks from the date of receipt of design calculations from the Contractor to initial comments in reply thereto.

Shop/Fabrication Drawings : The Architect/Engineer shall require 2 weeks from the date of receipt of construction drawings to initial comments in reply thereto.

The foregoing is based on reasonable packages of information being submitted by the Contractor, which information must be submitted via the Contractor; direct liaison between Sub-Contractors and Architect/Engineer shall not be permitted, unless so required by the Architect/Engineer and all discussions confirmed in writing to the Main Contractor.

All submissions by the Contractor in respect of the above must be made through the Architect and all instructions/ approvals etc., by the Engineer or Services Engineer will be made through the Architect.

Manufacture of the flooring units shall not begin until approval has been obtained from the Architect and Engineer.

Notwithstanding any approvals given by the Architect or Engineer, the plate floor manufacturer shall be responsible for the correctness and completeness of his drawings and calculations.

11/08/05 Finishes to Units

The underside of the plate floor units are to be finished to class F3 "Smooth Finish", suitable for direct decoration. The edges of all units are to be chamfered as indicated on the drawings and finished "Smooth Finish" as above.

11/08/06 Erection

The Contractor's attention is drawn to the need to ensure the stability of the plate floor units during erection and in particular to the bearing at each end. The Contractor must ensure that adequate temporary bearers are provided during erection and retained in place in accordance with the table for striking the formwork in the specification for insitu concrete. The requirements for propping through two floors set out in the clause shall also apply to these composite floor slabs.

When placing the plate floor units on their permanent support, grout leakage from the insitu concrete topping shall be prevented by pointing up any gaps between wall and plate floor units using a stiff mortar of sand and cement in the same proportions as contained by these elements in grade 35 concrete. Any such pointing shall be finished off neatly and flush with the wall surface.

Similarly, grout leakage between plate floor units and between plate floor and precast floor edge units shall be prevented either by sealing gaps with the stiff mortar specified above, or taping with approved tape such that it will not be displaced during casting of the insitu topping.

No units shall be cut, drilled, chased or repaired without the approval of the Engineer. All units shall be erected in the positions indicated on the drawings, and shall be properly bedded, packed and grouted so as to allow them to transmit evenly the loads carried by them to the bearing surface.

SECTION 12 STRUCTURAL STEELWORK SPECIFICATION

12/00/01 The steelwork specification is to conform, in all respects, with the "National Structural Steelwork Specification for Building Construction, 3rd Edition, 1994", published by the British Constructional Steelwork Association Ltd in conjunction with the Steel Construction Institute.

12/00/02 Where the structural steelwork is procured as a nominated sub-contractor in a main contract, the word "Contractor" in the above, and in the following addendum specification, should be construed as the nominated sub-contractor.

ADDENDUM SPECIFICATION

This Addendum Specification is to be read in conjunction with Clause 12/00/01 above and is considered to be part of the structural Steelwork Specification.

PROJECT SPECIFICATION PRO-FORMA
STRUCTURAL STEELWORK

1.	**Project Name:**	**Contract No:**	**Date:**
	Larkfield PFI	3702	March 1999

2. **Brief Description of Structure and Design Concept**

Portalised roof and compositely designed deck upper floor on steel beams and columns, pinned bases.

3. **Description of any Design Requirements, Control and/or Restrictions Affecting the Design.**

Column sizes to be minimised.

4. **State Grade of Steelwork and Bolts**

Grades 43 and 50, Grades 4.6 and 8.8 bolts

5. **Foundation and Holding Down Conditions to be Designed into Base Plate Details**

Pinned base foundation

6. **Details of Camber and/or Preset which have to be provided in the Fabrication of Steelwork to Achieve Specific Geometry**

Main cross beam to be cambered to suit composite design.

7. **Any other Relevant Information Relating to Project**

Local portalisation or bracing for wind stability

Signed..... **Date** 12 March 1999

The above is to be completed for each project and inserted to "front end" Section 12 "Structural Steelwork Specification".

Part 1 THE PROJECT SPECIFICATION

12/01/01 **Site Survey**

* Delete as appropriate

(a)* Attaching to existing structure.
The contractor shall carry out a full survey of the existing structure in order to arrive at accurate working dimensions for the new steelwork. The contractor shall fully survey areas where site connections are to be made to existing structure and shall submit detailed proposals to the engineer for comment and/or consent. No claim will be allowed out of failure to check site dimensions adequately.

(b)* Erection over previously constructed foundations and holding down bolts.
The contractor shall carry out a check and inspection of the foundations and holding down bolts which are to receive the fabricated steel to be satisfied that they are to line and level.

The contractor shall inform the main contractor and engineer if, in his opinion, the prepared foundations are outwith the tolerances in line and level. Failure to check on foundations and holding down bolts will result in the assumption that the contractor is satisfied with these and no claim will then be allowed for out of tolerance work by others.

Part 2 MATERIALS

12/02/01 Welded cold formed hollow sections to BS 6363 will not be used.

12/02/02 **Codes and Standards**
The following British Standards, or latest revision(s) thereof, shall be complied with where applicable:-

BS 275	Specification for dimensions of nuts (½ inch to 1 3/4 inch diameter)
BS 970 : Part 1	General inspection and testing procedures and specific requirements for carbon, carbon manganese, alloy and stainless steels.
BS 1494 : Part 1	Fixings for sheet, roof and wall coverings.
BS 1768	Unified precision hexagon bolts, screws and nuts. Normal series.
BS 2853	Overload runway beams.
BS 2989	Replaced by BS EN 10143.
BS 2994	Cold rolled steel sections.
BS 3382	Electro plated coatings on threaded components.
BS 3923 : Parts 1&2	Ultrasonic weld testing.
BS 4395 : Part 2	Higher grade bolts and nuts and general grade washers.
BS 4620	Rivets for general engineering purposes
BS 5289	Visual inspection of fusion welded joints.

Part 3 DRAWINGS

12/03/01 The architect and engineer will supply the contractor with the relevant information necessary for him to prepare properly and completely his working shop drawings. The contractor must examine all initial information provided in relation to the fabrication drawing programme requirements and requests for any outstanding information should be made within one week of receipt of initial information.

All subsequent requests for information or clarification must be submitted timeously.

12/03/02 **Design of Connections**

Where the architect's and engineer's drawings indicate the loads on members but do not detail the connections, the contractor shall design the connections and complete the detailing and submit the details for the approval of the architect and engineer. Where continuity of members at a connection is required as a necessary part of the design, the connection shall be such as not to cause any reduction in section or inertia in any members within the area of the joints.

Typical principal connections will normally be shown in detail on the architect's and engineer's drawings, but the contractor shall satisfy himself as to their practicability and he shall be at liberty to put forward alternative suggestions for their design.

Detail drawings incorporating such alterations shall not, however, be put in hand until the suggested alterations have been approved in writing by the architect and engineer.

Where the contractor is required to design connections, the rates in the Bill of Quantities shall be deemed to include for all such design charges.

Connection design shall be in accordance with BS 5950 : Part 1, BS 5950 : Part 5, BS 4604 : Part 1 and BS 2853.

12/03/03 **Submission of Design Calculations and Shop Drawings**

After the steelwork order has been placed, but before fabrication is begun, the contractor shall submit to the architect and engineer for comment, duplicate prints of his working drawings and details. The contractor shall be responsible for designing all connections, including bolts, welds, end plates and stiffeners as necessary to cater for the loads indicated on the drawings and shall submit duplicate copies of his calculations to the engineer. Notwithstanding the comments made by the engineer or the drawings and calculations submitted, the contractor shall be responsible for the correctness and completeness of his drawings and calculations.

The contractor shall allow a minimum of two weeks to enable the engineer to comment on the said calculations and drawings. The contractor shall allow a minimum of one week from receipt of revised calculations and drawings to final consent. This clause, however, shall be read in conjunction with particular requirements in the Preliminaries, which in all cases shall take precedence. The contractor shall be deemed to have taken account of the foregoing in the preparation and monitoring of his programme for the works.

On completion of the various work sections, the contractor shall immediately prepare and supply, in the undernoted format, a comprehensive set of all "as built" shop detail drawings prepared for the works by his firm:-

To the Planning Supervisor	Autodesk 3½" Computer Disk
	2 Paper prints

All charges in connection with the provision of shop detail drawings, "as built" drawings, calculations etc, will be deemed to be included in the contractor's offer.

12/03/04 **Shop Connections**

Shop connections should be welded whenever possible. If bolted, bolts shall not be less than 16mm diameter and a minimum of two bolts shall be used in any structural connection.

All hollow or tubular sections shall be sealed completely at all open ends with a welded plate, except where such sections are connected to other sections with a continuous weld around the full perimeter of the junction.

Butt joint connections in column splices using bearing plates shall be avoided unless precise and true bearing on faces is formed over the whole area. Where the contractor proposes the formation of intermediate beam splice connections in existing building installations, these connections must always be fully site welded.

12/03/05 **Site Connections**

Principal and secondary site connections shall be made with ordinary black bolts, nuts and washers or friction grip bolts, nuts and washers of a type and manufacture approved by the architect and engineer.

Where bolted connections are such that bolts pass through the full width of a tubular or hollow section, the detail shall incorporate a tubular steel sleeve encompassing the bolts and welded to the section at each end so that the action of tightening the bolt compresses the sleeve and avoids distortion of the walls of the section.

Connections may be made by welding provided written approval by the architect and engineer is obtained beforehand.

Fittings

Unless otherwise specifically stated with the item, the following allowances have been made in the Bills of Quantities under items for "fittings" to cover the weight of all cleats, gussets, etc, including all associated nuts, bolts, etc:-

On columns or the like	-	10%
On beams or the like	-	10%
On small channels, hollow sections, bracing etc	-	15%

The contractor will be deemed to have taken cognisance of the above allowances in the pricing of his offer, making due allowance for the nature, extent and location etc, of all works covered by the "fittings" item(s).

Part 4 WORKMANSHIP (GENERAL)

Part 5 WORKMANSHIP (WELDING)

Part 6 WORKMANSHIP (BOLTING)

Part 7 WORKMANSHIP (ACCURACY OF FABRICATION)

Part 8 WORKMANSHIP (ERECTION)

12/08/001 **Marking**
Erection marks shall be painted on all members and the weight shall be marked on all members weighing more than 2 tonnes. In addition, steel of Grade 50 shall be marked after rolling with a continuous pale blue water line in accordance with BS 4360 : 1986.

12/08/02 **Anchor Bolts**
Anchor bolts, washer plates and other anchorage materials which require to be built into foundations and the like shall be delivered to the site in advance of the main steelwork to suit the construction programme.

Adequate protection must be afforded to the threads of anchor bolts at all times.

12/08/03 The contractor shall include in his prices for the provision of all erection cranage and other specialist equipment necessary for the unloading, erection, welding, bolting and all other operations necessary for the complete erection of the steelwork.

Bases and any bearing plates and ends of beams which require grouting into the builder work shall be supported at their proper level by means of steel packs. All steelwork shall be set out accurately to the proper level and alignment as indicated on the approved steelwork drawings.

Flame cutting on site shall be expressly prohibited without the agreement of the engineer and equipment must not be brought on site without the engineer's permission.

Drifts of a larger diameter than the hole being drifted shall not be used and any misalignment of the members shall be reported to the engineer who may either permit the hole to be re-reamed or may reject the faulty member.

12/08/04 The contractor shall allow the engineer the opportunity to check the plumb, line and level of the framework once the contactor has satisfied himself that the work has been completed in accordance with this specification and drawings. Grouting up of holding down bolts will not be permitted until the agreement of the engineer has been given.

Part 9 WORKMANSHIP (ACCURACY OF ERECTED STEELWORK)

12/09/01 **Trial Assembly**
Sufficient trial assembly shall be done in the contractor's works to prove the accuracy of the workmanship and the amount required shall be at the engineer's discretion.

Where parts which have to fit together are manufactured in different works or for any reason cannot be matched before despatch to site, the contractor shall make adequate provision to ensure a correct fit by providing check jigs or other suitable means as agreed with the engineer.

Part 10 PROTECTIVE TREATMENT

12/10/01 **General**

This specification shall be read in conjunction with the requirements of Section 13 "Specification for Painting Structural Steelwork" Parts 1 to 6 inclusive.

Part 11 QUALITY SYSTEM

Part 12 GENERAL

12/12/01 **Sub-letting of the Works**

Sub-letting of the whole or any part of the structural steelwork drawing, fabrication, erection or painting shall not be permitted without the prior approval of the engineer.

12/12/02 Sheradizing

All lengths of the rods which pass through external walls and all nuts, bolts and washers are to be sheradized in accordance with BS 4921 : 1973 to a minimum coating thickness of 30 microns.

After sheradizing, the coating is to be passivated by chromating or phosphating.

Due allowance must be made in the manufacture to ensure a spin fit of all threaded items after sheradizing.

12/12/03 Treatment of Welded Steelwork on Site

Areas affected by welding carried out after application of paint shall be thoroughly cleaned down by hand-held power tools and power wire brush, then painted with 2 no coats of High Build zinc phosphate each to a dry film thickness of 75 microns.

12/12/04 Resin Anchors

All resin anchors to be installed in strict accordance with the manufacturer's written instructions.

After the minimum curing period and before the fixing of the structure to the resin anchors, every anchor should be non-destructively tested to a pull out load of 3 kN unless otherwise stated.

In addition, one resin anchor from each floor level at each tying-in location should be tested to four times its working pull-out load.

Notwithstanding this, the resin anchors may also require to be tested as directed and to the satisfaction of the engineer.

The contractor shall allow in his pricing for the testing by the supplier and for the preparation and submission of written reports to the engineer.

12/12/05 Purlins and Sheeting Rails

Proprietary make purlins, sheeting rails and associated accessories shall be "Metsec" type as manufactured by Metal Sections Ltd, Broadwell Road, Oldbury, Warley, West Midlands B69 4HE, telephone 0121-552-1541, or Ward "Multibeam" type as manufactured by Ward Building Components, Sherburn, Malton, North Yorkshire YO17 8PQ, telephone 01944-70591, Fax 01944-70777, or other equal and approved of in writing by the architect and the engineer.

The size, weight and method of fixing purlins etc shall be as detailed on the relevant architect's and engineer's drawings and/or as described in the Bills of quantities. All subsidiary cleats, extended/special cleats, sleeves etc and fixing bolts necessary to give complete installation of the purlin/rail systems will be deemed to be included in the relevant Bill item.

The final design/layout of the purlin/rail system shall be carried out in conjunction with Metal Sections or Ward Design Service and the contractor shall satisfy himself that the design "worked up" is complimentary to the whole of the frame and superficial cladding works. The details referred to are for pricing purposes only and any changes made to these and/or the basic design concept made by the relevant Design Service, and considered acceptable to the works by the architect and engineer, will be subject to variation as required.

The contractor may forward alternative proposals for purlin/sheeting rail design and installation as a separate submission, although the Metsec or Ward system will be deemed to be the basis of the tender price meantime. (Contractor to indicate preference).

12/12/06 General

Sundries - Holing for other Trades

Allowances have been made in the Bills of Quantities for holes and the like associated with other trade operations. Such allowances are inserted for rating purposes only meantime and will be adjusted in accordance with actual work executed.

12/12/07 Steel encased in Concrete

All surfaces of steel to be embedded in concrete shall be left unpainted unless otherwise stated, but shall be cleaned of all loose rust, scale or grease before placing in position.

All casing to be carried out in accordance with BS 5950 and as specified on the architect's and engineer's drawings.

SECTION 13 SPECIFICATION FOR PAINTING STRUCTURAL STEELWORK (Revised - June 1997)

PART 1 GENERAL

13/01/01 British Standard Specifications

Any British Standard Specification or Code of Practice referred to in this Specification shall be held to be the latest edition published at the date of the Tender, including amendments. Except where otherwise noted within the following Specification all relevant particulars and conditions in British Standard Specifications and Codes of practice relating to standards of material, quality, workmanship and testing shall be deemed to be complied with. In cases where no particular specification is given for any material the relevant British Standard Specification or Code of Practice where one exists shall apply.

13/01/02 Regulations & Specifications

The Contractor shall carry out the works to the requirements of the Health and Safety at Works Act, Control of Pollution Act and where applicable the Swedish Standard 515 05 59 00 - 1967.

The Contractor shall also ensure the relevant COSHH data is available relative to the specified products and that, in application, these are fully complied with.

PART 2 SURFACE PREPARATION

13/02/01 Degreasing

Heavy deposits of oil and grease shall be removed by scraping and washing with an emulsifying detergent or emulsifiable solvent cleaner. The surfaces so treated shall be thoroughly rinsed with fresh water and then allowed to dry.

13/02/02 Blast Cleaning

Where specified the steelwork to be blast cleaned shall be to the requirements of BS 7079, preparation grades SA2, SA2½ or SA3.

After blast cleaning all spent shot or grit shall be removed by vacuum cleaner or oil free air pressure and brush. The blast cleaned surfaces shall be primed with a blast primer as soon as is practical. At no stage shall the cleaned surfaces be left unprotected for more than 4 hours if kept internally and 2 hours if kept externally.

13/02/03 Chemical Cleaning

Where specified, millscale and rust shall be removed by acid pickling. If this process produces a phosphate coating a primer coat shall be applied immediately to the warm surfaces.

13/02/04 Manual Cleaning

Where specified the surfaces shall be cleaned by scraper, wire brush or abrasive disc to Swedish Standard SIS 0559 00 513. Prior to cleaning, hot rolled steel section should be weathered to a minimum of Swedish Standard SIS 05 59 00 Grade C.

13/02/05 Surface Defects

All surface defects exposed after cleaning shall be removed by filling or grinding. Where extensive removal has taken place in blast cleaned surfaces these surfaces, shall be re-blasted to obtain an acceptable blast profile.

13/02/06 Treatments of Welds

Prior to finish painting any welds on rusting surfaces they shall be prepared by blast cleaning, or manual cleaning as specified in Clause 02/04.

13/02/07 Galvanised Surfaces

Prior to painting galvanised surfaces, they shall be degreased using emulsifying or emulsifiable cleaning agents and washed with fresh water. The surfaces shall then be lightly and uniformly abraded and allowed to dry.

13/02/08 Previously Painted Surfaces

Prior to painting, all loose, flaking or deteriorated paintwork shall be removed by blast-cleaning, scraping, wire brush, disc or approved paint remover. After removal the surface shall be prepared to the specified appropriate standard.

PART 3 APPLICATION AND HANDLING

13/03/01 Conditions for Cleaning

Dry blast cleaning shall not be carried out when the surface is less than 3°C above the ambient dew point nor when the relative humidity is greater than 85%. Wet blast cleaning may be carried out when the surface temperature is below that specified above or the relative humidity is above 85% provided an anti-corrosive inhibition is included.

Manual cleaning shall not be carried out when the surface temperature is less than 3°C above ambient dew point.

13/03/02 Conditions for Painting Storage & Mixing

Paints shall be stored under cover and protected from frost and high temperatures (in excess of 40 C). Paints shall be mixed in strict accordance with the manufacturer's written instructions and recommendations. All 2 pack paints shall be discarded irrespective of its condition once its stated pot life has been exceeded. Paints shall only be applied by methods recommended by the manufacturer and all equipment shall be cleaned at the commencement of painting and kept clean during the operation.

The paint shall be applied in a uniform manner to the specified dry film thickness and free from runs, sags, pinholes contamination or other blemishes. Painting shall not take place when the surface temperature is less than 3°C above ambient dew point or as may be specified by the manufacturer.

The paint manufacturers recommendations shall be sought for the minimum period of time which must elapse prior to overcoating.

PART 4 HANDLING STORAGE ETC

13/04/01 Handling

Painted items shall not be handled until the paint system has been sufficiently dried and not shorter than the dry to handle time stated by the manufacturer.

Damage during handling shall be minimised by the use of appropriate lifting equipment.

13/04/02 Transport and Storage

During stacking, either in storage or transporting, coated surfaces should be separated by soft wood or a similar packing. The painted material shall be stacked to avoid ponding of rainwater or condensation.

PART 5 PAINT SYSTEMS SPECIFICATIONS

The following specifications, types 'G' - 'J' inclusive are based on systems from International Paint Ltd to meet the required life to first maintenance. The Contractor may submit alternative proposals for approval however, these must be in writing and must demonstrate that they will equally achieve the same design life to first maintenance. Alternatives will only be considered at no additional cost to the contract.

The contractor shall also make it clear as to whether all coats will be shop applied or if any final coating will be carried out, on site. Adequate protection to be allowed for, at all times.

13/05/01 **TYPE D SYSTEM - Intumescent Paint**

The painting specification shall be Type 'G' as noted in **13/05/04** applied to all steelwork prior to the application of intumescent paint.

The Contractor is to consult the manufacturer of the intumescent paint to ensure that it is compatible with the priming system.

After erection, areas of paint which have been damaged shall be treated in the same manner as that described in 13/05/04 prior to application of the intumescent paint.

13/05/02 **TYPE E SYSTEM - Galvanising**

The following specification shall be used for all steelwork described as galvanised on the contract drawings.

The steelwork shall be prepared by blast cleaning to BS 4232 second quality.

The steelwork shall be hot dip galvanised after fabrication in accordance with B.S. 729: 1971. The mass at coating shall be not less than 940 g/m² and shall be determined, if required, by the method laid down in B.S. 729: 1971.

After galvanising the coating is to be passivated by chromating or phosphating.

13/05/03 **TYPE F SYSTEM - Concrete Encased**

Unless otherwise specified, surfaces which will have concrete cast against them shall be left uncoated. The shop applied paint system on adjoining surfaces shall be extended 25mm as marginal strips within the contact surface.

13/05/04 **TYPE G SYSTEM - Internal Exposed Steelwork**

- Anticipated life to first maintenance: 20 years (assuming dry environment).

1 Coat Intercure 200 - fast curing, rapid recoat epoxy zinc phosphate norminal DFT 75 microns.

If steelwork is to be left exposed, apply 1 or 2 coats of a compatible polyurethane finish, where specified by the Architect.

SURFACE PREPARATION
Oil and grease should be removed in accordance with SSPC-SP1 solvent cleaning. Where necessary remove weld spatter and smooth weld seams or sharp edges.

The surface to be coated must be clean and dry.

Abrasive Blast Cleaning
Abrasive blast clean to Sa2½ ISO8501-1: 1988 (Swedish Standard SIS 05 59 00). Surface defects revealed by the blast cleaning process should be ground, filled or treated in the appropriate manner.

Intercure 200 is suitable for application to blast cleaned surfaces which were initially to SA2½ standard but have been allowed to deteriorate under good shop conditions for up to 7-10 days. The surface may deteriorate to Sa2 standard but must be free from loose powdery deposits.

Shop Primed Steelwork
Weld seams or damaged areas should be blast cleaned to Sa2½ ISO8501-1: 1988 (Swedish Standard SIS 05 59 00).

If the shop primer shows extensive or widely scattered breakdown, overall sweep blasting may be necessary.

METHOD OF APPLICATION

Airless spray	-	Recommended	- Tip range 0.43-0.53mm(17-21 thou).
			- Total output fluid pressure not less than 176 kg/cm² 2,500 p.s.i.)
Roller	-	Not recommended	

All works to be carried out in strict accordance with supplier's instructions.

Note: Mating surfaces of HSFG bolt connections shall remain unpainted. Alternatively, the slip factor may be amended accordingly with test data to justify being sent to the Engineer for approval.

After erection, areas of paint which have been damaged shall be cleaned to base metal and the edges of undamaged paint bevelled with sandpaper. The exposed parts of all anchor bolts and nuts should be thoroughly degreased and wire brushed to remove all rust and then painted to the above specification. The full specified painting system shall then be applied in such a manner that the new paint overlaps the existing paint by at least 50mm all round the affected paint. All damaged areas to be rectified at the Contractor's expense.

13/05/05 **TYPE H SYSTEM - Steelwork to be built into brick or blockwork cavities**

Option 1 - Anticipated life to first maintenance: 25 - 30 years.
1 Coat Intercure 200 - fast curing, rapid recoat epoxy zinc phosphate nominal DFT 75 microns.

1 Coat Intercure 420 - fast curing rapid recoat M.I.O. nominal DFT 125 microns.

Option 2 - Anticipated life to first maintenance: 50 years.
1 Coat Intercure 200, epoxy zinc phosphate @ 75 um D.F.T.

2 Coats Intercure 420, epoxy M10 @ 125 um D.F.T./coat.

Intercure 420 is available in 2 shades, natural and silver grey to differentiate between coats.

For Surface Preparation and Method of Application of Intercure 200, see Type 'G' System.

Surface preparation and Method of Application of Intercure 420 to be, as follows:-

SURFACE PREPARATION
Intercure 420 is designed for application to surfaces abrasive blast cleaned to Sa2½ ISO8501-1: 1988 (Swedish Standard SIS 05 59 00) and then primed with Intergard, Interzinc or Interplate materials. Consult International Protective Coatings specifications for details of the system.

Primed Surfaces
The surface to be overcoated must be clean, dry and free from contamination. Oil and grease should be removed in accordance with SSPC-SP1 solvent cleaning. Accumulated dirt and soluble salts must be removed. Dry bristle brushing will normally be adequate. Soluble salts should be removed by fresh water washing.

Areas of breakdown, damage or weld seams should be prepared to the specified standard and patch primed prior to application of Intercure 420.

If the shop primer shows extensive of widely scattered breakdown, overall sweep blasting will be necessary.

Zinc Primer Surfaces
Ensure zinc silicates are cured before overcoating.

Zinc surfaces must be free of zinc salts.

Zinc silicate primer should be tie coated with Intergard 405.

METHOD OF APPLICATION

Airless spray Recommended	-	Tip range 0.45-0.58mm (18-23 thou).
	-	Total output fluid pressure not less than 170 kg/cm² (2,500 p.s.i.)
Brush or Roller For small areas only	-	Multi coats required to achieve dry film thickness.

All other works to be carried out in strict accordance with suplier's instructions.

After erection, areas of paint which have been damaged shall be cleaned to base metal and the edges of undamaged paint bevelled with sandpaper. The exposed parts of all anchor bolts and nuts should be thoroughly degreased and wire brushed to remove all rust and then painted to the above specification. The full specified painting system shall then be applied in such a manner that the new paint overlaps the existing paint by at least 50mm all round the affected paint. All damaged areas to be rectified at the Contractor's expense.

13/05/06 **TYPE I SYSTEM - External, Exposed Steelwork**

Option 1 - Anticipated life to first maintenance: 10-15 years (inland location)
8 - 10 years (coastal location)

- 1 Coat Intercure 200 - fast curing, rapid recoat epoxy zinc phosphate nominal DFT 75 microns.
- 1 Coat Intercure 420 - fast curing, rapid recoat M.I.O. nominal DFT 125 microns.
- 2 Coats Interthane 799 - Recoatable polyurethane nominal DFT 50 microns per coat.

Option 2 - Anticipated life to first maintenance: 20 years (inland location)
10 - 15 years (coastal location)

- 1 Coat Interzinc 72 - epoxy zinc rich nominal DFT 75 microns.
- 1 Coat Intercure 420 - fast curing, rapid recoat epoxy M.I.O. nominal DFT 125 microns.
- 2 Coats Interthane 799 - recoatable polyurethane nominal DFT 50 microns per coat.

For Surface Preparation and Method of Application of Intercure 200 and 420, see Type 'G' and 'H' respectively.

If salt water is used in the blasting process or contamination with salt water is suspected, the surface should be thoroughly washed with fresh water prior to application of the Interzone 954.

Interzone 954 will tolerate re-oxidation (gingering) which may occur and may be applied to a largely dry surface with incompletely dry areas.

METHOD OF APPLICATION

Airless spray	Recommended -	Tip range 0.53-0.66mm (21-26 thou).
	-	Total output fluid pressure 190-246 kg/cm² (2,500-3,500 p.s.i.)
Brush or Roller	Possible, multiple coats will be required to achieve specified thickness.	
Conventional spray	Possible with correct thinning,	

All other works to be carried out in strict accordance with supplier's instructions.

After erection, areas of paint which have been damaged shall be cleaned to base metal and the edges of undamaged paint bevelled with sandpaper. The exposed parts of all anchor bolts and nuts should be thoroughly degreased and wire brushed to remove all rust and then painted to the above specification. The full specified painting system shall then be applied in such a manner that the new paint overlaps the existing paint by at least 50mm all round the affected paint. All damaged areas to be rectified at the Contractor's expense.

PART 6 INSPECTION

13/06/01 Inspection

The Contractor shall give the Engineer a minimum of 48 hours notice of when he intends to prepare and paint the steel surfaces. The Engineer and manufacturer of the paint shall be allowed access to the steel fabrication works and site to examine the material being applied and its method of application and shall be allowed to take samples during application. The Engineer shall also be afforded the opportunity to check on the specified paint thicknesses using a calibrated D.F.T. gauge.

The paint manufacturer, if instructed by the Engineer, shall visit the fabrication shop and the site at regular intervals to inspect the application of his paint and shall then report in writing to the Engineer.

Surface preparation and Method of Application of Interzinc 72 to be, as follows:-

SURFACE PREPARATION
Oil and grease should be removed in accordance with SSPC-SP1 solvent cleaning. Where necessary, remove weld spatter and smooth weld seams or sharp edges. The surface to be coated must be clean and dry.

Abrasive Blast Cleaning
Abrasive blast clean to Sa2½ 8501-1: 1988 (Swedish Standard SIS 05 59 00). Surface defects revealed by the blast cleaning process should be ground, filled or treated in the appropriate manner.

Apply Interzinc 72 to surfaces prepared in accordance with the specified visual ISO/Swedish Standard. If oxidation has occurred, the surface should be reblasted to the specified standard.

Shop Primed Steelwork
Weld seams or damaged areas should be blast cleaned to Sa2½ ISO 8501-1: 1988 (Swedish Standard SIS 05 59 00).

If the zinc shop primer shows extensive or widely scattered breakdown, overwall sweep blasting will be necessary. Other types of primer would require complete removal by blast cleaning.

METHOD OF APPLICATION

Airless spray	Recommended -	Tip range 0.43-0.53mm (17-21 thou).
	-	Total output fluid pressure not less than 176 kg/cm² (2,500 p.s.i.) Use agitated paint container.
Brush or Roller	Suitable for touch up of small areas only.	
Conventional spray	Use any suitable proprietary equipment with agitated paint container.	

All other works to be carried out in strict accordance with supplier's instructions.

After erection, areas of paint which have been damaged shall be cleaned to base metal and the edges of undamaged paint bevelled with sandpaper. The exposed parts of all anchor bolts and nuts should be thoroughly degreased and wire brushed to remove all rust and then painted to the above specification. The full specified painting system shall then be applied in such a manner that the new paint overlaps the existing paint by at least 50mm all round the affected paint. All damaged areas to be rectified at the Contractor's expense.

13/05/07

TYPE J SYSTEM - Steelwork partially or fully submerged in water, or ongoing damp/wet environment.

Anticipated life to first maintenance: Exact location - operating environment required to provide a realistic figure.

1 Coat Interzone 954 - Hydrocarbon epoxy nominal DFT 500 microns.

SURFACE PREPARATION
Heavily pitted areas should be stripe coated by brush, to ensure good "wetting" of surface, particularly if incompletely dry.

Degrease according to SSPC-SP1 solvent cleaning.

Where necessary remove weld spatter and smooth weld seams and edges. Dry or wet blast clean to Sa2 ISO 8501-1: 1988 (Swedish Standard SIS 05 59 00).

Recommended profile 75-100 microns.

SECTION 14 STRUCTURAL TIMBER

PART 1 GENERAL

Any British Standard Specification or Code of Practice referred to in this Specification shall be held to be the latest edition published at the date of the Tender, including amendments. Except where otherwise noted within the following Specification, all relevant particulars and conditions in British Standard Specifications and Codes of Practice relating to standards of material, quality, workmanship and testing shall be deemed to be complied with. In cases where no particular specification is given for any material, the relevant British Standard Specification or Code of Practice where one exists, shall apply.

14/01/02 Samples and Testing

The Engineer may issue instructions requiring the Contractor to submit samples and/or certificates in respect of materials to be used in the works. The Engineer may also issue instructions requiring the Contractor to arrange any tests of materials and/or workmanship and, in this connection, the Contractor will be required to prepare samples for testing and deliver to a laboratory in the Glasgow area.

All samples of materials and/or workmanship are subject to the Engineer's approval which, when received, will be held to form the standards required for the works. Any costs incurred in complying with these requirements, other than laboratory costs of testing materials and/or workmanship found to be in accordance with this Specification, will be paid for by the Contractor and allowed for in the Tender.

PART 2 MATERIALS

14/02/01 Timber

The species shall be as noted on the drawings. Grading shall be to BS 4978 to grades shown on drawings. All timber shall be face stamped with appropriate BS grading mark.

Laminated members shall accord with the requirements of BS 4169.

14/02/02 Plywood

Plywood for structural use shall comply with BS 5268.

Plywood generally shall comply with BS 6566. Plywood from sources not included in BS 6566 shall be of equivalent grades of veneers and type of bonding.

Bonding for external use shall be Type WBP and for internal use shall be Type MR.

Plywood for painting shall be grade 2/3 unless otherwise stated and for varnishing or polishing shall be grade 1/3 unless otherwise stated.

14/02/03 Timber Preservatives

The preservative treatment of timber shall be carried out strictly in accordance with the preservative manufacturer's instructions, in plants registered, licensed and inspected by them in the premises of the Timber Merchant. Timber, wherever possible, shall be worked prior to treatment.

Surfaces which are exposed after treatment shall be re-treated in accordance with the manufacturer's instructions. A certificate, stating type and date of application shall be supplied with each delivery.

All structural timber shall be double vacuum impregnated with vacsol preservative, as manufactured by Hicksons Timber Products Ltd to comply with treatment code HV1.

Where timbers are treated with preservative, this shall be deemed to include for sealing ends of all site-cut timbers with Vacsele end grain preservative liberally applied by brush. Alternative timber treatments will be considered subject to the Contractor furnishing full details to the Engineer for approval.

14/02/04 Moisture Content

The moisture content of timber shall not exceed 18 % of the dry weight at time of erection unless otherwise stated.

14/02/05 Adhesives

Adhesives for structural use and external joinery shall comply with BS 1204 : Part 1 : 1979 Type WBP or BS 1204 : Part 2 : 1979 Type WBP and the selected adhesive shall be suitable for the intended position and use.

14/02/06 Nails

Wire nails and cut nails shall comply with BS 1202.

Nails securing plywood roof boarding to structural members to be 3.35mm diameter galvanised ring shank nails 75mm long at 150mm centres, unless noted otherwise.

14/02/07 Screws,Screw Cups, Staples etc

Wood screws shall comply with BS 1210. Screw cups, staples etc shall comply with BS 1494. Screws and fixing accessories used externally shall be rustproofed.

14/02/08 Bolts

Black hexagon bolts, screws and nuts shall comply with BS 4190, Grade 4.6.

14/02/09 Storage of Materials

All timber shall be properly sacked to prevent undue stress and adequately protected from exposure to the weather so that the specified moisture content shall be maintained and to prevent the risk of decay or insect attack.

PART 3 WORKMANSHIP

14/03/01 Workmanship Generally

The work shall be carried out in accordance with the requirements of the Building Standards (Scotland) Regulations to the satisfaction of the Local Authority. The Contractor must acquaint himself before tendering with any such requirements. The Contractor shall comply with all reasonable instructions and directions given from time to time by the Engineer for the purpose of ensuring that the work shall be carried out in accordance with the Specification, working drawings and written instructions issued by the Engineer. Any defective material or work, including deviations from the working details in respect of setting out, correct lines and levels, verticality, sizes and thickness of member, shall be removed and reconstructed or otherwise rectified to the approval of the Engineer and the Contractor shall be responsible for all additional costs incurred.

The Client's supervisory staff and the Engineer reserve the right to check the work constructed by the contractor and the setting out in such cases and at such times as they may deem fit. There is, however, no duty on their part to make such checks and any failure by them to observe errors shall not relieve the Contractor of his responsibility in these respects.

All work shall be accurately set out, properly marked, tenoned, shouldered, wedged, primed and glued up, well fitted and securely and neatly put together, as directed by the Engineer.

All wrought timber shall be well finished square and true to a smooth and even surface, free from any roughness, machine works or ripples, arrised and sanded, all to the satisfaction of the Engineer.

14/03/02 Jointing

Finger jointing of structural timbers shall not be permitted without the written approval of the Engineer.

Surfaces at any joint in an assembly shall be in good contact over the whole area of the joint before any pressure or restraint from the fastenings is applied.

Nailed, screwed, bolted and connectored joints shall be formed in accordance with BS 5268.

The bolts in bolted or connectored joints shall be periodically inspected after erection and during the Maintenance Period and shall be tightened if necessary.

The assembly of units and the making of all joints shall be carried out in such a way as to avoid damage to any of the members and the finished structural unit shall conform to the detailed drawings in all respects.

14/03/03 Handling

Care shall be taken that structural members are not bruised, split or damaged in any way during transit, stacking and erection. Any damaged members will be rejected and shall be replaced at no cost to the Client.

14/03/04 Erection

All temporary propping shall be provided as necessary by the Contractor in order to allow the structural units to be erected in their proper position and to the proper shapes and sizes. Such temporary propping shall be to the approval of the Engineer and arrangements for the removal of any temporary propping shall be agreed with the Engineer prior to work beginning.

14/03/05 Structural Sizes

The final sizes of the members are to be as far as practicable the same as that specified on the drawings. The minimum sizes are to be as set out in Appendix D of BS 5268.

SECTION 15 PERFORMANCE SPECIFICATION FOR TIMBER TRUSSED RAFTERS

PART 1 GENERAL

15/01/01 SCOPE

This specification covers the design, manufacture and erection of trussed rafters for use in trussed rafter roofs, including materials and workmanship.

The provisions of BS 5268 : Part 3 - Code of Practice for Trussed Rafter Roofs shall apply throughout.

PART 2 MATERIALS

15/02/01 BRITISH STANDARDS

The materials used shall comply in all respects with the appropriate British Standard. Any British standard referred to shall be held to be the latest edition issued at the date of tender.

The grade of timber used shall comply with the requirements of the stress grades given in BS 4978.

15/02/02 GRADING

The species used shall be suitable to form satisfactory joints.

All timber shall be visually or machine stress graded in accordance with BS 4978. All timber shall be face stamped with the appropriate BS grade mark by the British Grading Authority.

Rafters and ceiling ties shall be graded to the recommendations for beams, but no increase in the size of knots outside the middle third of their length shall be permitted.

Internal struts and ties shall be graded as compression and tension members respectively.

15/02/03 KNOTS

Dead knots or knot holes shall not be permitted within the areas of metal plate fasteners.

Live knots are permitted within the plate areas provided that the nails or teeth can be satisfactorily embedded in the material of the knots. In addition, if the force on the fastener is acting towards the end or edge of the member, the distance between a knot and that end or edge shall not be less than the maximum dimension of the knot in the direction of the force.

15/02/04 WANE AND FISSURES

Wane shall not occur on the tope edges of the rafters nor the bottom edges of the ceiling tie, nor within the areas of any joints.

Fissures shall not occur within the area of metal plate fasteners.

15/02/05 SIZES AND FITTINGS

Timber less than 60mm in depth of 35mm in thickness after processing, or a 20% moisture content shall not be used for trussed rafter construction.

Punched metal plate fasteners and metal plate gussets shall bear the manufacturer's identification mark. The manufacturer shall exercise adequate control to ensure a consistent standard of product as regards quality of steel, plate thickness and teeth profile as appropriate. No significant incipient cracks shall be permitted at teeth-plate junctions and teeth shall have an adequate degree of ductility at these points. Metal plates with a thickness less than 0.91mm shall not be used for roof fasteners.

The material used for the fasteners shall be hot-dip galvanised plain steel sheet or coil to Class 2A of BS 2989. No changes shall be made in plate material, manufacture of design without re-assessing the joint characteristics.

The nails used with metal plate gussets and nailed plywood gussets shall also be protectively coated against corrosion by hot-dip galvanising, sheradising, parkerising or similar treatment.

The adhesive used for plywood gussets shall be in accordance with BS 1204 : Part 1.

Steel timber connectors shall comply with BS 1579 : 1960.

15/02/06 TIMBER PRESERVATIVES

The preservative treatment shall be carried out strictly in accordance with the preservative manufacturer's instructions, in plants registered, licensed and inspected by them in the premises of the Timber Merchant. Timber wherever possible shall be worked prior to treatment.

Surfaces which are exposed after treatment shall be re-treated in accordance with the manufacturer's instructions. A certificate, stating type and date of application shall be supplied with each delivery.

All structural timber shall be double vacuum impregnated with 'Vacsol' preservative, as manufactured by Hicksons Timber Products Ltd to comply with treatment code HV1.

Where timbers are treated with preservative, this shall be deemed to include for sealing ends of all site-cut timbers with Vacsele and grain preservative liberally applied by brush. Alternative timber treatments will be considered subject to the Contractor furnishing full details to the Engineer for approval.

PART 3 DESIGN

15/03/01 GENERAL

The Contractor shall undertake the duties of the "trussed rafter designer" as defined in clauses 17, 18 and 19 of BS 5268 : Part 3.

The general arrangement of the trussed rafter roofs shall be as shown on the Architect's and Engineer's drawings. The location, size and height of the buildings carrying the trussed rafter roofs will be as shown on the Architect's drawings. The profiles, spans, roof pitches, location of supports and method of support are shown on the Engineer's drawings. The make-up of roof coverings, ceilings and the like are shown on the Architects drawings. The requirement for accesses, walkways, support to water tanks and other plant and equipment to be carried within or by the trussed rafter roof are shown on the Engineer's drawings, and the trussed rafter designer shall take account of these requirements in preparing his design.

15/03/02 DESIGN

The trussed rafter designer shall design the trussed rafters in accordance with BS 5268 : Part 3. The design shall cover the whole area of trussed rafter roofs indicated on the Engineer's general arrangement drawings as being covered by trussed rafters. Any areas indicated on the Engineer's drawings as being dealt with by in-situ make-up are excluded from the trussed rafter design, save that the trussed rafter designer must take account of any loading coming on the trussed rafters arising from such in-situ make-up areas. The design shall include all necessary connections, bolts and the like required and shall take full account of the support arrangements indicated on the Engineer's drawings.

The loadings to be sustained by the trussed rafters shall be as set out in BS 5268 : Part 3 Clause 15. Notwithstanding any information on the Engineer's drawings as to location of water tanks in the roof space, all ceiling ties shall sustain water tank dead loads as described in Clause 15.1 of BS 5268 : Part 3, as a minimum requirement.

The dead load arising from the roof coverings and ceilings shall be as noted in the Engineer's drawings. Where no information is given, the trussed rafter designer shall evaluate the loadings from the information given on the Architect's drawings.

Imposed loads shall be as Clause 15.2 of BS 5268 : Part 3, together with any plant and equipment loads indicated on the Engineer's drawings. It shall be assumed that access will be available to the roof space, even if no specific access arrangements are shown on the Architect's or Engineer's drawings.

The design wind speed used in calculating wind loads shall be based on the basic wind speed for the site as derived from CP3 : Chapter V : Part 2 : 1972, modified by factors S1, S2 and S3 appropriate to the site and the building, for Class B structures,, unless specific requirements are stated on the Engineer's drawings.

15/03/03

DRAWINGS AND CALCULATIONS

The trussed rafter designer shall provide general arrangement drawings for each type of trussed rafter and for the arrangement of all the trussed rafters required to cover the whole area of trussed rafter roofs indicated on the Engineer's drawings. In preparing these arrangements, the trussed rafter designer is permitted to put forward alternatives to the arrangement shown on the Engineer's drawings if, in the former's opinion, a more economical arrangement appropriate to his fabrication or erection facilities will result. Such alternatives will only be accepted if, in the Engineer's and Architect's opinion, no adverse effects arise on other elements of the building as a result of such alternative proposals.

The trussed rafter designer shall prepare full design calculations to support his general arrangement drawings. The general arrangement drawings and the calculations will "inter alia" provide full information on the finished sizes, species, stress grades or strength classes of all members : the loads in the members and the type of joints to be used : the loadings and other conditions for which the trussed rafters are designed : the basis of the design : the positions and sizes of all bearings, together with the range of reactions to be accommodated at the support positions including those required to resist wind uplift forces : the spacing of the trussed rafters, including any special arrangements to accommodate chimneys, openings, changes of direction and the like : the positions, fixings and sizes of any lateral supports necessary to prevent buckling of compression members : the method of support for tanks and other equipment shown on the Engineer's drawings as requiring to be supported by the trussed rafter roofs ; and any special precautions to be observed in handling and erection.

The drawings and calculations prepared by the trussed rafter designer shall be particular to the contract. Unedited computer print-outs will not be acceptable. The drawings and calculations shall be submitted to the Architect and Engineer for approval, which approval is required to ensure the adequacy of the trussed rafter roof structure and its compatibility with the remainder of the works.

The trussed rafter designer shall prepare for the Engineer's approval such further shop drawings and detail calculations as will be required for fabrication, detailing "inter alia" the type, sizes and positions of all jointing devices with tolerances or the number of effective teeth or nails, metal plates and bolts and the like required in each member at each joint.

The Contractor shall allow reasonable times in his programme for approval by the Architect and Engineer of all drawings and calculations submitted by the trussed rafter designer. Fabrication of the trussed rafters shall not begin until approval has been obtained from the Architect and Engineer.

Notwithstanding any approvals given by the Architect or Engineer, the trussed rafter designer shall be responsible for the correctness and completeness of his drawings and calculations.

PART 4 FABRICATION

15/04/01 INSPECTION

The Engineer and his authorised representatives shall have access at all reasonable times to all places where the work is being carried out and shall be provided by the Contractor with all the necessary facilities for inspection during fabrication.

15/04/03 MOISTURE CONTENT

The moisture content of the timber at fabrication shall not exceed 22% except for the laminated timber members where strict compliance with BS 4169 shall be necessary.

15/04/04 DIMENSIONS

The minimum finished dimensions for the category of timber specified when measured at a moisture content of 20% should be in accordance with BS 4471. All timber members should have uniformity in thickness and depth of + or - 0.5mm on the specified dimensions and in abutting pieces, differences in thickness in excess of 1mm shall not be permitted for metal plate and nailed plywood gussets and 0.5mm for glued plywood gussets.

In all timber members, the following distortion limits should not be exceeded:-

Spring	-	5mm per 3 linear m
Twist	-	1mm per 25mm width per 3 linear m
Bow	-	10mm per 3 linear m
Cup	-	2mm per 100mm width of face

15/04/05 ASSEMBLY

Assembly shall follow the standard procedure using the tables, presses etc, associated with the particular joining device.

All members should be square cut or bevelled to ensure firm contact at the abutting surfaces of the joints and should be accurately cross-cut to length with a tolerance at + or - 1.5mm.

Within each specified design the horizontal and vertical dimensions shall not deviate in each batch by more than + or - 6mm on spans up to and + or - 9mm on spans greater than 7.5 metres and + or - 12mm on spans in excess of 12m.

All joint plates shall be of at least the size specified and shall be located to ensure that the correct number of effective nails, teeth or bursts as required by the design are embedded in each member. The edges of all plates shall not project beyond the upper and lower edges of the rafter and ceiling tie members respectively.

Spliced end joints may be used in ceiling ties and rafters, but the splice plates shall not project beyond the edges of the members.

Spliced end joints in ceiling ties should be so positioned that their centres are at a distance from a node point of not more than 0.3 nor less than 0.15 of the span between adjacent node points, unless otherwise specified on the design drawings.

Spliced end joints in rafters should be positioned so that their centres are not more than 0.3 nor less than 0.15 the span of the rafter between node points from the rafter/strut node point, unless otherwise specified on the design drawings.

PART 5

15/05/01

ERECTION

HOISTING AND FIXING

The Contractor shall be responsible for the hoisting and fixing of the trussed rafters which shall include for all lateral bracing and framing members and the prices in the Bills shall be deemed to include for all cranage.

The Contractor shall determine any temporary bracing that is required to maintain the trussed rafters in position until such time as the permanent bracing is in position. Such temporary bracing shall be provided by the Contractor and shall be deemed to be included in the prices in the Bills.

SECTION 17 STEEL SHEET PILING

PART 1 GENERAL

17/01/01 Any British Standard Specification or Code of Practice referred to in this Specification shall be held to be the latest edition published at the date of the Tender, including amendments. Except where otherwise noted within the following Specification all relevant particulars and conditions in British Standard Specifications and Codes of Practice relating to standards of material, quality, workmanship and testing shall be deemed to be complied with. In cases where no particular specification is given for any material the relevant British Standard Specification or Code of Practice where one exists shall apply.

17/01/02 Prior to the commencement of the piling works the Contractor shall carry out a dilapidation survey of all adjoining properties and shall agree the conditions with the property owners and the Architect/Engineer. The Contractor shall take a photographic record of the condition of these properties. If the work is being carried out within an existing building the dilapidation survey should be carried out in adjacent areas of the building.

17/01/03 The Contractor shall satisfy himself as to the location and type of all public utilities or other services in the area of the works and shall take all necessary steps to divert or remove such services that may impede the works.

17/01/04 Prior to the commencement of the works, the Contractor shall submit to the Engineer for his agreement, his driving method and system, detailing the equipment to be used including that for noise and vibration control. The contractor shall take all reasonable steps to minimise the effects of noise and vibration on the occupants and property adjacent to the works. Such methods may include the fitting of acoustic jackets or silencers and resilient dampers between the sheet piles and the drop hammer.

17/01/05 Pile driving works shall not be carried out outwith the hours of 07.00 to 19.00, Monday to Saturday.

PART 2 MATERIAL

17/02/01 The steel sheet piles shall be Frodingham or Larssen type and shall be designed by the Contractor to support the loads indicated on the drawings, together with any temporary loads deemed necessary by the Contractor.

17/02/02 The quality of the steel shall conform to the requirements of B.S. 4360 Grade 43A, 50B or 50C.

17/02/03 The rolling margin for sheet piles shall be not greater than 4% over, nor less than 2% under the theoretical mass and not greater than 75mm over or 50mm under the scheduled lengths.

17/02/04 Sheet piling walings, tie rods and fittings that are to form part of the permanent works shall be coated with tar manufactured to B.S. 1070: Type A before driving and a further coat to exposed surfaces on completion of driving. Pile surfaces which are to be embedded in concrete shall be left uncoated.

17/02/05 The design and fabrication of steelwork for walings, tie rods and filling shall be in accordance with the requirements of BS 5950.

17/02/06 Walings shall be delivered to the site 75m longer than the specified length, drilled at one end for site splicing. The other end shall be left plain for cutting to match driven lengths of wall and for drilling and splicing on site.

17/02/07 Tie rods shall be to the diameter specified on the drawings, Where bars are threaded the diameter at the bottom of the thread shall be at least equal to the specified bar diameter. The threaded lengths of a bar shall be a minimum of 250mm unless otherwise specified by the Engineer. Tie rods shall be provided with turnbuckles where specified for tensioning the rods.

PART 3 PLANT AND EQUIPMENT

17/03/01 The Contractor shall select the appropriate type and size of hammer to suit the piles being driven and the site conditions, Either vibratory, drop or single acting hammers may be used. If drop or single- acting hammers are to be used then a driving cap and dolly shall be used at all times to protect the pile head.

17/03/02 Temporary guide frames shall be provided to rigidly support the piles true to line and plumb and shall be so constructed that the top guide walings may be removed to allow the piles to be driven to their specified depth without displacement.

17/03/03 Cranes used for pitching and driving sheet piling shall have sufficient outreach, height and load capacity to avoid excessive manoeuvering.

PART 4 WORKMANSHIP

17/04/01 The piles shall be driven true to the lines and levels shown on the drawings. Piles that deviate excessively from these lines shall be withdrawn and redriven at no additional cost to the Contract. Tapered piles shall not be introduced to correct piles that are out of plumb without the prior approval of the Engineer.

17/04/02 Piles that reach refusal before achieving the designed penetration shall not be cut off without the approval of the Engineer.

17/04/03 All holes in the piling for tie rods, anchor bolts and fixing shall be made on site after the piles have been driven to their final penetrations and/or levels.

17/04/04 Following the erection of the guide frame the first pair of piles should be pitched, plumbed and partially driven to provide a guide for adjacent piles. The following piles should then be pitched and interlocked and the last pair within the frame length shall be partially driven. The intervening piles shall then be driven to the same level prior to the removal, if necessary, of the top guide waling and all piles except the last pair shall be driven to the working level.

17/04/05 When hard driving is encountered the piles shall be marked off in increments of 25mm and the number of hammer blows recorded for the penetration of each increment, thereby allowing an assessment of the set to be made.

17/04/06 When penetration into rock is specified as a requirement. The contractor shall ensure that no damage or distortion to the pile head occurs. The use of a cast steel driving cap may be required to limit such damage. Any damaged pile head shall be burnt off to avoid further deformation.

17/04/07 Where obstructions are encountered during the driving operation the Contractor shall drive adjacent piles until the extent of the obstruction has been defined. The piles immediately clear of the obstruction shall be driven to the maximum depth allowed by the guide frame. Driving shall then be carried out to the obstructed pile using the previously driven piles as guides. Any pile that becomes damaged or distorted shall be extracted and replaced by a new pile.

17/04/08 Water and air jetting in sand, silts and, fine sandy gravel or similar non-cohesive soils, may be permitted with the prior approval of the Engineer.

17/04/09 The Contractor shall keep a full record of the piling operation and these records shall show the length of piles, driven depths of piles, cut length of piles, location and depths of obstructions, and the set of piles in hard driving.

17/04/10 The tops of any permanent sheet piling shall be cut back to the levels shown on the drawings and the cut face shall be protected as clause 17/02/04.

SECTION 19 DRAINAGE

PART 1 GENERAL

19/01/01 British Standards quoted in this Specification include all amendments made on or before the Date of Tender.

19/01/02 All work, unless stated otherwise, shall generally conform with British Standard Code of Practice BS 8301 : 1985 Building Drainage.

19/01/03 The Engineer may issue instructions requiring the Contractor to submit samples and/or certificates in respect of materials to be used in the works. The Engineer may also issue instructions requiring the Contractor to arrange any tests of materials and/or workmanship and in this connection the Contractor will be required to prepare samples for testing and deliver to a laboratory. All samples of materials and/or workmanship are subject to the Engineer's approval which, when received, will be held to form the standards required for the works. Any costs incurred in complying with these requirements, other than laboratory costs of testing materials and/or workmanship found to be in accordance with this Specification will be paid for by the Contractor and allowed for in the Tender.

PART 2 MATERIALS

19/02/01 Vitrified Clay Pipes

Pipes and fittings for foul and surface water drains and sewers must comply in all respects with B.S. 65. Unless otherwise noted all pipes and fittings shall be "extra strength" and of "normal" quality. Pipes shall be joined with flexible joints according to the recommendations of the manufacturers of the pipes.

Where a joint has to be made to an existing pipe where the use of a flexible joint is inappropriate, the pipes shall be joined using a proprietary bandseal coupling e.g. Naylor Band-seal.

19/02/02 Agricultural Tiles & Pipes

Agricultural tiles and pipes shall be best well burnt earthenware, and circular in bore, and with an externally flat bottom and plain ends suitable for laying with open or butt joints, all as per B.S: 1196.

19/02/03 Concrete Pipes

Concrete pipes shall be Class M to B.S. 5911: Part 100 manufactured with Sulphate Resisting Portland Cement. Pipes shall be formed with flexible joints according to the recommendations of the manufacturers of the pipes and joints.

19/02/04 Cast Iron Pipes and Specials

Cast iron pipes and specials shall conform to B.S. 437 or B.S. 4772. Pipes shall be coated with bitumen internally and externally. Pipes shall be provided with mechanical joints.

19/02/05 U.P.V.C. Pipes

Shall conform to B.S. No 4660 with flexible joints from a manufacturer approved by the Engineer.

19/02/06 Joints Between Vitrified Clay and Cast Iron Pipes

Where vitrified clay pipes and fittings are to be connected to cast iron pipes or fittings, proprietary band-seal connections shall be provided e.g. Naylor Band-seal.

19/02/07 Pipe Bedding Materials

i) Granular bedding Type A for pipes shall consist of aggregates from natural sources complying with B.S. 882. Grading shall comply with B.S. 882 Table 4 as follows:-

Material X1 :
20 mm nominal size graded aggregate, for use with pipes up to 525 mm nominal diameter.

90 - 100% passing 20 mm sieve
30 - 60% passing 10 mm sieve
0 - 10% passing 5 mm sieve

Material X2 :
40 mm nominal size graded aggregate, for use with pipes over 525 mm diameter.

90 - 100% passing 37.5 mm sieve
35 - 70% passing 20 mm sieve
10 - 40% passing 10 mm sieve
0 - 5% passing 5 mm sieve

Material Y1 :
20 mm nominal size, single size aggregate, for use with pipes up to 525 mm nominal diameter.
85 - 100% passing 20 mm sieve
0 - 25% passing 10 mm sieve
0 - 5% passing 5 mm sieve

Material Y2 :
40 mm nominal size, single size aggregate, for use with pipes up to 525 mm nominal diameter.

85 - 100% passing 37.5 mm sieve
0 - 25% passing 20 mm sieve
0 - 5% passing 5 mm sieve

Note : 1. Gravel is not acceptable for Material X2 and Y2.
2. The material to be used for bedding and surround for concrete pipes shall not contain more than 0.3% sulphate expressed as sulphur trioxide.

ii) Selected fill Type B shall be uniform readily compactable material free from vegetable matter, building rubbish, frozen soil, material susceptible to spontaneous combustion and clay lumps and stones retained on 75 mm sieve and 37.5 mm sieve respectively.

iii) Granular bedding Type C shall be as for Type A but to pass a 10 mm sieve.

iv) Sand for bedding pipes shall comply with the provisions of B.S. 882, Table 5, Grading Zone C.

v) Type E material for backfilling field or French drains shall be hard clean crushed rock or gravel having a grading within the following limits:-

100% passing 63 mm sieve
85 - 100% passing 37.5 mm sieve
0 - 20% passing 20 mm sieve
0 - 5% passing 10 mm sieve

19/02/08 Precast Concrete Ring Manholes

Manhole Chamber Rings : shall be manufactured in accordance with B.S. 5911 : Part 200.

i) Chamber rings shall be provided with tongue and groved joints to accommodate a tok-strip sealing compound.

ii) The unit shall be manufactured with Sulphate Resisting Portland Cement.

iii) All chamber rings shall be reinforced.

iv) Chamber rings up to 1800 mm diameter shall be provided with galvanised mild steel step irons.

v) Chamber rings greater than 1800 mm diameter shall be provided with plastic encapsulated steel rungs.

Slabs and Seating Rings : shall be manufactured in accordance with B.S. 5911 : Part 200.

i) Units shall be manufactured using Sulphate Resisting Portland Cement.

ii) All cover slabs shall be designed as heavy duty.

iii) Seating rings surfaces shall be indented and roughened to form a good key.

19/02/09 Manhole Covers and Frames

Manhole covers and frames shall conform with B.S. 497 and shall be of the type indicated on the drawings. All covers require to have a B.S.I. Kitemark.

19/02/10 Manhole Step Irons

Shall be of galvanised malleable iron conforming with B.S. 1247 with a tail of 230mm spacing 300 horizontally and 300 vertically staggered as shown.

19/02/11 Gully Pots

Gully pots shall be either:-

Precast concrete to B.S. 5911 Part 2 and unless otherwise specified shall be of the trapped pattern, and of the dimensions as shown on the drawings. The gullies shall be manufactured with Sulphate Resisting Portland Cement.

or

Vitrified clay to B.S. 65 and unless otherwise specified shall be of the trapped pattern and of the dimensions shown on the drawings.

19/02/12 Gulley Gratings

a) Carriageways : gulley gratings shall be cast iron to B.S. 497 Grade A Class 2 for 450 mm wide unless otherwise specified on the drawings.

b) Footpaths : gulley gratings shall be cast iron to B.S. 497 Grade B for 325 mm wide.

19/02/13 Cement Sand and Aggregate

Cement, sand and aggregate for concrete shall be in accordance with the relevant parts of the Specification for Concrete Works and the qualities of concrete called for in the drainage works shall be as described in that Specification.

The sand for the mortar for use in brickwork, shall accord with B.S. 1200, Table 1. Sand for use in benching screeds, rendering, channel bedding and cover setting shall accord with B.S. 1199, Table 1. Alternatively, concreting sand to B.S. 882 Zones C to M may be used for all the above if adequate workability and smoothness of finish is obtained.

19/02/14 No Fines Concrete

The no fines concrete shall consist of 50kg cement to 0.28 cu.m. of 38mm to 19mm graded aggregate. The whole to be mixed as other grades of concrete.

19/02/15 Bricks

All bricks for use in manholes silt traps, petrol and oil interceptors and make-up to gulley covers shall be Class B engineering bricks conforming with B.S. 3921: 1985 unless otherwise stated on the drawings. they shall be free from lime and shall be hard, well burnt, square cornered and of uniform size, shape and texture. Samples of brick shall be submitted to the Engineer for his approval prior to work beginning and all supplies of bricks used in the works shall conform with the approved samples.

19/02/16 Special Fittings

If any special fittings are called for on the drawings not covered by the foregoing materials Specification, they shall be fully described on the drawings.

PART 3 WORKMANSHIP

19/03/01 Codes of Practice

Codes of Practice quoted in this Specification include all amendments made on or before the Date of Tender.

19/03/02 Excavations for Pipelines

Where shown in the Contract or directed, top soil shall be stripped over the full width of the working area before any other operation is carried out and the soil deposited in dumps. On completion of the other operations the soil shall be evenly spread over the stripped surface. Otherwise the ground shall be so excavated to the lines and depths shown on the drawings, or to such other lines and depths as the Engineer may direct. Trenches taken out to a greater depth than is necessary shall be filled up to the required level with mass concrete grade 10 or as otherwise directed by the Engineer, at the Contractor's own cost. Excavated material shall be stacked away from the edge of the trench and care shall be taken by the Contractor to ensure that the size and location of the spoil bank shall not endanger the stability of the excavations.

The Contractor shall take steps to protect from the weather, the material excavated from the trench and set aside in spoil tips to await backfilling. Any material, which, in the opinion of the Engineer becomes unsuitable for use as backfill on account of the Contractor failing to take such protective measures shall be replaced with suitable backfill material at the Contractor's own cost. Where, in the opinion of the Engineer, materials are excavated from the trench which are unsuitable for backfilling at the time of excavation, they shall be removed off the site and replaced with suitable material, and the Contractor shall be reimbursed accordingly.

To assist in controlling the depth of excavation and the setting of the pipes to a proper level, substantial timber sight rails shall be provided at suitable intervals at a definite height in round numbers above the invert of the pipes.

Trenches shall be excavated in such lengths as to ensure that the trenches remain open for the minimum practicable time.

19/03/03 Trench Widths

From the bottom of the trench to a level 300 millimetres above the crown of the pipe trench widths shall be not less than the minimum nor greater than the maximum figures shown in the table below.

The minimum width is that width between the faces of the soil required to ensure the correct placing and compaction of bedding materials equally on either side of the pipe. All sheeting and supports are to be outwith this width.

The maximum width is that width between the faces of the soil which has been used in the structural design of the pipeline and it includes an allowance for sheeting and tolerance.

Battering the sides of trenches shall only be permitted above this level where approved, otherwise the sides of pipe trenches shall be adequately supported to the satisfaction of the Engineer, by timbers or other approved means. Such supports to the sides of trenches shall be so designed as to allow the pipes to be laid accurately, the pipe line to be surrounded in concrete where required and proper re-filling and compacting of the trench to be carried out. Where directed by the Engineer, supports shall be left in the trenches and the cost of such supports so left in will be reimbursed to the Contractor except where in the opinion of the Engineer the necessity for leaving the supports in has arisen from carelessness or neglect on the part of the Contractor.

Where rock is encountered in trenches, it shall be cut out to a depth of 200mm or one quarter of the outside diameter of the pipe, whichever is greater below the intended level of the bottom of the barrel of the pipe.

The bed shall then be made with Type A granular material, or other approved material to provide a firm bed for the pipe, unless a concrete bed haunch or surround is to be provided.

Rock shall be defined as any material met within an excavation which is of such size and position that it can be removed only by means of wedges or special plant. Blasting is not permitted. Heavy clays (including boulder clay) shall not be classified as rock even though pneumatic spades are used for their removal.

The Contractor shall take all precautions necessary for the safety of adjoining structures or buildings whether the trench is in soft excavations or in rock excavation, by providing shoring (which shall be to the approval of the Engineer) and by trenching in short lengths or by any other approved method.

Trenches shall be kept free from water unitl any concrete or other works therein are sufficiently set and there is no danger of flotation of the pipes. The Contractors shall construct all necessary sumps, channels, temporary drains and shall provide all necessary pumping equipment to ensure that this requirement is complied with. The use of newly constructed drains for the disposal of water from the excavations will not be allowed without the express permission of the Engineer and such permission shall only be given provided precautions are taken to prevent all grit stones or slurry from entering such drain.

Nominal Internal Diameter mm.	Minimum Trench Width mm.	Maximum Trench Width mm
100	430	630
150	490	690
225	580	780
300	680	880
375	950	1150
450	1030	1230
525	1120	1320
600	1240	1440
675	1330	1530
750	1400	1600
825	1490	1690
900	1920	2120
1050	2100	2300
1200	2290	2490
Above 1200	Outside diameter of pipe plus 800mm	Outside diameter of pipe plus 1000mm

19/03/04 Pipe Laying General

Flat braided steel wire slings or band slings shall be used for slinging all pipes. Chain or rope slings, hooks or other devices working on scissor or grab principles shall not be used.

Subject to the requirements of inspection before acceptance, protective bolsters, caps or discs on the ends of flanges of pipes, specials or fittings shall not be removed until the pipes, specials or fitting are about to be lowered into the trench.

Before a pipe is lowered into the trench, it shall be thoroughly examined to ensure that the internal coating or lining and the outer coating or sheathing are undamaged. Where necessary the interiors of pipes, specials and fitting shall be carefully brushed clean. Any damaged parts of the coatings or linings, shall before a pipe is used, be made good as directed.

Pipelaying shall not commence until the bottom of the trench and the pipe bed have been approved.

Pipes shall be brought to the correct alignment and inclination, concentric with the pipes already laid.

All pipes less than 600 millimetres in diameter with flexible joints shall be accurately marked prior to laying to ensure that the correct gap is left in the joint.

19/03/05 Bedding and Protecting Pipes

Bedding and surrounding pipes shall be of the arrangements and dimensions shown.

The bottom of the trench or surface of the bed shall be finished to a smooth even surface at the correct levels to permit the barrel of the pipe to be solidly and evenly bedded throughout its whole length.

The preparation of the trench bottom or surface of the bed shall be completed for at least one full pipe length in advance of the pipelaying, except where in exceptional circumstances another arrangement is approved.

No bedding material shall be placed in trenches containing water.

Where granular bedding is to be used, stones, bricks or similar materials shall not be used below or against the pipes to locate them in position in the trench or to level the pipes. Sufficient of the infill materials shall be placed around the barrels of pipes to prevent movement.

Where dictated by the requirements for testing pipelines the method of haunching and surrounding pipes shall be modified to leave pipe joints exposed.

For Class B bedding, Type A granular material as previously specified shall be placed by hand in the excavation below the level of the pipe barrel and shall be tamped and rammed by hand in layers not exceeding 150 millimetres thick before compaction to provide a dense, well compacted bed free from soft spots throughout the length of the pipeline between joint and sling holes.

After the pipes have been properly bedded and tested Type A granular material shall be carefully placed into the spaces between the pipe and the sides of the trench to the level of half pipe. The Type A material shall be thoroughly packed and rammed by careful hand tamping in layers not exceeding 150mm thick before compaction. The placing and the tamping of the material shall proceed equally on both sides of the pipe.

Thereafter Type B fill as previously specified shall be placed into the spaces between the pipe and the sides of the trench to the level of the crown of the pipe. The Type B fill shall be thoroughly packed and rammed by careful hand tamping in layers not exceeding 150mm thick before compaction. The placing and the tamping of the material shall proceed equally on both sides of the pipe.

Class B bedding shall be completed by placing Type B fill material at least 300mm deep after compaction and the full width of the trench in two equal layers over the crown of the pipe, each layer being lightly tamped by hand.

For class F + class N bedding type A pipe bedding material shall be laid and compacted as for the class B bedding.

After the pipes have been tested type B material shall be carefully placed into the spaces between the pipe and the side of the trench to the level of the pipe crown. The material shall be thoroughly packed and rammed by careful hand tamping in layers not exceeding 150mm thick before compaction. The placing and the tamping of the material shall proceed equally on both sides of the pipe.

The remainder of the trench filling and compaction shall proceed as for the class B bedding.

19/03/06 <u>Concrete Bedding, Hauching Surrounding & Anchoring</u>

Concrete for bedding, haunching or surround pipes shall be Grade 15 with 20 or 40mm maximum size of aggregate and no back filling of the trench shall be done until the concrete has reached a strength of 10 newtons per square millimetre.
Before placing concrete, pipes shall be supported near each joint on a precast concrete block or engineering bricks with a padding of two layers of hessian based damp proof course or material of similar yield betwen the barrel of the pipe and the supporting block. The surface of the support shall be perfectly smooth for at least 75mm by 75mm under the pipe and the size of the block shall be as directed.

Concreting of bedding, haunching or surrounding shall not be done until the pipes have been jointed and inspected. The concrete shall be vibrated into place under the pipe and the concrete shall be in full contact with the underside of the barrel of the pipe throughout its length. The concrete shall be placed in one operation and shall be well worked to form a homogeneous mass. There shall be no horizontal construction joint in the concrete below the level of half pipe. The pipe shall be carefully anchored against flotation.

Concrete bedding, haunching or surrounding pipes shall be discontinuous at flexible pipe joints. Shaped formwork made from fibreboard or other equally compressible material of the thickness stated in the Contract and of size and shape equal to the net section of the concrete protection to the pipes shall be used and left at the pipe joints as shown in Figures on the drawings. The formwork shall be neatly cut and properly supported by temporary struts and rails where necessary.

Grade 20 shall be placed at all bends, tees, junctions, changes of direction and gradient to prevent movement of pipelines due to thrust from water pressure, in such positions and quantities as directed.

Care must be taken, when placing concrete with the pipes in position, to ensure that the concrete is thoroughly worked beneath the pipe barrel and the sockets and that the pipes are not displaced.

Concrete shall not be dropped more than 2.5m without the use of suitable chutes. Alternatively, skips which deposit the concrete at the place where it is required may be used. Before placing new concrete on old, the interface shall be thoroughly roughened and wetted.

Where the trench is supported by timbering or other means and the supports are not to be left in, the supports shall be withdrawn ahead of the layer to be compacted, care being taken to keep the sides of the trench solid and fill all spaces left by the withdrawn supports.

19/03/07 Plugs

Immediately after laying, the open end of a pipe shall be sealed with a wooden plug or approved stopper of appropriate size to prevent the entry of material which might contaminate the pipeline, damage the linings, obstruct the waterway or affect the working of valves, metres etc. Plugs shall be unperforated and shall be shaped to fit neatly so that water from the trench excavations shall not be allowed to gain access to the pipeline.

Water pipes and fittings 150 millimetres and under in diameter shall have a brush equal in diameter to the internal bore of the pipe drawn through them as the work proceeds. The brush shall not be removed from the pipeline from commencement until completion.

The plugs in sewers may with the Engineer's approval be provided with small holes for drainage purposes, but water from the trench excavation which is heavily charged with silt shall not be allowed to gain access to the pipe.

Where work is interrupted for a period, the plugs left in position shall be regularly inspected for their fixing to ensure that there has been no tampering by unauthorised persons. Whenever any plug is removed, the immediate length of pipe shall be examined for dirt or obstructions and shall be cleaned as required.

Adequate precautions shall be taken by way of backfilling or other means to anchor each pipe securely to prevent flotation of the pipeline in the event of the trench being flooded.

19/03/08 Reinstating Road Surfaces

Sewers that are constructed under a public roadway require to be backfilled using compacted Type 1 hardcore. The Contractor shall be responsible for the construction of a temporary wearing surface above the track. During the Defects Liability Period (Maintenance), the Contractor will be responsible for any settlement that occurs to the road surface. The final reinstatement will be carried out by the Local Authority.

19/03/09 Pipelaying and Jointing

All pipes shall be laid singly and to the lines and levels shown on the drawings, or as otherwise determined by the Engineer. Pipes shall be laid with the sockets leading uphill and wherever possible they shall be laid from the low end of the trench to the high end, on bedding as previously specified.

Where pipes pass through walls and foundations, they should be protected against differential movement by one of the following methods:-

(a) where the pipe passes through brickwork, by having a brick arch constructed clear of the pipe.

(b) by concrete lintols of appropriate length built into walls to allow clearance over the top of the pipe.

(c) by cast iron sleeves (pipes of the next larger stock diameter would fulfil this requirement).

(d) where cast iron pipes pass through concrete foundations, by wrapping the pipe with fibreglass quilting 30mm thick.

On completion, all drains shall be thoroughly cleaned out and tested as later described.

19/03/10 Vitrified Clay & Concrete Pipes

Each pipe should be tested for soundness before being used in the works by being rung with a hammer and those that do not ring true and clear shall be rejected, notwithstadning their having been inspected at the time of delivery. The flexible pipe joints shall be installed in accordance with the manufacturer's recommendations. On completion of a section of pipe track, a properly fitted plug shall be secured at the end of the last pipe laid and shall be removed only when pipe laying is recommenced.

19/03/11 Open Jointed Drains & Filter Drains

Agricultural tiles shall be laid with a space of 13mm between the ends of the tiles. The tiles shall be laid on the bottom of the trench and after laying shall be packed round as shown on the drawings with approved Type E stone filling. This stone filling shall be carried above the pipes to the thickness shown on the drawings.

Where tile drains pass near trees or through hedges appropriate lengths of close jointed glazed ware pipes shall be laid, as directed by the Engineer.

19/03/12 Junction Pipes

Junction pipes which are laid but not immediately connected shall be fitted with temporary earthenware stoppers or seals and the position of all such junctions shall be clearly defined by means of stakes or straining wires properly marked and labelled.

Where junction pipes are required on the drawings to be provided for further connections, the earthenware stoppers shall be mortared into the socket using the mortar used for pipe jointing and the location of these future junction pipes shall be accurately recorded on the record drawings.

19/03/13 Connections to Existing Sewer

Connection of new drains to existing sewers shall unless otherwise directed be carried out either at existing manholes or at new manholes constructed on an existing sewer. The works shall be carrried out to the entire satisfaction of the Engineer.

Unless otherwise directed, the specification for the workmanship involved in work to existing manholes or in constructing new manholes shall be as described in this specification under "Manholes". Great care must be taken in work associated with existing sewers not to allow any debris to enter the sewer, nor to create any obstruction which might interfere with the flow in the sewer. If making such an obstruction is unavoidable in carrying out the work, arrangements shall be agreed with the Engineers so as to maintain the flow by pumping, temporary piping, or other suitable means.

19/03/14 Testing Sewers

Close jointed drains up to and including 450mm diameter shall be tested for watertightness in suitable lengths (e.g. between manholes) after jointing is completed and before concreting or backfilling begins, by filling with water under a head of at least 1.2 metres at the highest point of the section under test for foul water sewers and not less than 1.0 metre for surface water sewers, and maintaining the head for not less than 30 minutes and not longer than one hour. The test shall be carried out by suitably plugging the low end of the drain and the ends of connections, if any, and filling the system with water, due provision being made to allow air to escape through any trap seals during filling. A bend should be temporarily jointed in at the higher end and a sufficient length of vertical pipes jointed to it so as to provide the required test head. Allowance shall be made for absorption by adding water until absorption ceases, after which the test proper shall commence. The test will be regarded as successful if the quantity of water added is not greater than 0.9 litres per hour in 30 lin metres per 25mm of diameter pipe. The pipes shall be thorougly examined during the test and any defective parts shall be cut out and made good after.which the test length shall be retested.

Drains found to be watertight and otherwise satisfactory will be passed as satisfactory but the water must be retained in the pipes until backfilling has been completed.

Wherever possible, no part of the drain under test shall be subjected to a head greater than 2.5 metres and on no account will a pressure of 6 metres be exceeded at any point.

As an alternative to the water test an air test may be used as follows:-

The length of sewer under test shall be effectively plugged and air pumped in by suitable means, e.g. a hand pump, until a pressure of 100 millimetres head of water is indicated in a U tube connected to the system. The air pressure shall not fall to less than 75 millimetres head of water during a period of 5 minutes without further pumping after a period for requisite stabilisation. Drains exceeding 450mm in diameter may be tested by means of a smoke test before they are covered up. Both ends of the length of drain to be tested shall be sealed to the satisfaction of the Engineer and smoke shall then be pumped into the section from an approved testing machine. Should any joint in the section show an escape of smoke the section shall be taken up and the pipes re-laid and re-tested until there is no further escape of smoke.

19/03/15 Backfilling of Trenches

If the Contractor allows material to become unsuitable which, when excavated was suitable for re-use, and it is unsuitable, when required for backfilling, he shall make good by running it to spoil and replacing with suitable material.

When required to meet the specification for testing pipelines, trenches shall be partially backfilled to provide anchorage, but joints shall be left exposed.

Backfilling shall wherever practicable be undertaken immediately the specified operations preceding it have been completed.

No backfill material shall be placed in trenches containing water.

In trenches in roads, verges and where directed in the Contract, above 300 millimetres over the crown of the pipe backfill material shall be deposited in layers each not exceeding 225 millimetres thickness and each compacted as specified in the Spectification for excavating and earthworks. Power rammers or vibrating plate compactors shall be used to compact the backfilling from one metre above the crown level of the pipe to the surface.

In trenches in fields or open country backfill material above 300 millimetres over the crown of the pipe may be placed by machine, provided the method of operation ensures that the material slides or rolls into position and does not drop from a height.

Sufficient space shall be left to receive the original thickness of soil, turf or other materials removed from the surface. The surfaces shall be restored by replacing the materials in their proper order and form, and by compacting them to such a level as will ensure that after settlement is complete the surface level of refilled trenches shall be within 30 millimetres of that of the adjacent undisturbed ground.

19/03/16 Underground Cables and Trenches

Before breaking ground the Contractor shall verify from the Authorities concerned the location of all existing electricity, water, gas and drainage services etc. The Contractor shall be held responsible for any fractures or breakages to these services while engaged on this work. The Contractor shall also verify what is or what will be final finished ground level in the area where cables will be laid.

Trenches shall be pegged off in as straight a line as is permissable to avoid all other services.

Trenches shall be excavated and cleared of all stones and metallic materials.

A layer of 75mm fine sand to be laid to form a bed for cables and tiles and a further 75mm layer laid on top of cable after installation.

After cables and tiles are installed a further 200mm layer of soft riddled soil shall be installed and the whole well beaten down. A pre-printed polythene strip is to be installed at this level before any heavy materials are infilled and this may be as the Hepworth Iron Co Ltd yellow heptape printed "Electrical Cable Below" 150mm wide or approved equal.

UNDER NO CIRCUMSTANCES SHALL ASHES OR CLINKER BE USED IN FILLING A TRENCH.

Trenches shall be fully restored to the top finish which existed prior to cables being laid. The Contractor must include for returning to site to make good any subsidence which may take place over the trench during his maintenance period and to restore the ground to its finished state as he then finds it.

Interlocking cable tiles of pattern and manufacture approved by the Engineer shall be used throughout. Each cable shall be separately protected with tiles with the exception of MICC/PVC cables where two cables may be covered by one tile.

150mm dia vitrified clay ducts with ceramic internal glazing and plastic sleeve joints shall be installed by the Contractor where cables pass under roadways, paths and ducts. Where pipes are laid under roadways they shall be encased in situ with 150mm minimum thickness of concrete.

All pipes whether supplied under the Contract or by others shall be sealed with non setting compound as Denomasto Plast or approved equal.

The FC ducts shall be as manufactured by the Hepworth Iron Company Limited or equal and approved.

Where cables are laid in open ground they shall be accurately marked with concrete cable markers spaced not more than 28 metres apart. The markers shall be approved by the Engineer and additional markers shall be supplied to indicate all changes of direction.

Where cables enter a building, a wall mounted marker measuring approximately, 200 x 200mm is to be supplied, if instructed and installed approximately 300mm above FGL and engraved "Electric Cable Entry".

19/03/17 Manholes

Manholes shall be constructed to the levels and in the positions indicated on the drawings or as otherwise directed by the Engineer, all in accordance with the provisions for conversion and brick and blockworks.

Excavations shall be taken out in such a manner as to avoid damage to surrounding structures and services and to ensure the safety of personnel, and, where necessary, support shall be provided to the sides of the excavation to the satisfaction of the Engineer. Any material excavated below the required level shall be replaced by mass concrete grade 10 at the Contractor's own expense unless such additional excavation is carried out at the Engineer's direction, when the cost of such make-up shall be reimbursed to the Contractor.

Where rock is encountered, it shall be cut out to a depth of 50mm below the underside of the manhole base slab and the formation to the base slab prepared in mass concrete grade 10. Rock shall be defined as in excavation for pipe trenches.

Excavations shall be kept free from water until concrete, brickwork and pipes are set and there is no danger from flotation. The Contractor shall provide such sumps as are necessary and also appropriate pumping equipment to comply with this requirement. The use of new drains for disposal of water shall be subject to the same requirements as in trench excavation.

Backfilling to manhole excavations shall be executed in layers in the same way as backfilling to pipe trenches and the reinstatement of existing road surfaces shall be dealt with in the same way as for pipe trenches.

Concrete in base slabs and roof slabs shall be grade 20 unless otherwise indicated on the drawings. Prior to placing concrete, the forms shall be accurately set and thoroughly cleaned out and the concrete shall be thoroughly consolidated to form a dense homogenous mass. It shall not be dropped through a height greater than 2.5 metres. Reinforcement where required shall be provided as shown on the drawings and with the specified cover.

The end of all pipes shall be neatly built into the wall of the manhole and finished flush with 3:1 sand/cement mortar. Where the diameter of the pipe is 225 or 300 a 110 brick ring shall be formed over the pipe for the full thickness of the brickwork. Where the diameter of the pipe is greater than 300 a 225 brick ring shall be used.

Brickwork shall be constructed in modified English bond using 3:1 sand/cement mortar. Care shall be taken to ensure that all joints are completely filled with mortar as the work proceeds. Internal faces shall be flush pointed. In dry weather bricks shall be thoroughly wetted and in frosty weather brick-laying will only be permitted provided appropriate agreed winter building measures are taken.

Where the depth of the invert in manholes exceeds 1 metre below cover level, manhole step irons as specified shall be provided at vertical intervals of 300mm with alternate steps in line vertically and 300mm apart horizontally.

The inverts in surface water and foul water drainage manholes shall be of channel form, the main channels up to and including 300mm diameter being glazed half round channel sections securely bedded in 3:1 sand/cement mortar. Channels over 300mm diameter shall be formed in the benching concrete.

In surface water and foul water drainage manholes side branches up to and including 150mm diameter shall be formed using three-quarter round channel branch bends, swept in the direction of flow and side branches over 130mm diameter shall be formed in the benching concrete following the same principles as for channel branch bends.

Benching shall be formed in mass concrete grade 20. In surface water and foul water drainage manholes the benching concrete shall rise vertically from the top of the channel or branch up to the level of the soffit of the outgoing pipe and then be sloped up to the walls of the chamber at a gradient of 1:12. Benching concrete shall be finished on all exposed surfaces with a coat of 3:1 granolithic concrete of 25mm thickness, trowelled to a smooth dense surface, as soon as possible after the benching has been formed.

Manhole covers shall be set to proper levels and shall be securely bedded and haunched in epoxy mortar.

On completion, each manhole shall be filled with water and shall be tested for water tightness for a period not less than ten minutes after all absorption has ceased.

19/03/18 Other Types of Chamber

Silt traps shall be constructed in Class B Engineering brickwork in modified English bond. Care shall be taken to ensure that all joints are completely filled with mortar as the work proceeds. Internal faces shall be flush pointed.

19/03/19 Road Gullies

Road gullies shall be set on a foundation of mass concrete grade 15 of 150mm nominal thickness, care being taken to set the outlet at the proper level and on the correct alignment. The gully shall then be surrounded to top of the pot with 150mm nominal thickness of concrete and engineering brickwork class 'B' built thereon for a minimum of two courses. The gully grating shall be bedded and haunched securely using epoxy mortar.

19/03/20 Testing Drainage Installation on Completion

When the drainage is complete, it shall be tested again, over the whole system, in order that all drainage shall have been tested twice. Tests unless otherwise ordered shall be by means of air. Should the drainage fail to withstand the tests it shall be taken up where directed and relaid and jointed at Contractor's expense. The Contractor shall be held responsible for any disturbance of the drains after they have been tested.

The Contractor shall provide all labour and apparatus for carrying out tests and shall test until satisfactory.

PART 4 MISCELLANEOUS

19/04/01 Corrugated Steel Buried Structures

Corrugated steel buried structures of internal span exceeding 900mm shall comply with this Clause.

All earthworks shall comply with the relevant section of these specifications.

19/04/02 Structural Components

Steel for the plates for bolted segmental structures shall comply with BS 1449: Part 1, Grade 3, Condition HR. Steel for helically wound structures shall be either hot-dip zinc coated steel sheet complying with BS 2989, Grade Z2, coating G600 or aluminium-coated steel sheet complying with AASHTO Specification No. M274-841. Structural steel for corrugated steel buried structures shall have a minimum yield strength of 193 N/mm² before the forming of the corrugations.

After forming, the depth of the corrugations shall be within a tolerance of ± 6% and the pitch of the corrugations within a tolerance of ± 4% of the nominal dimensions. Plates shall have a minimum lip of 45mm beyond each end crest. Cut edges shall be free from notches, gouges, rust or burrs.

19/04/03 Bolts & Nuts

Bolts and nuts for connecting plates shall comply with BS 3692, Grade designation 8.8 nominal size M20 or with BS 4395, nominal size M20, or with BS 3139, nominal diameter 3/4", with the exception that the bearing surfaces of both bolt heads and nuts shall be symmetrically shaped to suit the crown and the valley of the corrugations of the structure.

When all the plates have been assembled, the bolts shall be tightened by applying a torque of not less than 135 Nm or more than 270 Nm. The tightening shall be repeated if necessary to achieve the required torque.

19/04/04 Galvanising of Plates for Bolted Segmental Structures, Bolts and Nuts

Steel plate shall be galvanised in compliance with Section 1900 of the DOT Specification for Highway Works 1986, but with minimum thicknesses of galvanising complying with the following table.

Minimum Thickenss of Galvanising

Thickness of Section	Minimum Average Coating Weights for Each Developed Surface
Under 4.75 mm but not less than 2.7mm.	305g/m²
4.75 mm thick and over	460g/m²

Plates shall be galvanised after forming the corrugations and completing all necessary cutting punching and drilling.

Bolts and nuts shall be galvanised in compliance with section 1900 of the DOT Specification for Highway Works 1986.

Units in which the zinc coating has been burned by welding or otherwise damaged in fabrication, transport or handling at Site shall be made good in compliance with BS 729, Appendix D.

19/04/05 Bitumen Protective Coatings

Material for bitumen protective coating shall be either

(i) unfilled bitumen compound complying with BS 4147 Type 1, Grade B, with a minimum total thickness of 1.3mm applied at the factory, or

(ii) hot-dipped bituminous material complying with AASHTO Specification M190-80, with a minimum total thickness of 1.3mm applied at the factory.

Bitumen protective coatings shall be applied in two uniform coats. The first coat shall be allowed to dry thorougly before the second coat is applied.

Damage to protective coatings shall be made good to the satisfaction of the Engineer, with comparable cold applied bitumen.

19/04/06 Testing of Bitumen

Two sets of samples shall be taken by the Contractor from each consignment of any compound applied to the structure. One sample shall be taken when commencing the use of the consignment, the other on completion. These samples shall be tested in compliance with BS 4147 or AASHTO Specification M190-80 as appropriate.

19/04/07 Testing of Seam Strength of Longitudinal Bolted Joints

The Contractor shall submit for approval by the Engineer details of tests carried out on any particular bolt and plate thickness configuration using the following procedure.

(i) For each plate thickness tested, at least three representative sections of longitudinal seam shall be prepared from straight corrugated steel plates, each one containing at least four bolts per two corrugations. The bolts shall be torqued to a maximum value of 135 Nm. The sample shall include an even number of corrugations with a minimum of two.

(ii) Parallel flat plates shall be welded to the top and bottom of the sample normal to the plane of the corrugated plate to act as compression bearing surfaces. The length in the direction of loading of the sample shall be such that buckling does not occur. The plates shall be rectangular and extend everywhere at least 30mm from the corrugated plate.

(iii) A compression testing machine of suitable capacity and capable of applying the load at a uniform rate and maintaining it during slipping of the joint shall be use. It shall be equipped with two steel bearing platens which shall be at least as large as the sample, the upper platen having a cyllindrical or flat bearing surface. There shall be sufficient friction between the bearing surfaces to prevent any horizontal movement of the sample. Unless the machine can record both load and deflection, two dial guages reading accurately to 0.1mm shall be mounted between the platens on either side of the sample and opposite its centre.

(iv) The sample shall be placed in the machine so that the load is applied in the plane of the sample. It shall then be loaded in increments of 20 kN until failure. Alternatively, when the load can be applied automatically it shall be applied continuously such that the rate of change of strain shall not exceed 10,000 microstrain per minute and the load displacement record shall be recorded automatically.

(v) Unless the load has been applied automatically as described in (iv) above, a record of load and deflection shall be taken and plotted, the deflection being the average recorded by the two dial gauges.

(vi) The average ultimate strength obtained from the three specimens tested shall be taken as the nominal strength of the longitudinal seam for that particular thickness. Seam strengths may be obtained by interpolation of results of tests on plates not differing in thickness by more than 0.75mm

The nominal seam strength of the longitudinal bolted joints for 150mm x 50mm corrugations, as demonstrated by the tests, shall not be less than the values given in the following table.

Minimum Nominal Seam Strength of Longitudinal Bolted Joints for 150mm x 50mm Corrugations (kN/m of Seam)

Thickness of Metal (mm)	No of 20mm or 0.75 in bolts per Corrugation	Minimum Nominal Seam Strength
2.75	2	610
3.50	2	905
4.25	2	1180
4.75	2	1355
5.50	2	1635
6.25	2	1925
7.00	2	2100
7.00	3	2625
7.00	4	2830

The nominal seam strength of the longitudinal bolted joints for 200mm x 55mm corrugations, as demonstrated by the tests, shall be not less than the values given in the following table.

Minimum Nominal Seam Strength of Longitudinal Bolted Joints for 200mm x 55mm Corrugations (kN/m of Seam)

Thickness of Metal (mm)	No. of 20mm or 0.75 in bolts per Corrugation	Minimum Nominal Seam Strength
2.75	2	460
2.75	3	660
3.25	2	590
3.25	3	810
4.00	2	780
4.00	3	1045
4.75	2	975
4.75	3	1270
5.50	2	1190
5.50	3	1520
6.25	2	1410
6.25	3	1760
7.00	2	1630
7.00	3	2000
7.00	4	2350

SECTION 21 KERBS, FOOTWAYS AND PAVED AREAS

PART 1 — PRECAST CONCRETE KERBS, CHANNELS, EDGINGS AND QUADRANTS

21/01/01 Precast concrete kerbs, channels, edgings and quadrants shall be hydraulically pressed complying with the BS 7263. They shall be laid and bedded in a layer of 1:3 mortar not less than 10mm and not more than 40mm thick, on the concrete pavement or on a Grade C15 concrete foundation or on the roadbase. Alternatively they may be laid and bedded directly in a Grade C15 concrete foundation whilst it is still plastic. All precast units shall be backed with Grade C15 concrete.

21/01/02 Expansion joints shall be provided in kerbs, channels and backing which are laid on or adjacent to a concrete pavement to coincide with the pavement transverse contraction, warping and expansion joints. The joints shall be the same width as the joint sealing grooves of the pavement and shall be caulked and sealed as indicated on the drawings. Concrete foundations to kerbs and channels laid adjacent to a concrete pavement shall be provided with joint filler board as indicated on the drawings placed vertically through the full extent of the concrete foundation at positions coinciding with the pavement joints. At expansion joints in bridge decks, the kerb joints shall be as described in the Contract.

21/01/03 For curves of radius 12m or less, kerbs of appropriate radius shall be used.

21/01/04 Units of kerb, channel, edging quadrant shall not deviate by more than 3mm in 3m from line and level.

PART 2 — IN SITU ASHPHALT KERBS

21/02/01 The making and placing of in situ asphalt kerbs shall comply with the recommendations of BS 5931 and shall be laid by a machine approved by the Engineer.

21/02/02 Materials for in situ asphalt kerbs shall comply with BS 594: Part 1 Clauses 3 and 4. The mixed asphalt shall comply with BS 594: Part 1 Clause 7 Table 5 columns 19 or 20 or 21, or Table 6 columns 25 or 26.

21/02/03 Kerbs shall be laid to the lines and dimensions described in the Contract.

21/02/04 Vertical expansion and contraction joints shall be formed in kerbs laid on unreinforced concrete slabs and jointed reinforced concrete slabs to coincide with the pavement transverse expansion and contraction joints. All joints shall be sealed in compliance with the drawings.

PART 3 — IN SITU CONCRETE KERBS AND EDGE DETAILS

21/03/01 In situ concrete kerbs and edge details shall comply with the recommendations of BS 5931 and shall be laid by a machine approved by the Engineer. The kerbs shall be dense with regular sides, arrises and chamfers, finished to a fine surface free from blow holes and dragging and constructed to the lines and dimensions described in the Contract.

21/03/02 The concrete shall be C40 grade.

21/03/03 Kerbs and edge details shall be firmly secured to the surface on which they are laid. Kerbs and edge details laid on or adjacent to a concrete pavement shall be tied to the carriageway slab by tie bars as described in the Contract. Vertical expansion and contraction joints shall be formed in kerbs and edge details laid on or adjacent to unreinforced concrete slabs and jointed reinforced concrete slabs to coincide with the pavement transverse expansion, warping and contraction joints. Vertical expansion joints at 40m spacings and intermediate contraction joint at 5m spacing shall be formed in kerbs and edge details laid on or adjacent to other types of concrete and flexible pavement. All joints in kerbs and edge details shall be sealed in compliance with the drawings.

PART 4 FOOTWAYS AND PAVED AREAS (PRECAST CONCRETE FLAGS)

21/04/01 Precast concrete flags shall be hydraulically pressed complying with BS 7263.

21/04/02 Flags shall be laid to the required cross falls with a bond as described in the Contract and with joints at right angles to the kerb. Flags shall be bedded on a layer of mortar not less than 10mm and not more than 40mm thick. Mortar shall be 1:4 or 1:6 as described in the Contract. Where permitted by the Engineer as an alternative, flags 450mm x 450mm and smaller may be bedded on a layer of clean sharp sand complying with BS882 grading C or M 25mm ± 10mm thick.

21/04/03 The road base shall be graded road stone as detailed on the drawings. The sub base shall be Type 1 granular material.

21/04/04 On circular work where the radius is 12m or less all flags shall be radially cut on both edges to the required line.

PART 5 FOOTWAYS AND PAVED AREAS (FLEXIBLE SURFACING)

21/05/01 Flexible surfacing for footways and paved areas shall be made and laid in compliance with the appropriate British Standard for the type of material described in the Contract.

21/05/02 Surfacing shall be laid to the levels and crossfalls and be of the thickness described in the Contract.

21/05/03 Surfacing shall be laid on the road base and sub base, as shown on the drawings.

PART 6 FOOTWAYS AND PAVED AREAS (IN SITU CONCRETE)

21/06/01 In situ concrete for footways and paved areas shall be made laid and cured as required by the Contract. The grade of concrete and surface finish shall be as described in the Contract.

21/06/02 In situ concrete shall be laid to the levels and crossfalls and be of the thickness described in the Contract.

21/06/03 Surfacing shall be laid on the road base and sub base, as shown on the drawings.

PART 7 FOOTWAYS AND PAVED AREAS (CONCRETE BLOCK PAVING)

21/07/01 Precast concrete paving blocks shall be chamfered and shall comply with BS 6717 : Part 1 "Specification for Paving Blocks" and conform to the shapes, dimensions and colours described in the Contract.

21/07/02 Precast concrete paving blocks shall be laid in accordance with BS 6717 : Part 3 "Code of Practice for Laying".

21/07/03 Tolerances in surface levels shall comply with the following table:-

Layer of Pavement	Maximum Permissible Deviation from Design Level
Sublayer:	mm
Sub-base	±20
Road base	±15
Surface Course:	
Overall	± 6
Flatness	10 under a 3m straightedge 2 between adjacent blocks
Adjacent to gullies, surface drainage channels and outlets	+6, -0

21/07/04 Sand for laying course and jointing shall be naturally occurring sand or crushed rock fines graded in accordance with the following table (using sieves complying with BS 410):

Nominal aperture of sieve size	Percentage by mass passing through sieve	
	Laying Course Sand	Jointing Sand
10.00mm	100	100
5.00mm	90 - 100	100
2.36mm	75 - 100	95 - 100
1.18mm	55 - 90	90 - 100
600 microns	35 - 70	55 - 100
300 microns	8 - 35	15 - 50
150 microns	0 - 10	0 - 15
75 microns	0 - 3	0 - 3

Note: Sand should be graded by washing, decanting and dry sieving in accordance with BS 812 : Part 103.

21/07/05 The layout of blocks and details at edges, manholes, gullies and other openings shall be agreed with the Engineer prior to laying.

PART 8 FOOTWAYS AND PAVED AREAS (CLAY PAVERS)

21/08/01 Clay pavers shall comply with BS 6677 Part 1, Type PB with chamfers. The shape and dimension of clay pavers shall be as described in the Contract.

21/08/02 Clay pavers shall be laid in accordance with BS 6677 Part 3.

21/08/03 The layout of pavers and details at edges, manholes, gullies and other openings shall be agreed with the Engineer prior to laying.

SECTION 23 **ROAD PAVEMENTS : MINOR WORKS**

PART 1 GENERAL

23/01/01 BRITISH STANDARD SPECIFICATION

The recommendation of the relevant British Standard where referred to in this Specification shall be those listed in the British Standards Institution Catalogue (current edition at the date of Tender) applicable to the technical content of the works being described.

32/01/02 CODES OF PRACTICE

The recommendation of the relevant Code of Practice where referred to in this Specification shall be those listed in the British Standards Institution Catalogue (edition of the date of Tender) applicable to the technical content of the works being described.

23/01/03 SPECIFICATIONS

This Specification is to be read in conjunction with other McLay Collier & Partners Standard Specifications where appropriate to the works described.

23/01/04 CONTENTS AND SCOPE

This Specification refers to the construction of Road Pavements.

The recommendations of this Specification are "deemed to satisfy" various regulations and local byelaws. The requirement apply and fully satisfy the relevant Regulations and local Byelaws and shall inform the Engineer of any variations whatsoever so that the amendments as may be necessary will be cleared by the Engineer and actioned in advance of any construction.

23/01/05 DETAILS, DRAWINGS AND INSTRUCTIONS

All the works shall be carried out in accordance with the Drawings, Sketches, this Specification and Instructions which are issued to the Contractor by the Engineer at the start and during the course of the Contract.

Large scale details shall take precedence over small scale details. Scaling sizes from drawings shall not be permitted and in all cases figured dimensions shall be used.

The Contractor shall satisfy himself with all details before proceeding with the works and any inaccuracy shall be referred to and cleared with the Engineer.

23/01/06 DEFECTIVE WORK

Any materials or workmanship not conforming with this Specification shall be rejected and made good by the Contractor at his own expense to the Engineers satisfaction.

PART 2 GENERAL CONSTRUCTION

23/02/01 PAVEMENT CONSTRUCTION

Road pavements shall be constructed from one of the permitted options as specified on the Engineer's drawings and in compliance with this Series and the appropriate Clauses of Sections 03 and 04 of this Specifications.

23/02/02 HORIZONTAL ALIGNMENTS, SURFACE LEVELS AND SURFACE REGULARITY OF PAVEMENT COURSES.

(1) Horizontal alignments shall be determined from one edge of the pavement surface as described in the Contract. The edge of the pavement as constructed and all other parallel alignments shall be corrected within a tolerance of + or - 25mm therefrom, except for kerbs channel blocks and edge lines which shall be laid with a smooth alignment within a tolerance of + or - 13mm.

(2) The design surface levels of pavement courses shall be calculated from the vertical profile, crossfalls and the pavement course thicknesses as shown on the Engineer's drawings. The level of any point on the constructed surface of the pavement courses shall be the design level subject to the appropriate tolerances stated in Table 1.

TABLE 1: TOLERANCE IN SURFACE LEVELS OF PAVEMENT COURSES

Road surfaces	± 6mm
Basecourses	± 6mm
Upper roadbase in pavements without basecourse	± 8mm
Roadbase other than above	± 15mm
Sub-bases	+ 10mm - 30mm

(3) The combination of permitted tolerances in the levels of different pavement courses shall not result in a reduction in thickness of the pavement excluding the sub-base by more than 15mm from the specified thickness nor a reduction in the thickness of the bituminous wearing course by more than 5mm from that specified.

(4) If any tolerances or limits in the Clause are exceeded or the texture depth requirement is not achieved, the full extent of the area which does not comply with the Specification shall be made good and the surface of the pavement course shall be rectified to the satisfaction of the Engineer.

23/02/03 COLD WEATHER WORKING

(1) No road pavement material in a frozen condition shall be incorporated in the Works but it may be used if acceptable when thawed out.

(2) Material for use in road pavements shall not be laid on any surface which is frozen or covered with ice.

(3) Materials containing tar or bitumen binders, or mixtures thereof, shall not be laid if the temperature of the surface to be covered is at or below 2°C. Where however the surface is dry, unfrozen and free from ice, laying may proceed at air temperatures in the shade or at above 1°C on a rising thermometer.

(4) Additionally, unless the temperature of the surface to be covered is 5°C or more, rolled asphalt wearing course shall not be laid when the air temperature falls below 3°C.

23/02/04 USE OF SURFACE BY TRAFFIC AND CONSTRUCTION PLANT

(1) Plant used on pavements under construction shall be suitable in relation to the material, condition and thickness of the courses it traverses so that damage is not caused to the sub-grade or the pavement courses already constructed.

(2) The wheels or tracks of plant moving over the various pavement courses shall be kept free from deleterious materials.

(3) Where the Contractor proposes to use the sub-base for construction plant he shall improve the sub-base where necessary to accommodate the method of construction and the type of plant and vehicles which he proposes to use, in order to avoid damage to the sub-base, any capping and the subgrade. Any permanent thickness shall be across the whole width of the pavement, unless otherwise agreed by the Engineer. Temporary thickening shall not impede drainage of the sub-base or the subgrade.

23/02/05 GENERAL REQUIREMENTS FOR SUB-BASES AND ROADBASES

(1) The Contractor shall in his choice of permitted materials for sub-base and roadbase have regard to the nature of those materials and of the subgrade or any capping and the need to protect them for deterioration due to the ingress of water, the adverse effects of weather and the use of constructional plant. The Contractor shall programme the laying and compaction of the sub-base and the subsequent pavement courses and take such other steps as may be considered necessary, to afford protection to the roadbase, sub-base and subgrade.

(2) Subject to the tolerance given in Table 1, material used within 450mm of the designed final road surface shall not be frost susceptible as defined in the test method and procedure of the Transport and Road Research Laboratory Supplementary Report No.SR 829.

(3) Plant-mixed material shall when mixed be removed at once from the mixer, transported directly to the point where it is to be laid and protected from the weather both during transit from the mixer to the laying site and whilst awaiting tipping.

(4) All material shall be placed and spread evenly. Spreading shall be undertaken either concurrently with placing or without delay. Unbound and cement bound roadbase material shall be spread using a paving machine or a spreader box approved by the Engineer and operated with a mechanism which levels off the material to an even depth.

23/02/06 EXCAVATION TRIMMING AND REINSTATEMENT OF EXISTING SURFACES

(1) The Contractor shall not excavate pits, trenches or other openings in paved areas which have been constructed as part of the Permanent Works in order to construct other parts of the works, including Statutory Undertakers and other service works, except when such excavations are unavoidable and then only with the prior approval of the Engineer.

(2) Where such excavations are permitted and where excavations and trimming of existing paved areas and highways not constructed as part of the Permanent Works is required in the Contract, they shall be carried out and reinstated in compliance with the requirements specified on the Engineer's drawings. Excavations shall be carried out to the dimensions shown in the Contract, or, if not so described to the minimum dimensions necessary to carry out the work.

PART 3 UNBOUND MATERIAL

23/03/01 UNBOUND MATERIAL FOR SUB-BASE AND ROADBASES

(1) Unbound sub-bases and roadbases shall be made and constructed using materials described in the following Clauses. The permitted alternatives for each part of the Works shall be as specified by the Engineer.

(2) Slag for use in sub-base and roadbase materials shall comply with BS 1047 whether or not it is air cooled blast furnace slag. Materials other than slag when placed within 500mm of cement bound materials, concrete pavements concrete content not exceeding 1.0g of sulphate (expressed as SO3) per litre when tested in accordance with Test 10 of BS 1377 except that a 2:1 water to material ration shall be used for the test.

(3) Except where otherwise specified unbound material up to 225mm compacted thickness shall be spread in one layer so that after compaction the total thickness is as specified. Unbound material of compacted thickness greater than 225mm shall be laid in two or more layers and the minimum compacted thickness of any such layer shall be 110mm. Where the layers of unbound material are the unequal thickness the lowest layer shall be the thickest layer.

23/03/02 COMPACTION

(1) Compaction shall be completed as soon as possible after the material has been spread and in accordance with the requirements for the individual materials.

(2) Special care shall be taken to obtain full compaction in the vicinity of both longitudinal and transverse joints.

(3) Compaction of unbound materials shall be carried out by a method specified in table 5.

(4) The surface of any layer of material shall on completion of compaction and immediately before overlaying, be well-closed, free from movement under compaction plant and from ridges cracks, loose material, pot holes, ruts or other defects. All loose segregated or otherwise defective areas shall be removed to the full thickness of the layer, and new material laid and compacted.

23/03/03 GRANULAR SUB-BASE MATERIAL TYPE 1.

(1) Type 1 granular material shall be crushed rock. The material shall be well-graded, and lie within the grading envelope of Table 2.

(2) The material passing the 425μm BS sieve shall be non-plastic as defined by BS 1377 and tested in compliance therewith.

(3) The material shall be transported laid and compacted without drying out or segregation.

(4) The material sha2ll have a 10% fines value of 50kN or more when tested in compliance with BS 812 except that samples shall be tested in a saturated and surface dried condition. Prior to testing the selected test portions shall be soaked in water at room temperature for 24 hours without previously having been oven dried.

TABLE 2 SUB-BASE TYPE 1 RANGE OF GRADING

BS sieve size	Percentage by mass passing
75mm	100
37.5mm	85-100
10mm	40-70
5mm	25-45
600μm	8-22
75μm	0-1-

The particle size shall be determined by the washing and sieving method of BS 812 Part 103

23/03/04

GRANULAR SUB-BASE MATERIAL TYPE 2

(1) Type 2 granular material shall be natural sands, gravels, crushed rock. The material shall be well graded and lie within the grading envelope of Table 3.

TABLE 3. SUB-BASE TYPE 2 RANGE OF GRADING

BS sieve size	Percentage by mass passing
75mm	100
37.5mm	85-100
10mm	45-100
5mm	25-85
600μm	8-45
75μm	0-10

The particle size shall be determined by the washing and sieving method of BS 812 Part 103

(2) The material passing the 425μm BS sieve when tested in compliance with BS 1377 shall have a plasticity index of less than 6.

(3) The material shall satisfy the minimum CBR requirement specified by the Engineer when tested in accordance with BS 1377 Test 16, with surcharge discs. The material shall be tested at the density and moisture content likely to develop in equilibrium pavement conditions which shall be taken as being the density relating to a uniform air voids content of 5% and the optimum moisture content determined in compliance with BS 5835.

(4) The material shall be transported laid and compacted at a moisture content within the range 1% above to 2% below the optimum moisture content determined in compliance with BS 5835 and without drying out or segregation.

(5) The material shall have a 10% fines value of 50kN or more when tested in compliance with BS 812 except that the samples shall be tested in a saturated and surface dried condition. Prior to testing the selected test portions shall be soaked in water at room temperature for 24 hours without previously having been oven dried.

23/03/05

GRADED ROAD STONE

(1) Graded roadstone shall consist of stone supplied from a source approved by the Engineer. The grading shall conform to the undernoted table.

TABLE 4 GRADED ROADSTONE

BS sieve size	% by mass passing
75mm	100
37.5mm	30-60
10mm	0-25
2mm	0-10

(2) The material shall be laid without segregation of the various stone sizes in layers 100mm to 150mm thick, well rolled with a roller not less than 8,000Kg or the vibratory equivalent. Each layer shall be blinded with suitable graded crusher dust brushed into the interstices of the stones and thoroughly rolled to provide a surface to the Engineer's satisfaction.

PART 4

BITUMINOUS BOUND MATERIALS

23/04/01

COATED MACADAM ROADBASE AND SURFACING MATERIALS

(1) Coated macadam for roadbase, base course and wearing course shall comply with the requirements of BS 4987 Part 1, "Specification for constituent materials and for mixtures." The type and nominal size of the coated macadam, type and grade of binder, compacted thickness of course and any special requirements shall be as stated on the Engineer's drawings. Where any information to be given by the purchase, as listed in Appendix C1 of BS 4987 Part 1, is not stated on the Engineer's drawings, the choice of method and/or materials shall rest with the Contractor but will be subject to approval by the Engineer.

(2) Transportation, laying and compaction of coated macadam shall comply with the requirements of BS 4987 Part 2 "Specification for transport, laying and compaction."

23/04/02

HOT ROLLED ASPHALT ROADBASE AND SURFACING MATERIALS.

(1) Hot rolled asphalt for roadbase, base course and wearing course shall comply with the requirements of BS 549 Part 1 "Specification for constituent materials and asphalt mixtures." Wearing course mixtures shall be in accordance with BS 594 Part 1: Clause 7 - "Group 3 Wearing Course Recipe Mixtures." The use of wearing course design mixtures will not be permitted. The description ofcourse (s), thickness of layer, course aggregate content, binder type and grade, coated chippings and any additional relevant information shall be as stated on the Engineer's drawings. Where any information to be given by the purchaser, as listed in Appendix C1 of BS 594 Part 1, is not stated on the Engineer's drawings, the choice of materials shall rest with the Contractor but will be subject to approval by the Engineer.

(2) Transportation, laying and compaction of hot rolled asphalt shall comply with the requirements of BS 594 Part 2 "Specification for the transport, laying and compaction of rolled asphalt."

TABLE 5: COMPACTION REQUIREMENTS FOR GRANULAR MATERIALS TYPES 1 AND 2 AND WET-MIX MACADAM

Type of compaction plant	Category	Number of passes for layers not exceeding the following compacted thicknesses: 100mm	150mm	225mm
Smooth-Wheeled roller (or Vibratory roller operating without vibration)	Mass per metre width of roll			
	over 2700kg up to 5400kg	16	Unsuitable	Unsuitable
	Over 5400 kg	8	8	Unsuitable
Pneumatic-tyred roller	Mass per wheel:			
	Over 4000kg up to 6000kg	12	Unsuitable	Unsuitable
	Over 6000kg up to 8000kg	12	Unsuitable	Unsuitable
	Over 8000kg up to 12000kg	10	16	Unsuitable
	over 12000kg	8	12	Unsuitable
Vibratory roller	Mass per metre width of vibrating roll:			
	Over 700kg up to 1300kg	16	Unsuitable	Unsuitable
	Over 1300kg up to 1800kg	6	16	Unsuitable
	Over 2300kg up to 2900kg	4	6	10
	Over 2900kg up to 3600kg	3	5	9
	Over 3600kg up to 4300kg	3	5	8
	Over 4300kg up to 5000kg	2	4	7
	Over 5000kg	2	4	6
		2	3	5
Vibrating plate compactor	Mass per square metre of base plate:			
	Over 1400kg/m² up to 1800kg/m²	8	Unsuitable	Unsuitable
	Over 1800kg/m² up to 2100kg/m²	5	8	Unsuitable
	Over 2100kg/m²	3	6	10
Vibro-tamper	Mass:			
	Over 50kg up to 65kg	4	8	Unsuitable
	Over 64kg up to 75kg	3	6	10
	Over 75kg	2	4	8
Power rammer	Mass:			
	100kg - 500kg	5	8	Unsuitable
	Over 500kg	5	8	12

DEFINITIONS AND REQUIREMENTS ASSOCIATED WITH TABLE 5.

(1) Number of passes is the number of times that each point on the surface of the layer being compacted has been traversed by the compaction plant (or struck, in the case of power rammers).

(2) The number of passes required with each type of compactor is a function of the mass of the machine and the compaction. Plant in the above Table is listed in terms of its mass. The mass per metre width of roll is the total mass on the roll divided by the total roll width. Where a smooth-wheeled roller has more than one axle the machine will be assessed on the basis of the axle giving the highest value of mass per metre width.

(3) For pneumatic-tyred rollers mass per wheel is the total mass of the roller divided by the number of wheels. In assessing the number of passes of pneumatic-tyred rollers, the effective width shall be the sum of the widths of the individual wheel tracks together with the sum of the spacing between the wheel tracks, provided that each spacing does not exceed 230mm. When the spacing exceeds 230mm, the effective width shall be taken as the sum of the widths of the individual wheel tracks only.

(4) Vibrating rollers are self-propelled or towed smooth-wheeled rollers having means of applying mechanical vibration to one or more rolls.

(i) The requirements for vibrating rollers are based on the use of the lowest gear on a self-propelled machine with mechanical transmission and a speed of 1.5 - 2.5km/h. for a towed machine, or a self-propelled machine with hydrostatic transmission. If higher gears or speeds are used an increased number of passes shall be provided in proportion to the increase in speed of travel.

(ii) Where the mechanical vibration is applied to two rolls in tandem, the minimum number of passes shall be half the number given in the above table for the appropriate mass per metre width of one vibrating roll. If one roll differs in mass per metre width from the other, the number of passes shall be calculated as for the roll with the smallest value. Alternatively, the machine may be treated as having a single vibrating roll with a mass per metre width equal to that of the roll with the higher value or, if appropriate, each roll may be assumed to be attached to a separate machine and the requirements of Note (8) applied.

(iii) Vibrating type rollers operating without vibration will be classified as smooth-wheeled rollers.

(5) Vibrating plate compactors are machines having a base-plate to which is attached a source of vibration consisting of one or two eccentrically-weighted shafts.

(i) The mass per unit area of base-plate of a vibrating-plate compactor is calculated by dividing the total mass of the machine in its working conditions by the area in contact with, compacted soil.

(ii) Vibrating-plate compactors shall be operated at the frequency of vibration recommended by the manufacturer. They shall normally be operated at travelling speeds of less than 1km/h but if higher speeds are necessary, the number of passes shall be increased in proportion to the increase in speed of travel.

(6) Vibro-tampers are machines in which an engine driven reciprocating mechanism acts on a spring system, through which oscillations are set up in a base-plate.

(7) Power rammers are machines which are actuated by explosions in an internal combustion cylinder, each explosion being controlled manually by the operator.

(8) Combinations of different types of plant will be permitted, in which case the number of passes for each type shall be such proportion of the appropriate number in the above Table as will together produce the same total compactive effort as any type operated singly, in accordance with the under noted Table.

SECTION 24 TIMBER FRAME SUPERSTRUCTURE : PERFORMANCE SPECIFICATION

PART 1 INTRODUCTION

Note: The Timber Framed Superstructure as defined below and on the Contract Drawings, shall be the design and build responsibility of a specialist timber Contractor, who shall hereinafter be referred to as the "Timber Frame Contractor."

The foundations and other works not covered in the following shall be carried out by the Main Contractor, hereinafter referred to as the "Main Contractor" in accordance with the relevant Engineer's and Architect's drawings and specifications.

24/01/01 This Specification refers to the timber superstructure as indicated or implied on the drawings, prepared by the Architect and Engineer, and called for in this Specification. The foundation, drainage and other works essential to the final development, including internal finishes, will be designed and scheduled by the Architect and Engineer.

24/01/02 In order to establish an equitable and systematic basis for design, the assessment thereof and choice between offered solutions, the following Specification has been prepared which defines the user requirements.

24/01/03 In general the requirements have been set down as needs and related acceptance criteria. However in certain cases specific requiremets have been set down.

24/01/04 All designs and details submitted will be subject to the approval of the Architect and Engineer.

24/01/05 Should any design submitted require alterations to the foundations as detailed, these changes shall be scheduled by the Tenderer to allow relative costing to be carried out.

PART 2 GENERAL

24/02/01 The layout of the building, including internal sizes and accommodation provided are shown on the drawings.

24/02/02 The structure shall not intrude upon the specified spaces unless approved by the Architect.

24/02/03 The building shall have a useful life of not less than 60 years.

24/02/04 Satisfactory evidence (in the form of proposed supplementary specifications and/or proof of past performance) of the ability of any element to meet the required performance shall be made available to the Architect and the Engineer.

24/02/05 Where in the opinion of the Tenderers it is desirable to obtain agreement on specific solutions, prior to tender acceptance, then these should be submitted with the tender offer.

24/02/06 In all other cases Tenderers shall be deemed to have allowed in their offer for solutions which, in the opinion of the Architect and Engineer will satisfy the specified criteria.

24/02/07 The building shall be constructed in accordance with Section J2 of the current edition of the Building Standards (Scotland) Regulations to give a thermal performance standard equivalent to the following thermal transmission coefficients for individual elements.

Roofs - 0.25 W/m2/C
(excl. windows in roof)

Ground Floors & Walls - 0.45 W/m2/C
(excl. windows)

Thermal performance standards shall be calculated using co-efficients, factors and ratios as prescribed in the current Building Regulations.

24/02/08 The successful Tenderer shall detail and construct the entire superstructure of the works covered by this Specification in accordance with all statutory obligations and local bye-laws or regulations relating therto and in accordance with the best current practice and shall rectify all defects arising. He shall also submit the complete design data, including Supplementary Specifications, supportive calculations and detailed working drawings to the Architect and if required modify the details and Supplementary Specifications until accepted by the Architect before the relevant work is constructed and at no extra cost to the Contract. The Architect's or Engineer's acceptance of the details and/or Supplementary Specifications wholly or in part shall not relieve the contractor of this responsiblity under the Contract.

PART 3 STRUCTURAL TIMBER SPECIFICATION

24/03/01 All the British Standard Specifications Codes of Practice and relevant Publications referred to in this Specification are listed below and reference shall be made to the latest editions together with all current amendments and additions therto and any differences between the requirements of these and the requirements of specific B.S.C.P. or Publication referred to in the body of the Specification shall be submitted to the S.O. for his ruling.

BS 4471 1987 : Specification for Sizes of Sawn and Processed Softwoods.

BS 4978 1988 : Specification for Softwood Grades for Structural Use.

BS 5268 1988 : The Structural Use of Timber Part 2 Code of Practice for Permissible Stress Design Materials and Workmanship.

BS 5268 1985 : Part 3 Code of Practice for Trussed Rafter Roofs.

BS 5268 1978 : Part 4 Fire Resistance of Timber Structures. Section 4.1 Recommendations for Calculating Fire Resistance of Timber Members.

BS 5268 1989 : Part 5 Code of Practice for the Preservative Treatment of Structural Timber.

BS 5268 1988 : Part 6, Section 6.1 Code of Practice for Timber Frame Walls.

BS 5450 1977 (1984) : Specification for Sizes of Hardwoods and Methods of Measurement.

BS 5756 1980 (1985) : Specification for Tropical Hardwoods Graded for Structural Use.

BS 6399 1984 : Loading for Buildings Part 1 Code of Practice for Dead and Imposed Loads.

CP3 1972 : Chapter V : Part 2 : Wind Loads.

PART 4 CONTRACTOR DESIGNED TIMBER FRAMED STRUCTURES

24/04/01 General

The Contractor shall be responsible for the design, supply and erection of all integral structural elements of the timber frame structure inclusive of external wall panels, internal load bearing and non load bearing studs, roof trusses, insitu timber elements, lintels, connections, holding down straps etc. together with all necessary permanent and temporary stability bracing to provide a complete and stable timber frame structure. If the Contractor wishes, the plywood sarking may be used as a horizontal diaphragm to transfer wind loads to the shear walls. Alternatively, horizontal plywood diaphragms, positioned on top of the ceiling ties, may be used to transfer wind loads. If this option is chosen the Contractor shall ensure that the diaphragm does not foul duct routes/structure-free zones or chimney and hearth construction, which are shown on the Architect's drawings.

Where applicable, the first and ground floors shall be used as horizontal diaphragms for stability. The diaphragm action will either be achieved by T & G flooring or chipboard. Refer to the drawings for the required type of flooring at every location. The Timber Frame Contractor shall also be responsible for the design, supply and erection of all roof truss supports shown typically as beams and columns on the drawings. The structure shall be designed in accordance with the above British Standards Codes of Practice and TRADA Publications.

The components shall be factory produced by the Contractor and approved manufacturer and be of the exact form and layout shown on the Architect's drawings, particularly in respect of roof pitch, eaves and verge details.

Where the Contractor wishes to amend any specific aspect of the layout, sketch drawings of his proposals must be made available at the time of Tender.

24/04/02 Design Calculations & Drawings

The Timber Frame Contractor shall submit to the Architect and Engineer two copies of all design calculations, detail drawings and layouts for approval prior to the start of any pre-fabrication of the structure.

The following are the minimum requirements in respect of approval times by the Architect/Engineer:

Design Calculations: The Engineer shall require 2 weeks from the date of receipt of design calculations from the Contractor to initial comments in reply thereto. The Engineer shall thereafter require one week from receipt of revised calculations to final approval.

Shop/Fabrication Drawings: The Architect/Engineer shall require 2 weeks from the date of receipt of construction drawings to initial comments in reply there. The Architect/Engineer shall thereafter require 2 weeks minimum from receipt of revised construction drawings to final comment.

The foregoing is based on reasonable packages of information being submitted by the Contractor, which information must be submitted via the Main Contractor: direct liaison between sub-contractors and Architect/Engineer shall not be permitted, unless so required by the Architect/Engineer and all discussion confirmed in writing to the Main Contractor.

All submissions by the Contractor in respect of the above must be made through the Architect and all instructions/approvals etc, by the Engineer or Services Engineer will be made through the Architect. All correspondence between Architect and Timber Frame Contractor must be copied to Main Contractor for his information.

The Timber Frame Contractor must anticipate his requirements for other general information from the Architect/Engineer/Services Engineer and allow for a response time of at least two weeks. All requests for all information must be made through the Architect.

NOTE: The Main Contractor shall be deemed to have taken account of the foregoing in the preparation and monitoring ofl his programme for the works.

Notwithstanding any checking by the Architect/Services Engineer or the Engineer and/or the comment upon any calculations or of any shop drawings related to any matter, the Main Contractor shall be responsible for himself, any specialist sub-contractor or any supplier making good or correcting any error or omissions at his own cost.

The drawings and calculations prepared by the timber frame contractor/designer shall be particular to the contract. Unedited computer print-outs will not be acceptable.

24/04/03 Design Certificate

In addition to the above the Contractor shall submit to the Architect a design certificate signed by a Chartered Civil or Structural Engineer to the effect that the timber frame structure has been designed in accordance with the Specification.

24/04/04 Minimum Factors of Safety

Overturning of the structure, or any component of the structure. FOS to be 2.0.

Sliding of the structure, or any component of the structure. FOS to be 2.0 .

FOS against roof uplift to be 1.4

PART 5 PERFORMANCE SPECIFICATION

24/05/01 Loadings

Loadings used in the design calculations shall comply with the following:

Dead and Imposed Loads	BS 6399 Part 1, 3
Schedule of Weights of Building Materials	BS 648
Wind Loads	CP3 CH V Part 2

The wind loads requirements of CP 3 Chapter V Part 2 shall apply with the following factors:

Basic Windspeed	= 52 m/s
S1	= 1.1
S2	use Ground Roughness Category 2
S3	= 1.0
or	BS 6399 Part 2
Basic Windspeed	= 24.5mm/sec
Altitude	100mm (significant topography)
Location (whichever yeilds lesser results)	"Country", 2km from sea

The loadings utilised in the roof truss design inclusive of self weight, shall be not less than the following:

Rafter:	Dead Load on Plan	= 0.96 KN/m²
	Imposed Load on Plan	= 0.75 KN/m²
	Concentrated Imposed Load	= 0.9 KN as specified in BS 6399
Ceiling Ties:	Dead Load	= 0.26 KN/m²
	Imposed Load	= 0.25 KN/m²
	Concentrated Imposed Load	= 0.9 KN as specified in BS 6399

In addition to the above loads, the internal members of the trusses shall be designed to carry the isolated loads due to any water storage tanks as necessary.

First Floor:	Dead Load	= 1.5 kN/m²
	Imposed Load	= 1.5 kN/m²
	Concentrated Imposed Load	= 1.4 kN as specified in BS 6399

PART 6 PRODUCTS/MATERIALS

24/06/01 Timber/Timber Components

Plywood sheathing for roof sarking and structural wall sheathing shall comply with BS 5268 : Part 2 : 1984. The durability of the particular species selected shall be appropriate for the conditions of use.

24/06/02 SOFTWOOD for timber frame construction stress graded to BS 4978 or the National Grading Rules of the Canadian NLGA of the USA NGRDL.

Strength Class as BS 5268: Part 2, Table 8: SC4 (MINIMUM)

24/06/03 SOFTWOOD for infill roof timbers and bracing: stress graded to BS 4978 or the National Grading Rules of the Canadian NLGA or the USA NGRDL.

Strength Class (as BS 5268: Part 2) Table 8.

PRESERVATIVE TREATMENT for all structural timbers: to BS 5268: Part 5.

Preservative: applied after machining.

Application: Vacuum/pressure impregnated with Tanalith C preservative ADSR 4.0 kg/m3 by Hicksons Timber Impregnation GB Limited.

Provide a certificate of assurance that treatment has been carried out as specified.

Treatment is to be carried out by an approved processor.

PRESERVATION TREATMENT FOR CUT ENDS: all cut ends shall be liberally coated with a brush or spray applied coloured compatible preservative.

All fixings, connectors, plates, shoes etc. necessary to effect the installation shall be supplied by the manufacturer and will be deemed to be included in pricing for the works.

All metal plate timber fasteners for trussed rafters are to be designed and fabricated in accordance with Clause 16.4 of BS 5268: Part 3: 1985.

Where a single truss is indicated on the drawings the Contractor may utilise double or multiple trusses together, in lieu, should this be considered economic efficient or desirable for other reasons. The Contractor will be deemed to have carried out this assessment at tender stage and the price quoted for any single truss situation will be deemed to include for a double or multiple truss alternative.

The same principle shall apply where double or multiple trusses are indicated on the layout drawings and the Contractor wishes to utilise a greater or lesser number at any one situation.

Notwithstanding the provisions of BS 5268: Part 3 trusses in excess of a clear span of 7250mm and trusses described as "hip trusses" shall comprise of members having a minimum thickness of 47mm.

The Contractor's tender price shall be based upon the roof truss layouts and configurations shown on the tender drawings.

The Contractor may, in addition, submit an alternative layout and price with his tender provided that the proposals are compatible with the geometry and detailing of the building. Any approval granted will be on the strict understanding that there will be no cost increase on the tender price and that the proposals shall include for the cost of all other alterations associated with permanent bracings, horizontal binders, etc. etc.

The internal configuration of truss members shall be maintained along any run of trusses between external or party walls and shall only be modified in close proximity to the varying support conditions.

The internal configurations of truss members shall also be compatible with the roof access walkways and service duct routes (ie where indicated on the drawings, structural free zones must be provided).

24/06/03 SOFTWOOD for infill roof timbers and bracing: stress graded to BS 4978 or the National Grading Rules of the Canadian NLGA or the USA NGRDL.

Strength Class (as BS 5268: Part 2) Table 8.

24/06/04 Wane and Fissures

Wane shall not occur on top edges of the rafters nor the bottom edges of the ceiling tie, nor within the areas of any joints.

Fissures shall not occur within the area of metal plate fasteners.

24/06/05 Knots

Dead knots or knot holes shall not be permitted within the areas of metal plate fasteners.

Live knots are permitted within the plate areas provided that the nails or teeth can be satisfactorily embedded in the material of the knots. In addition, if the force on the fastener is acting towards the end or edge of the member, the distance between a knot and that end or edge shall not be less than the maximum dimension of the knot in the direction of the force.

24/06/06 Preservatives

The preservative treatment of timber shall be carried out strictly in accordance with the preservative manufacturers instructions and applied after machining in plants registered, licensed and inspected by them in the premises of the Timber Merchant. Timber wherever possible, shall be worked prior to treatment.

Surfaces which are exposed after treatment shall be retreated in accordance with the manufacturer's instructions. A certificate stating type and date of application shall be supplied with each delivery.

All structural timber shall be double vacuum impregnated with vacsol preservative, as manufactured by Hicksons Timber products Ltd to comply with treatment code HV1.

Where timbers are treated with preservative, this shall be deemed to include for sealing ends of all site-cut timbers with Vacsele end grain preservative liberally applied by brush. Alternative timber treatments will be considered subject to the Contractor furnishing full details to the Engineer for approval.

24/06/07 Sizes and Fittings

Timber less than 60 mm, in depth or 35 mm in thickness after processing or a 20% moisture content shall not be used for trussed rafter construction.

The minimum floor joist widths shall be 45 mm to enable adquate nailing of the T&G or chipboard flooring. All flooring is to be top nailed into the joists (i.e. direct fixing is required as opposed to secret fixing). Where it is necessary for T&G boards to butt, the connection shall be so detailed to ensure that all minimum spacings/edge distances are maintained.

Punched metal plate fasteners and metal plate gussets shall bear the manufacturer's identification mark. The manufacturer shall exercise adequate control to ensure a consistent standard of product as regards quality of steel, plate thickness and teeth profile as appropriate. No significant incipient cracks shall be permitted at teeth-plate junctions and teeth shall have an adequate degree of ductility at these points. Metal plates with a thickness less than 0.91 mm shall not be used for roof fasteners.

The material used for the fasteners shall be hot-dip galvanised plain steel sheet or coil to Class 2A of BS 2989. No changes shall be made in plate material, manufacture or design without re-assessing the joint characteristics.

The nails used with metal plate gussets and nailed plywood gussets shall also be protectively coated against corrosion by hot-dip galvanising, sherardising, parkerizing or similar treatment.

The adhesive used for plywood gussets shall be in accordance with BS 1204 : Part 1.

Steel timber connectors shall comply with BS 1579 : 1960.

All fixings, connectors, plates shoes etc. necessary to effect the installation shall be supplied by the manufacturer and will be deemed to be included in pricing for the works.

All metal plate timber fasteners for trussed rafters are to be designed and fabricated in accordance with Clause 16.4 of BS 5268 : Part 3 : 1985.

PART 7 TIMBER TRUSSED RAFTERS

24/07/01 General

The timber frame Contractor shall undertake the duties of both the "building designer" and the "trussed rafter designer" as defined in Clauses 17, 18 and 19 of BS 5268 : Part 3.

The general arrangement of the trussed rafter roofs shall be shown on the Architect's and Engineer's drawings. The location, size, height and roof pitch of the buildings carrying the trussed rafter roofs will be as shown on the Architect's drawings. The profiles, spans, location of supports and method of supports are shown on the Engineer's drawings. The make-up of roof coverings, ceilings and the like are shown on the Architect's drawings. The requirement for accesses, walkways, support to water tanks and other plant and equipment to be carried within or by the trussed rafter roof are shown on the Architect's drawings, and the trussed rafter design shall take account of these requirements in preparing his design.

24/07/02 Design

The trussed rafter designer shall design the trussed rafters in accordance with BS 5628 : Part 3. The design shall cover the whole area of trussed rafter roofs indicated on the Architect's general arrangement drawings as being covered by trussed rafters.

The loadings to be sustained by the trussed rafters shall as set out in BS 5268 : Part 3 Clause 15. Notwithstanding any information on the Architect's drawings as to location of water tanks in the roof space, all ceiling ties shall sustain water tank dead loads as described in Clause 15.1 of BS 5268 : Part 3, as a minimum requirement.

Imposed loads shall be as Clause 15.2 of BS 5268 : Part 3 together with any plant and equipment loads indicated on the Architect's drawings. Access should be made available to the roof space, even if no specific access arrangements are shown on the Architect's drawings.

The design wind speed used in calculating wind loads shall be based on the basic wind speed for the site as derived from CP3 : Chapter V : Part 2 : 1972, modified by factors S1, S2 and S3 appropriate to the site and the building, for Class B structures.

24/07/03 Drawings and Calculations

The trussed rafter designer shall provide general arrangement drawings for each type of trussed rafter and for the arrangement of all the trussed rafters required to cover the whole area of trussed rafter roofs indicated on the Architect's drawings.

The trussed rafter designer shall prepare full design calculations to support his general arrangement drawings. The general arrangement drawings and the calculations will "inter alia" provide full information on the finished sizes, species, stress grades or strength classes of all members : the loads in the members and the type of joints to be used : the loadings and other conditions for which the trussed rafters are designed : the basis of the design : the positions and sizes of all bearings, together with the range of reactions to be accommodated at the support positions including those required to resist wind uplift forces; the spacing of the trussed rafters, including any special arrangements to accommodate chimneys, openings, changes of direction and the like : the positions, fixings and sizes of any lateral supports necessary to prevent buckling of compression members; the method of support for tanks and other equipment shown on the Architect's drawings as requiring to be supported by the trussed rafter roofs : and any special precautions to be observed in handling and erection.

PART 7 TIMBER TRUSSED RAFTERS - Revised July 1997

24/07/01 General

The timber frame Contractor shall undertake the duties of both the "building designer" and the "trussed rafter designer" as defined in Clauses 17, 18 and 19 of BS 5268 : Part 3.

The location, size, height and roof pitch of the buildings carrying the trussed rafter roofs will be as shown on the Architect's drawings. The make-up of roof coverings, ceilings and the like are shown on the Architect's drawings. The requirement for accesses, walkways, support to water tanks and other plant and equipment to be carried within or by the trussed rafter roof are shown on the Architect's drawings, and the trussed rafter design shall take account of these requirements in preparing his design.

24/07/02 Design

The trussed rafter designer shall design the trussed rafters in accordance with BS 5628 : Part 3. The design shall cover the whole area of trussed rafter roofs indicated on the Architect's general arrangement drawings as being covered by trussed rafters.

The loadings to be sustained by the trussed rafters shall as set out in BS 5268 : Part 3 Clause 15. Notwithstanding any information on the Architect's drawings as to location of water tanks in the roof space, all ceiling ties shall sustain water tank dead loads as described in Clause 15.1 of BS 5268 : Part 3, as a minimum requirement.

Imposed loads shall be as Clause 15.2 of BS 5268 : Part 3 together with any plant and equipment loads indicated on the Architect's drawings. Access should be made available to the roof space, even if no specific access arrangements are shown on the Architect's drawings.

The design wind speed used in calculating wind loads shall be based on the basic wind speed for the site as derived from CP3 : Chapter V : Part 2 : 1972, modified by factors S1, S2 and S3 appropriate to the site and the building, for Class B structures.

24/07/03 Drawings and Calculations

The trussed rafter designer shall provide general arrangement drawings for each type of trussed rafter and for the arrangement of all the trussed rafters required to cover the whole area of trussed rafter roofs indicated on the Architect's drawings.

The trussed rafter designer shall prepare full design calculations to support his general arrangement drawings. The general arrangement drawings and the calculations will "inter alia" provide full information on the finished sizes, species, stress grades or strength classes of all members : the loads in the members and the type of joints to be used : the loadings and other conditions for which the trussed rafters are designed : the basis of the design : the positions and sizes of all bearings, together with the range of reactions to be accommodated at the support positions including those required to resist wind uplift forces; the spacing of the trussed rafters, including any special arrangements to accommodate chimneys, openings, changes of direction and the like : the positions, fixings and sizes of any lateral supports necessary to prevent buckling of compression members; the method of support for tanks and other equipment shown on the Architect's drawings as requiring to be supported by the trussed rafter roofs : and any special precautions to be observed in handling and erection.

The drawing and calculations prepared by the trussed rafter designer shall be particular to the Contract. Unedited computer print outs will not be acceptable. The drawings and calculations shall be submitted to the Architect and Engineer for approval, which approval is required to ensure the adequacy of the trussed rafter roof structure and its compatibility with the remainder of the works.

The trussed rafter designer shall prepare for the Engineer's approval such further shop drawings and detail calculations as will be required for fabrication, detailing "inner alia" the type, sizes and positions of all jointing devices with tolerances or the number of effective teeth or nails metal plates and bolts and the like required in each member at each joint.

Notwithstanding any approvals given by the Architect of Engineer, the trussed rafter designer shall be responsible for the correctness and completeness of his drawings and calculations.

NB : The above four paragraphs should be read in conjunction with Clause 4.2.

24/07/04 Fabrication : General

Fabrication shall be approved in accordance with the design specification and approved drawings and no departures by way of reductions shall be permitted with regard to truss dimensions, member sizes and joint details outside the tolerances given in BS 5268. The species and stress grade of timber shall also be in accordance with the design specification and drawings.

24/07/05 Inspections

The Architect and Engineer and their authorised representative shall have access at all reasonable times to all places where the work is being carried out and shall be provided by the Contractor with all the necessary facilities for inspection during fabrication.

24/07/06 Dimensions

The minimum finished dimensions for the category of timber specified when measured at a moisture content of 20% should be in accordance with BS 4471. All timber members should have uniformity in thickness and depth of + or - 0.5 mm on the specified dimensions and in abutting pieces, differences in thickness in excess of 1 mm shall not permitted for metal plate and nailed plywood gussets and 0.5 mm for glued plywood gussets. In all timber members the following distortion limits should not be exceeded.

Spring	5 mm per linear m.
Twist	1 mm per 25 mm width per 3 lm.
Bow	10 mm per 3 lm.
Cup	2 mm per 100 mm width of face

24/07/07 Assembly

Assembly shall follow the standard procedure using the tables, presses, etc., associated with the particular joining device.

All members should be square cut or bevelled to ensure firm contact at the abutting surfaces of the joints and should be accurately cross-cut to length with a tolerance at + or - 1.5 mm.

Within each specified design the horizontal and vertical dimensions shall not deviate in each batch by more that + or - 6 mm on spans up to and + or - 9 mm on spans greater than 7.5 m and + or - 12 mm on spans in excess of 12 m.

All joint plates shall be of a least the size specified and shall be located to ensure that the correct number of effective nails, teeth or burst as required by the design are embedded in each member. The edges of all plates shall not project beyond the upper and lower edges of the rafter and ceiling tie members respectively.

Spliced end joints may be used in ceiling ties and rafters but the splice plates shall not project beyond the edges of the members.

Spliced end joints in ceiling ties should be positioned so that their centres are not more than 0.3 nor less than 0.15 of the span between adjacent node points, unless otherwise specified on the design drawings.

Spliced end joints in rafters should be positioned so that their centres are not more than 0.3 nor less than 0.15 the span of the rafter between node points from the rafter/strut node point, unless otherwise specified on the design drawings.

24/07/08 Hoisting and Fixing

The Contractor shall be responsible for the hoisting and fixing of the trussed rafters which shall include for all lateral bracing and framing members and the prices in the Bills shall be deemed to include for all craneage.

The Contractor shall determine any temporary bracing that is required to maintain the trussed rafters in position until such time as the permanent bracing is in position. Such temporary bracing shall be provided by the Contractor and shall be deemed to be included in the prices of the Bills.

PART 8 TIMBER FRAMED WALLS

24/08/01 External Walls

250mm thick cavity wall, with timber framed inner leaf as follows:

Components designed, supplied and erected by Timber Frame Contractor:

Vertical timber studs with noggings (minimum depth of studs to be 89 mm, maximum depth of studs to be 100mm, maximum centres to be 600mm). External quality Douglas Fir plywood sheathing to outer face (minimum thickness 9.5mm, maximum thickness 12.5mm). Corovin 100 breather membrane to outer face of plywood sheathing.

Components supplied and erected by Main Contractor:

All components shown on the Architect's drawings, excluding these provided by the Timber Frame Contractor, but including the following:-

100mm flexible insulation between studs. 12.5mm thick taper edged plasterboard on 1000 gauge visqueen vapour barrier to inner face of panel.

24/08/02 Internal Walls

Internal load bearing and non-loadbearing walls as follows:

Components designed, supplied and erected by Timber Frame Contractor

Vertical timber studs with noggings (minimum depth of studs to be 89 mm, maximum depth of studs to be 100mm, maximum centres to be 600mm) Douglas Fir plywood sheathing to be provided, if required structurally (minimum thickness 9.5mm, maximum thickness 12.5mm)

Components supplied and erected by Main Contractor

All components shown on the Architect's drawings, excluding those provided by the Timber Frame Contractor, but including the following:-

12.5mm thick taper edge plasterboard, both sides of wall and 100mm flexible insulation between vertical studs.

PART 9 FASTENING/ADHESIVES

24/09/01

NAILS: to BS 1202
Material/finish: Mild Steel

WOOD SCREWS: to BS 1210
Material/finish: Mild Steel

COACH SCREWS:
Finish: Black

BLACK BOLTS, SCREW AND NUTS: to BS 4190
Finish (applied by manufacturer): black

BLACK CUP COUNTERSUNK HEAD BOLTS, SCREWS AND NUTS: to BS4933 Finish (applied by manufacturer): black

INDENTED BOLTS AND NUTS:
Finish (applied by manufacturer): black

WASHERS: to BS 4320
Finish: Black

EXPANDING BOLTS AND NUTS:
Manufacturer and reference: Hilti type PHB

JOIST HANGERS: pressed or seam welded mild steel
Size: Varies
Gauge: Varies
Finish: Galvanised
Manufacturer and reference BAT & SPW and speedy hangers.

FRAMING ANCHORS: pressed or seam welded mild steel
Size: 38mm
Gauge: 2mm
Finish: Galvanised
Manufacturer and reference: BAT Truss Clips.

TIE-DOWN STRAPS FOR ROOF: Mild Steel
Size: To be determined by Contractor
Gauge: 3mm
Finish: Galvanised
Manufacturer and reference: Hydro Air with twist bent into wall coursing.

TIE-DOWN STRAPS FOR EXTERNAL WALLS: Mild Steel
Size: To be determined by Contractor
Gauge: 3mm
Finish: Galvanised
Manufacturer: BAT

MILD STEEL CONNECTORS FOR TIMBER: to BS 1579
Type 50mm square and tooth plate connectors
Manufacturer and reference: BAT

BRACING CLIPS:
Gauge: 1.2mm
Finish: Galvanised
Manufacturer: Hydro-Air

TRUSS CLIPS:
Size: to suit
Gauge: 1.2mm
Finish: Galvanised
Manufacturer: Hydro-Air

PART 10 WORKMANSHIP

24/10/01 General/Design Co-ordination

CO-ORDINATION: The Contractor must:

(1) Liaise with the Architect and others as necessary to help ensure co-ordination of the work with related building elements and services.

(2) Provide co-ordination/fabrication/installation drawings and other information showing such details of the work as the Architect may reasonably require.

(3) Submit sufficient copies of drawings including 2 copies each for the Architect & Engineerfor checking.

(4) Make necessary amendments in accordance with any comments of the Architect and Engineer and re-submit unless Architect confirms that this is not necessary.

(5) Submit sufficient copies of final version of the information, including 4 copies for the Architect for distribution to all affected parties.

DESIGN: The Contractor must prepare all design details in accordance with BS 5268: Part 2, allowing for all loading requirements. Drawings must show:

(1) Geometry for structure
(2) Timber species, sizes and grades

QUALITY OF WORK: machine and accurately assemble all structural timber to BS 5268: Part 2. Use proprietary products to manufacturer's recommendations.

PRESERVATIVE TREATMENT: liberally apply the preservative to all new surfaces exposed by minor cutting.

MOISTURE CONTENT of timber to be not more than 20 ± 2% at time of fabrication and erection, and maintained until completion within 5% of the expected equilibrium moisture content of the building in use.

24/10/02 Fabrication

DIMENSIONS OF TIMBER SECTIONS, unless otherwise stated, are basic (nominal) sizes. When planed (wrot) timber is specified reduction to finished sizes to be BS 4471: Parts 1 and 2 for softwood and BS 5450 for hardwood.

24/10/04 Cutting for Services

(1) Cutting of structural timbers for services is not permitted unless shown on the drawings and alternative framing provided.

(2) It may be permitted to hole or notch some minor joists in particular locations and these should be referred to the Architect for agreement prior to work proceeding.

(3) Notching, where previously agreed, should be of minimum sizes to accomodate the services.

(4) Notches and holes must not be so positioned in a member that the remainder of the cross section contains a knot or other defect which would significantly affect its strength.

(5) Notches in joists to be at the top, located between 0.1 and 0.25 of the span from the support and not deeper than 0.125 x depth of joist.

(6) Holes in joists to be through the neutral axis, with diameters not more than 0.25 x depth of joist and not less than 3 diameters apart.

Any timber work notched, holed or cut without the Architect's prior approval shall be replaced at the Contractor's expense to the Architet's satisfaction.

FIXING OF WALL SOLE PLATE TO CONCRETE SLAB: sole plate to be fixed down with minimum 8 dia. bolts at not more than 600mm centres as designed by Timber Frame Contractor).

24/10/05 Inspection/Testing

SITE SUPERVISION: the Timber Frame Contractor/Designer must provide qualified site supervisory staff to ensure that the design and details are satisfactorily completed on site. The Architect and the Engineer shall be informed by the Contractor, in writing, when the aforesaid details are complete.

INSPECTION: give Architect reasonable opportunity to inspect structural timberwork before covering up.

BOLTED JOINTS: tighten all bolts after erection so that washers just bite the surface of the timber. Inspect at the end of the Defects Liability Period and tighten if necessary.

TRUSSED RAFTERS AND WALL PANELS: carefully inspect each truss and wall panel to ensure compliance with shop drawings and specification, including:

(1) Grades and sizes of timber.

(2) Types, sizes and timber.

(3) Gaps between ends of timber at joints.

(4) Full penetration of nails.

TRUSSED RAFTERS: carefully inspect each truss before erection and before finally fixing in place for any signs of cracking, splitting, distortion or distress. Do not use any damaged truss; lay aside and obtain a replacement.

24/10/06 Timber Battens/Non Structural Framing

To be read in conjunction with Preliminaries and General Conditions.

SEPARATE NAIL TYPE FASTENERS: fix plates so that they do not project beyond edges of timber sections.

END JOINTS: do not use without approval.

WALL FRAMING: Fix each butt joint with at least 2 nails, end nailing where possible otherwise skew nailing.

PLYWOOD SHEATHING: fixed to framing around board edges and to intermediate studs as detailed by Timber Frame Contractor. Vertical sheathing joints are to be made on intermediate studs. Horizontal sheathing joints are to be made where noggings occur.

VAPOUR BARRIER: Visqueen applied by tacking to the studs with 100mm laps occuring vertically over studs.

24/10/03 Protection/Erection/Fixing

PAINTED FINISHES: Structural timber to receive clear finishes to be kept clean, and first coat to be applied before delivery to site.

HANDLING: do not overstress, distort or disfigure sections or components during transit, storage, lifting, erection or fixing.

MOISTURE CONTENT: store timber and components under cover, clear of the ground and with good ventilation. Arrange sequence of construction, and to cover timber as necessary during and after erection to ensure that specified moisture content is not exceeded.

ACCURACY: unless specified otherwise erect structural timber to levels of accuracy so that in relation to BS 5606, Tables 2 and 3:

(1) All achieved dimensions fall within the permissable deviations, and
(2) Approximately two thirds of achieved dimensions fall within one third of the permissable deviations.

TEMPORARY BRACING: provide as necessary to maintain structural timber components in position and to ensure complete stability during construction.

WALL PLATES: ensure that wall plates are positioned and aligned to give the correct span and level.

HANGERS/ANCHORS: fix to timber with 30 x 3mm sherardized square twisted nails or other approved fastenings in each hole.

STRAPS GENERALLY: fix to timber sections/components and brick/blockwork with the type and number of fixings recommended by the strap manufacturer.

TIE-DOWN STRAPS FOR ROOF: fix to wall plates at not more than 1800mm centres.

TIE-DOWN STRAPS FOR EXTERNAL WALLS: fix to vertical studs at not more than 1800mm centres, with twist bent under bottom course of brickwork.

Materials

TIMBER: unless specified otherwise, sawn softwood, free from decay, insect attack, except pinhole borers, and with no knots wider than half the width of the section. Tolerances on specified sizes: +3mm, - 0.5mm.

PRESERVATIVE TREATMENT for all external framing/battens, all timber stud walls, all dwangs to walls/ceilings flanking roof spaces, all grounds in contact with external walls:

Preservative: applied after machining and as specified in paragraph 24/06/08.

NAILS AND SCREWS: to relevant British Standard. Lengths:

(1) Nails to be not less than 12mm or 2 1/2 times thickness of member through which nails are being driven, whichever is the greater.

(2) Screws to be not less than 12mm or twice thickness of member through which screws are being driven, whichever is the greater.

(3) Regardless of the specified minimum length, fastenings to be not longer than total thickness of members being joined less 5mm.

Workmanship

PRESERVATIVE TREATMENT: liberally apply the preservative to all new surfaces exposed by cutting.

MOISTURE CONTENT: of timber: not more than 22% at time of fixing, thereafter maintained within 5% of the expected equilibrium moisture content of the building in use.

SPACING: where no dimensions are specified or shown on drawings, space battens, fillets, grounds, studs, etc., in accordance with the recommendations of the manufacturer of the sheets and/or sections being fixed.

ADDITIONAL SUPPORTS: where not shown on drawings, position and fix additional support for appliances, fixtures, edges of sheets, etc., in accordance with manufacturers' recommendations.

FIXING GENERALLY: securely fix sections together and to substrates using jointing methods and types and spacings of fastenings suited to the:

(1) Nature of substrate.

(2) Materials and loads to be supported.

(3) Conditions expected in use.

STUD PARTITIONS: cut sections accurately so that they fit together tightly but without distortion. Fix each joint with at least 2 nails.

SECTION 26 PERFORMANCE SPECIFICATION FOR COMPOSITE FLOOR SLABS OF CONCRETE AND PROFILED METAL DECK.

Note: Throughout this specification, the Contractor shall be held to be the profiled metal deck manufacturer unless the manufacturer of the decking is the subject of a nominated supply contract, in which case the nominated supplier shall be regarded as the metal deck manufacturer.

PART 1 GENERAL

26/01/01 Scope

This specification covers the design, manufacture and construction of composite floor slabs consisting of in-situ concrete and profiled metal decking.

PART 2 DESIGN

26/02/01 Scope of Design

The Contractor shall design the concrete floor slabs consisting of insitu concrete and profiled metal decking in accordance with BS 5950 : Part 4 : 1982 "Code of Practice for design of floors with profiled steel sheeting."

The general arrangement of the composite floor slabs shall be as shown on the Architect's and Engineer's drawings.

The Contractor shall include in his design, detail and construction for all holes indicated on the Architect's and Engineer's drawings.

The Contractor shall take full account of the support arrangements indicated on the Engineer's drawings.

26/02/02 Performance Criterion

i) The steel sheet profile shall be suitable to achieve composite action with the concrete slab; enforcements in the profile of 2 mm minimum projection, profile not less than 50 mm deep; generally as the generic profile indicated on the Engineer's drawings.

ii) The overall thickness of the concrete composite slab shall be as indicated on the Engineer's drawings.

iii) The decking shall be so designed to perform without temporary support during the wet concrete stage of spans up to 3000 mm.

iv) The decking shall be so designed as to support the wet load of concrete slab plus construction load of 1.5 kN/m² or live load of 2.0 kN/m² whichever is more critical.

v) The decking shall be so designed as to deflect no more than span/180 at the construction stage.

vi) The composite slab shall support the loads shown on the Engineer's drawings and blockwork walls as located on the Architect's drawings.

vii) The completed composite slab shall support the unfactored imposed load with a deflection of not more than span/360.

viii) The insitu concrete shall be no less than strength Grade C30.

ix) The completed composite slab shall have a fire resistance of not less than one hour.

26/02/03 Design Submission

Prior to preparing and submitting design calculations and arrangement and detail drawings, the Contractor shall submit details of his proposed profiled metal deck manufacturer and supplier to the Architect for approval.

On receipt of approval of the proposed manufacturer/supplier, the Contractor shall prepare and submit full general arrangement and detail drawings for all areas of the floor slab together with full calculations before materials are ordered. The drawings and calculations shall include long term deflection calculations. Unedited computer printout will not be accepted. The Contractor's drawings should also clearly indicate any temporary works needed to maintain stability during construction.

The Contractor shall allow reasonable times in his programme for approval by the Architect and Enginer of all drawings and calculations submitted. Ordering of the flooring materials shall not begin until approval has been obtained from the Architect and Engineer.

Notwithstanding any approvals given by the Architect or Engineer, the Contractor shall be responsible for the correctness and completeness of his drawings and calculations.

26/02/04 Design Alterations

The Contractor is at liberty to propose modifications to the general arrangement or details indicated on the Engineer's drawings in order to utilise to best advantage his expertise. The Engineer however reserves the right not to adopt such proposed modifications if in his opinion the overall requirements of the design are not achieved and no additional expense will fall on the Employer in the event of the proposed modifications not being adopted.

Similarily, should the Contractor consider that a more economic slab design can be achieved by altering the generic profile then he should submit details of any proposed changes and savings with his tender.

PART 3 MATERIALS

26/03/01 General

All materials used shall be in accordance with BS 5950 : Part 4 : 1982 "Code of Practice for design of floors with profiled steel sheeting."

26/03/02 Concrete

All concrete shall be in accordance with the separate concrete specification.

26/03/03 Profiled Metal Decking

The profiled metal decking shall be manufactured from hot dip zinc coated steel Grade Z28 to BS 2989. The bare metal thickness should be not less than 0.75 mm nor greater than 2.5 mm.

The zinc coating shall be in compliance with BS 2989 with a minimum coating of 275 g/m² and be chemically passivated with a chromate treatment.

26/03/04 Reinforcement

All reinforcement shall be in accordance with the separate reinforcement specification.

26/03/05 Accessories

i) Fixing Devices : The profiled metal decking shall be secured to the steel frame with fixings as recommended by the metal decking manufacturer.

ii) Steel Formwork to Edges of Concrete Slabs : Purpose made formwork to edges of concrete slabs shall be manufactured from cold formed hot dip zinc coated steel grade Z28 to BS 2989, shall be a minimum of 1.2mm thick and shall have a minimum zinc coating of 275 g/m².

iii) Edge Trim Restraint Straps: Shall be of hot dip zinc coated steel and be placed as recommended by the metal decking manufacturer.

26/03/6 Shear Stud Connectors

Shear stud connectors shall be installed at locations shown on the Engineer's drawings by through deck welding, in general accordance with BS 5400: Part5.

Shear studs shall be of length and diameter shown on the Engineer's drawing and be manufactured from steel of a minimum ultimate tensile strength of 450 N/mm² and an elongation (on a gauge length of 5.65 x the square root of So as given in BS 18) equal to 15%.

26/03/07 Shear Stud Weld Testing

i) Trial Test Studs/Welding: At the start of each working shift and at any change of operator or equipment, every stud shall be tested by bending through thirty degrees until two successive studs have demonstrated a full 360 degree flash and the weld shows no sign of cracking.

ii) Production Test: The following studs shall be tested by bending through fifteen degrees and shall show no visible signs of cracking:-
   a) all studs not showing full fusion or 360 degree flash-bend so that the area of no flash is subject to tension.
   b) 2% of all remaining studs as selected by the Engineer. Where some or all of the percentage tested are indadequate a further two percent shall be selected and tested.
   c) any other studs when directed by the Engineer

PART 4 ERECTION

26/04/01 Storage

Metal decking sheets shall be stored flat on an even surface, raised above ground level and protected from the weather. Stored sheets shall be inspected regularly to ensure moisture has not penetrated the stack.

26/04/02 Handling

Metal decking sheets shall not be dragged along the ground. Care shall be taken not to distort sheets when lifting. Ropes shall be used for hoisting.

Edges shall be protected from damage.

26/04/03 Erection Preparation

Prior to laying and fixing, decking shall be cleaned and the top flanges of the steel beams shall be cleaned, degreased and dried, thus removing all paint, oil, grease, rust, or any other contaminant.

26/04/04 Fixing Sequence

Metal decking shall be progressively fixed as laid. Care should be taken to ensure that progressive creep between adjacent sheets is avoided and that abutting profiles line through.

Decking shall be true to level without gaps.

26/04/05 Orientation

Unless shown otherwise on the Engineer's drawings, decking shall be placed with ribs aligned for full length of the floor.

26/04/06 Temporary Stability

If the decking is to provide temporary stability to the steelwork during erection, the Contractor is to ensure the adequacy of the connection between the decking and the beams.

26/04/07 Side Lap Fixing

If the decking system does not have preformed side lap fixings the Contractor shall provide suitable fixings between sheets.

26/04/08 Laying and Fixing

The Contractor shall lay and fix decking and accessories in accordance with BS 5950: Part 4 and manufacturer's instructions:

Minimum end bearing 50mm
Minimum number of fixings:-
2 per panel at ends of sheets
1 per panel at intermediate beam positions.

26/04/09 Preventation of Damage

The Contractor shall not force decking, components or accessories into position or otherwise induce abnormal stresses.

26/04/10 Damaged Sheets

The Contractor shall provide the Engineer with ample opportunity to inspect the decking sheets when placed prior to concreting in order to assess any handling damage.

The Contractor shall himself prior to inspection by the Engineer:-

a: inspect the decking himself
b: set aside sheets with damage to steel or coatings
c: report the damage to the Engineer
d: if not rejected by the Engineer, the damaged sheets shall be made good by a agreed method.
e: repair damage to zinc coatings immediately.

26/04/11 Temporary Props

The Contractor shall provide temporary props where necessitated by his design and where shown on his drawings. Props provided shall be adequate to resist the construction loads and ensure the floor is within the stated deflections.

The following table gives the minimum interval of time which shall be allowed between the placing of the concrete and the removal of props. The number of days which the temperature has fallen below freezing point shall be added to these times.

Removal of Shuttering	Ordinary Portland Cement Concrete		Rapid Hardening Portland Cement Concrete	
	Cold Weather (above freezing)	Normal Weather (about 16 C)	Cold Weather (above freezing)	Normal Weather (about 16 C)
	Days	Days	Days	Days
Removal of Props to Slabs	35	28	14	5

The times stated in the above table for "Removal of Props to Slabs" are for slabs without superimposed constructional loadings. Where it is the Contractor's intention to use a slab as a working platform, either to support a subsequent floor or for storage of materials or similar, then the Contractor shall agree the sequence of operations and cycle of propping with the Engineer prior to work being undertaken.

During construction, soffits of slabs shall be propped through two floors at least. The time lapse between adjacent floors being at least 7 days and at all times the lower unsupported floor shall be at least 28 days old.

26/04/12 Edge Formwork

The Contractor shall provide edge formwork to retain the wet concrete at the correct line and level. Restraint straps for the edge trim shall be fixed at maximum 600mm centres.

Cut and seal the edge formwork where the edge profile passes beyond the perimeter, or past internal columns. Complete with restraining corner pieces at re-entrant and external corner column positions.

26/04/13 Holes

The Contractor shall box out holes shown on the Architect's and Engineers drawings with timber or polystyrene boxes. After concrete has been placed and set he shall cut decking to suit sizes of services passing through hole.

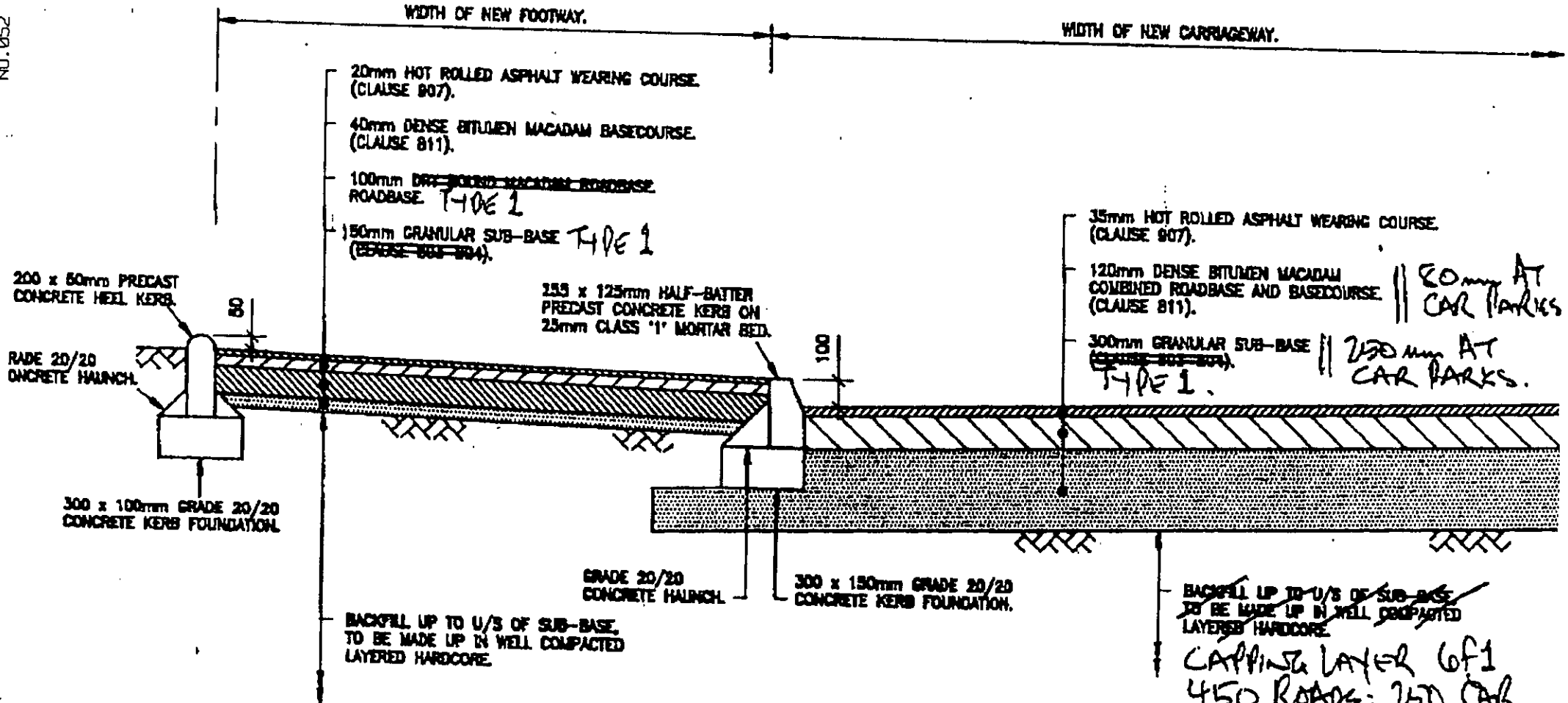
26/04/13 Preventing Grout Loss

The Contractor shall tape joints between decking to prevent grout loss. The method of sealing is not to cause a reduction in bond between the concrete and decking.

NO.052

MCLAY COLLIER & PARTNERS

12:14



NEW FOOTWAY/CARRIAGEWAY CONSTRUCTION

STANDARD DETAIL REFERENCE – ROAD

LARKFIELD HOSPITAL , GREENOCK

PART C

MECHANICAL/ELECTRICAL SPECIFICATION

RENFREWSHIRE HEALTHCARE N.H.S. TRUST

LARKFIELD P.F.I. DEVELOPMENT

INDEX

RENFREWSHIRE HEALTHCARE N.H.S. TRUST
LARKFIELD P.F.I. DEVELOPMENT

Outline of Mechanical and Electrical Engineering Services.

1.00 Mechanical Services

1.01 General

1.01.1 The following is a brief description of the mechanical services for the development, comprising L.T.H.W Boiler Plant, Calorifier Plant, Heating, Ventilation, Medical Gases Services, Hot and Cold Water Services, Fire Fighting Service and internal drainage.

1.01.2 This report has been compiled based on relevant Hospital Building Notes and Hospital Technical memorandum, Statutory Regulations British Standards, Building Regulations Scotland and Water By-Laws.

1.02 L.T.H.W. Boiler Plant

1.02.1 Natural Gas Fired Boiler Plant would be provided to cater for the Heating and D.H.W.S. loads.

The 3-off boilers would each be rated at approximately 50% full design load capacity that will allow servicing and maintenance to be carried out at minimum inconvenience.

1.02.2 The boilers would be fitted with sequence controls to duty share and select the number of units operating to the load imposed

1.02.3 Separate heating circuits would be provided for the Psycho-Geriatric Unit, Day Hospital and the Geriatric Unit, Day Hospital and Young Physically Disabled to allow the individual circuits to be shut down at periods when they are not in use and thus reduce the energy requirement.

1.02.4 All Plant Room pipework would be thermally insulated to current British Standards and Best Practice.

1.03 D.H.W.S. Calorifiers

1.03.1 Duplicate high output low water content, water to water Domestic Hot Water Calorifiers would be provided and installed within the boiler plant room.

1.03.2 The high output low water content calorifier gives greater power regulation coping with fluctuations in demand and saving in energy due to the lower water content, whilst complying with the Prevention of Legionellae in Health Care Premises.

1.03.3 As a safety measure, all Calorifiers would be provided with a safety high temperature limit cut-out thermostat in addition to the normal working thermostat.

1.03.4 All Calorifier Plant, Heating and Hot & Cold Water Services pipework in Plantrooms would be thermally insulated to current British Standards.

1.04 Heating and Ventilation Services

1.04.1 Conventional low temperature hot water heating system will be employed, with ceiling mounted radiant heating panels, low surface temperature radiators or rounded top-steel panel radiators as required by the relevant Hospital Building Notes and Health Guidance Notes.

These systems would be provided with appropriate weather compensation and zone controls to provide comfort levels with energy efficiency, with capabilities of reducing space temperature at night. Automatic controls would be direct digital controls which could be connected to a Building Management System Bus cable if desired.

1.04.2 Supply and extract ventilation will be provided as required to suit the building layout and relevant Hospital Building Notes and Hospital Technical Memorandum 2025.

The Exhaust Ventilation Systems would incorporate Heat Recuperators capable of recovering up to 80% of the heat being extracted from the Building through the exhaust air system this equates to approx. 60kW of energy used per hour.

1.04.3 The building will be naturally ventilated where practicable, otherwise mechanical extract will be provided as previously indicated.

1.04.4 An exhaust canopy shall be installed within the Kitchen This canopy will be of the Energy saving induction type constructed entirely of stainless steel and including integrated recessed light fittings. This type of canopy will produce energy savings of up to 60%

1.05 Medical Gases (Oxygen, Compressed Air and Vacuum)

1.05.1 Medical Gas Services will be provided as required throughout the development to meet Hospital Technical Memorandum No 2022.

1.05.2 Oxygen supply services will be derived from an automatic manifold in a separate Oxygen Store Room, the System would have 5 Oxygen Bottles on line with 5 on standby and 5 spares in storage.

1.05.3 A Vacuum Plant would be provided and located adjacent to the main ground level plantroom.

1.05.4 A medical gas main alarm panel would be located at the main reception or porters room with slave panels located at nurses stations.

1.06 Hot and Cold Water Services

1.06.1 Cold water storage tanks would be sited within Plantrooms on the Ground Floor of the proposed new buildings.

1.06.2 Mains cold water would be fed to all tanks and other points where required as an extension of the existing cold water mains supply.

This service will be agreed and finalised with the local water supply authority

Water Filtration Plant would be provided on the water main serving the development as required by the latest Scottish Hospital Technical No 2

This plant would consist of 1 Membrane Fully Automatic Microfiltration unit with replaceable cartridge filters as an emergency back up.

1.06.3 Cold Water distribution service from the new tanks will be by pressure booster pumps to the development as required. At this stage costs reflect domestic water services pipework as being constructed uPVC Cold Service and CPVC for Hot Service and will have thermal insulation to current British Standard. Local pressurisation will be provided for the Dental Suite.

1.06.4 Hot water will be distributed throughout the development, as required, from the Calorifiers as a pumped circulation system. All pipework will be of CPVC construction, and will have thermal insulation to current British Standards.

1.06.5 Thermostatic Mixing valves will be provided as necessary to provide the required outlet temperature as the Health Guidance Note "Safe" Hot Water and Surface Temperature.

1.06.6 The Hot and Cold Water systems provided will be in accordance with the latest edition of the Control of Legionellae within Health Care Premises 2040 and the Scottish Hospital Technical Note No. 2 and all relevant Hospital Technical Memorandum and Water By-Laws.

1.07 Fire Services

1.07.1 Fire hydrants would be provided as required the site of the new buildings utilizing existing hydrants where possible and hose reels would be provided within the new buildings.

1.07.2 All the foregoing fire services would require to be agreed and finalised with the Local and Hospital Fire Officers.

1.08 Internal Drainage

1.08.1 Above ground soil, waste and vent stacks 50mm dia, and above will be installed in PVC-u to BS 4514 with ring seal joints and installed to BS 5572.

1.08.2 The same specification will apply to all concealed floats 50mm dia. and above.

1.08.3 All above ground internal and external rain water pipework will also be installed in PVC-u to BS 4514 with ring seal joints, PVC-u gutters will be to BS 4576.

1.08.4 All below ground drainage will be installed in PVC-u to BS 5481 with ring seal joints, and installed to BS 8301.

1.08.5 All exposed and concealed above ground drainage below 50mm dia. will be installed in MUPVC solvent weld system to BS 5255, and installed to BS 5572

1.08.6 Waste of a highly corrosive nature will be conducted through pipework constructed of glass or Vulcathene, this will particularly apply to the Laboratory area.

2.00 Electrical Services

2.01 General

2.01.1 The following is a brief description of the Electrical Services for the Proposed Development

2.01.2 The Electrical Services as described in this report comply with current Hospital Technical Memorandums, Hospital Planning notes, relevant British Standards and Statutory Regulations.

2.02 Main Electrical Distribution System

2.02.1 It is proposed that a new supply to the proposed New Development will be provided by Scottish Power terminating in the Electrical Switchroom. This will be a 415 Volt, 50 Hertz 3 Phase Supply capable of carrying an estimated load of up to 500 amps.

2.02.2 The main switchboard would be split into essential and non-essential services. In the event of a supply failure an autochangeover contactor arrangement would automatically start a stand-by generator to provide a supply to the essential services.

An alternative proposal has been submitted to feed the complete building from the Essential Services / Generator supply.

2.02.3 A standby diesel generator set shall be provided and shall be rated to provide standby supply to essential services.

2.02.4 The main switchboards shall be fitted with metering capable of providing pulsed outputs to a Building Management system. This will allow for detailed analysis of energy usage.

2.03 Sub-Mains Electrical Distribution

2.03.1 The main essential and non-essential switchboards shall each serve six final distribution boards strategically located throughout the unit to reduce final circuit cable lengths.

2.03.2 Final Distribution Boards shall be mounted in lockable sheet steel enclosures.

2.03.3 Final circuits shall be PVC single core cables in trunking and conduit to allow for ease of future rewiring. This type of installation would not require to be rewired within 25 years.

2.03.4 Final circuits where necessary shall be segregated. General power and lighting circuits shall be run in separate containment systems from telephone, data, security, cabling, etc.

2.04 Emergency Lighting Installation

2.04.1 A system of emergency lighting would be installed throughout all escape routes within the Complex, including exits, stairs, corridors and toilet areas exceeding 8 square metres in gross area.

2.04.2 The installation in general would comprise self contained. miniature fluorescent emergency luminaires of the non-maintained and maintained type.

2.04.3 The non-maintained type units would be used for the general illumination of toilet areas in the event of local lighting sub-circuit failure

2.04.4 Where possible emergency luminaires shall be contained within standard mains luminaires. This will reduce the need for additional dedicated emergency luminaires which can spoil the aesthetics of a well designed lighting scheme.

2.04.5 The maintained type of luminaire would be used primarily to identify and illuminate exit routes and stairs at all material times, and to compensate for possible local lighting sub-circuit failure.

2.04.6 In order to comply fully with BS 5266 Part 1 1988, relative to testing of the system, the luminaires supplied would be fitted with a supplementary circuit, enabling them to be group activated through a simple extra low voltage single multi-stranded core screened cable connected to a central control / test unit.

2.04.7 The central control / test unit would comprise a wall mounted zinc coated, sheet steel stove enamelled enclosure, housing a sealed lead acid battery, constant current charger and solid state mains failure changeover circuit, together with all integrated test circuitry and electronic timers, with engrave front coverplate containing all necessary control switches and lights, indicating clearly the procedures for carrying out the testing and extinguishing of luminaires as required hereunder :-

(a) Manually activate all luminaires for period of one half hour, one hour, and three hours, without interruption of the mains supply.

(b) Manually activate all luminaires at a time of emergency even although the normal mains supply remains energised.

(c) Automatically activate all luminaires in the event of the fire alarm system coming into operation, for a maximum period of three hours, thus avoiding discharge of the cadmium-nickel cells located within the luminaires and so minimising the risk of reversed polarity.

If the alternative Essential Services arrangement for the building is accepted then the self contained emergency lighting would be limited to new escape routes and stairs.

2.05 Door Security Intercommunications System

2.05.1 It is anticipated that a door security intercommunication system shall be installed at the main entrance and the link entrance to prevent unauthorised entry, while permitting free movement of staff.

2.05.2 A system would also be provided at the day care entrance doors.

2.05.3 The system would provide verbal communication with, and an electro-magnetically operated door lock to be controlled from the reception area.

2.05.4 An override, located inside the entrances would be provided, in order that staff can exit for normal work or in the event of fire.

2.05.5 It would be a requirement that the locks would disengage in initiation of the fire alarm system

2.06 Fire Alarm Installation

2.06.1 It is anticipated that a fire alarm installation will be provided within the new complex.

2.06.2 The installation shall comprise an analogue addressable detector system, fully and continuously monitored and operated either manually or automatically. The system shall be supplied from an independent trickle charge battery.

2.06.3 The installation, and its components, would comply fully with the relevant recommendations contained in BS 5445, BS 5446 and BS 5839.

2.07 Lightning Protection

2.07.1 This system would comprise a series of 25mm x 3mm aluminium conductors installed below ridge tiles, or equal, by means of non-metallic fixings at 0.5 metre centres.

2.07.2 Down conductors comprising 25mm x 3mm aluminium conductors, encased in PVC of an approved colour, would run from the perimeter tapes to bi-metallic joint units located some 600mm above finished ground level, as per BS 6651 1985.

2.07.3 Earth terminals would comprise lengths of 25mm x 3mm PVC sheathed copper conductors from the bi-metallic joints to earth electrodes. An earth electrode would be provided at each down conductor position consisting of 1 No 2400mm x 16mm dia copper clad earth electrode surmounted by a lightweight inspection housing unit

2.08 Nurse Call System

2.08.1 A system comprising Patient/Nurse and Nurse/Nurse calls shall be provided, as manufactured by Static, Wandsworth or similar.

2.08.2 A Patient/Nurse call facility will be provided at bedheads, disabled toilets and general locations throughout the complex.

2.08.3 A Nurse/Nurse call facility (Attendance Call) shall be provided at all bedheads, disabled toilets and general locations throughout the complex.

2.08.4 It is proposed that bedheads in the Psycho-Geriatric areas shall only have Nurse / Nurse call facilities to prevent nuisance calls.

2.08.5 The system shall be split into six separate areas with each area having an indicator panel. The indicator panel would be located at the nurses station or another suitable location. A facility would be available to link each of the indicator panels to provide call indication facilities between the areas.

2.08.6 Overdoor indicators shall also be provided outside each room that has call facilities. This shall provide additional visual indication to nursing staff.

2.09 Ward Radio / TV System

2.09.1 A ward Radio / TV sound system shall provide Radio / TV sound to each bedhead unit. This will allow patients to listen to television or radio without disturbing others.

2.09.2 A communal television / radio aerial system shall be installed and connected to various television outlet points throughout the complex.

2.09.3 The aerial system shall also provide radio / TV signals to the sound system which will distribute these to each of the bedhead units.

2.09.4 The sound system shall provide sound for four television channels and up to four radio channels to each bedhead.

2.10 Intruder Alarm System

2.10.1 An Intruder alarm system shall be provided in any areas which are only occupied during normal working hours.

2.10.2 The intruder alarm system shall consist of magnetic door and window contacts and P.I.R. movement detectors. These shall be connected to intruder alarm panels located at the entrances.

2.10.3 Intruder alarm equipment shall be located to protect vulnerable areas containing medical and computing equipment.

2.11 Electrical Accessories

2.11.1 Electrical accessories such as socket outlets, light switches, connection units, etc., shall be mainly the moulded plastic type In circulation areas and ward areas the accessories shall be decorative metal plate type with a finish to suit the surroundings.

2.11.2 In office areas with a large amount of electrical accessories a multi-compartment type dado trunking will be used to house the accessories and cabling. This will reduce installation time, allow for future modifications and be more aesthetically pleasing.

2.11.3 Electrical accessories at each bedhead will be contained within one bedhead unit. This will include Nurse Call System, Sound System, Socket Outlet and light switch.

2.12 Lighting

2.12.1 In general lighting shall consist of fluorescent luminaires and low energy compact fluorescent luminaires. Where fluorescent luminaires are used they shall have high frequency control gear providing a 20% energy saving compared to switch start control gear.

2.12.2 The lighting installation shall be designed to comply with "Lighting Guide – LG2 – Hospitals and Health Care Buildings" issued by the Chartered Institute of Building Services Engineers and all relevant Hospital Building Notes and Hospital Technical Memorandum

2.12.3 During the design of the lighting scheme the function, interior decoration and structural constraints of each room shall be considered to achieve the most suitable design.

2.12.4 Selective switching and dimming shall be used to provide variable levels of artificial lighting and to reduce energy costs. High efficiency lamps such as compact fluorescent will be used as they use less power to provide a higher light output. They also have a longer life providing a reduction in maintenance as well as energy costs.

2.12.5 In wards and ward corridors night lighting shall be installed. This will provide reduced illumination levels at night to allow for safe movement of patients and staff without disturbing sleeping patients.

2.12.6 In office areas where computer terminals are used the lighting shall be designed to comply with "LG3 Areas for Visual Display Terminals" issued by the Chartered Institute of Building Services Engineers.

2.13 External Lighting

2.13.1 External lighting shall be provided in the open courtyard / terrace areas and car parking areas.

2.13.2 Bollard type fittings shall be used in the courtyard / terrace areas and shall be approximately 1 metre high. Lamp sources for these bollards shall be compact fluorescent or discharge type for energy efficiency and long lamp life. The bollards shall be vandal resistant.

2.13.3 Car park lighting shall consist of 5m high lighting columns with high pressure discharge lamps.

Column positions shall be carefully considered to avoid stray light entering ward areas.

2.14 Patient Tracking System

2.14.1 A Patient Tracking System will be provided in the Psycho-Geriatric area of the unit. This will be used to inform staff should a patient stray from a designated area.

2.14.2 The patient tracking system will consist of electronically tagged wrist bands which will activate an alarm on a centrally located panel should the patient leave their designated area.

2.15 Lift Installation

2.15.1 Provision has been allowed for 2 off 2 storey hydraulically driven 26 person (bed lifts) all contained within separate brick / blockwork shafts.

2.15.2 The hydraulic bed lifts will be controlled from separate motor rooms located adjacent to each shaft at the ground floor level.

2.16 Clinical Equipment

2.16.1 Provision has been allowed for the supply and installation of all electrical group I equipment required under the Health Trusts Equipment Schedule and in line with normal practice of N.H.S. Healthcare Supplies.

2.16.2 Allowance has also been made for the electrical supply and connection of normally provided group II and III equipment such as X-Ray viewers and medical refrigerators, etc., as covered by the Health Trusts Equipment Schedule. Group IV equipment has been excluded from the electrical costs together with all specialist dental equipment.

2.17 Telephone System

2.17.1 Provision has been made for the containment of all IT and telephone services within the building. Hard wiring of the telephone cabling will also be undertaken however the supply, installation and maintenance of all IT cabling to meet the Trust's requirements will be carried out by others under a separate contract. The supply, maintenance and routine replacement of telephone handsets will also be the Trust's responsibility.

The telephone cabling will be run to the existing hospital telephone room to be connected at the existing main Hospital switchboard. It is assumed that any necessary upgrading of the existing switchboard to accommodate the new extensions will be carried out separately by the Trust prior to connection to the new system.

The new telephone system will cater for up to 150 internal lines.

2.18 C.C.T.V. Security System

2.18.1 A minimum TV camera coverage has been included covering the entrances and reception areas to monitor and record all visitors etc., by means of fixed cameras, surveillance monitors and VCR units.

3.00 Building Energy Consumption

3.01 General

3.01.1 The design of the building and its associated engineering services has been progressed to ensure optimum performance and minimised energy consumption throughout the life-span of the building.

3.01.2 The heating has been zoned as indicated in the attached drawings to ensure that areas not requiring 24 hour, 7 days per week service can be shut down or put to a minimum setback temperature.

3.01.3 All heating circuits are provided with weather compensated control further enhanced by thermostat control valves to each occupied room providing efficient use of heating energy coupled with individual comfort.

3.01.4 Supply and extract ventilation has been included to comply with Hospital Technical Memorandum 2025. The exhaust ventilation system proposed incorporate heat reciperators capable of recovery up to 80% of the heat being extracted from the building through the exhaust air therefore providing energy savings which would be required to heat make-up air.

3.01.5 The kitchen extract canopy proposed for the main catering equipment would be of the energy saving induction type which will provide up to 60% savings over conventional kitchen extract/make-up ventilation installations.

3.01 6 Lighting shall generally be of the low energy compact fluorescent luminaires with high frequency control gear which would provide approximately 20% on energy consumption compared to switch start control gear

3.02 Calculated Energy Consumption

3.02 1 The building energy consumption figures provided below are given for

(a) Heating, Ventilation and estimated domestic hot water consumption

Estimated Annual Energy Consumption 6264 GJ/annum

(b) Annual Electrical Consumption for small power, lighting, plant & lifts 320,000Kwh/annum

4.00 Maintenance

4.01 General

4.01.1 The Mechanical and Electrical Services within the building would be maintained for a period of 25 years and there will be a separate Facilities Management agreement which details the requirements for the full maintenance of the building including M & E Services.

4.01.2 The agreement would cover the following aspects in relation to maintenance and the capital cost of replacement of the M & E Services through the 25 year agreement :-

- Planned Preventative Maintenance
- Reactive Maintenance
- Plant Replacement Costs

4.01.3 The expected economic life of the plant and systems to be installed are as detailed below :-

Plant / Systems	**Economic Life**
Boilers	30
Boiler Burners	15
Pumps	25
Calorifiers	30
Automatic Controls	25
Water Tanks	30
Water Filtration Plant	15
Air Handling Plant	15
Medical Gases	25
Standby Generator	25
Emergency Lighting	10

Plant / Systems	Economic Life
Fire Alarm System	25
Intruder Alarm System	25
Nurse Call System	25
Electrical Installation	25
Patient Tracking	25
Switchgear	30
Lifts	30
Lift Ropes	5

4.01.4 The tables contained within Appendix 1 indicate the Maintenance (Revenue) and Replacement / Major Service Cost over the 25 year period of the service agreement.

APPENDICES

1 Annual Maintenance Costs

Plant Replacement Costs / Programme

2. Schedule of Equipment and Preferred Manufacturers

APPENDIX 1

LARKFIELD HOSPITAL , GREEENOCK

LIFE CYCLE MAINTENANCE SUMMARY

SINKING FUND MAINTENANCE (refer attached breakdown sheet 1)	£ 1,625,900
PLANNED PREVENTATIVE MAINTENANCE (refer attached breakdown sheet 2)	£ 2,447,300
LIFE CYCLE MAINTENANCE TOTAL	£ 4,073,200

LARKFIELD HOSPITAL GREENOCK
LIFE CYCLE MAINTENANCE
SINKING FUND

	4	5	7	8	10	12	14	15	16	20	21	22	23	24	25	TOTAL
MECHANICAL																
BOILERS					6,300			6,300			6,300				6,300	25,200
PUMPS		3,300			3,300			3,300			3,300				3,300	16,500
CALORIFIERS																
RADIATORS & PIPEWORK																
CONTROLS										10,000	10,000	10,000	10,000	10,000	6,150	56,150
WATER TANKS																
WATER FILTRATION PLANT		7,000			7,000			7,000			7,000				7,000	35,000
AIR HANDLING PLANT								40,000			10,000	10,000		7,000		67,000
MEDICAL GASES																
ELECTRICAL																
STAND BY GENERATOR							6,000					16,000				24,000
LAMP REPLACEMENT																
EMERGENCY LIGHTING					25,000						25,000					50,000
FIRE ALARM SYSTEM											12,000	12,000	12,000	12,000	11,000	59,000
INTRUDER ALARM											5,000		5,000		4,700	14,700
NURSE CALL SYSTEM										14,000	14,000	14,000	14,000	14,000	9,000	79,000
GENERAL ELECTRICAL INSTALLATION										10,000	10,000	10,000	10,000	9,500		49,500
PATIENT TRACKING															2,800	2,800
SWITCHGEAR											5,000		10,000		9,900	24,900
UPTS		5,000			5,000						5,000				5,150	20,150
LAUNDRY EQUIPMENT			18,000				18,000				18,000					54,000
CCTV		5,000			5,000			5,000		5,000		2,000		2,000	1,000	25,000
SERVICES SUBTOTAL		20,300	18,000		51,600		26,000	61,600		39,000	130,600	74,000	61,000	54,500	66,300	602,900
GENERAL BUILDING MAINTENANCE	25,000			25,000		35,000			35,000	25,000	25,000			50,000		220,000
REDECORATION		50,000			50,000			50,000		50,000			20,000		20,000	240,000
FLOOR COVERINGS		34,000			74,000			34,000		74,000		5,500	9,500	9,500	9,500	250,000
ROADS		10,000			20,000			20,000			20,000			10,000	3,000	83,000
GROUP 1 EQUIPMENT			35,000				35,000					35,000				105,000
GROUP 2 & 3 EQUIPMENT			41,000				42,000					42,000				125,000
TOTAL	25,000	114,300	94,000	25,000	195,600	35,000	103,000	165,600	35,000	188,000	175,600	156,500	90,500	124,000	98,800	1,625,900

LARKFIELD HOSPITAL GREENOCK
LIFE CYCLE MAINTENANCE
PLANNED PREVENTIVE

YEAR	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	TOTAL
Building Fabric																										
Redecoration	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	50,000
Floor Coverings	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	50,000
Ironmongery Replacement/Glazing	1,000	1,000	1,000	2,000	2,000	2,000	2,000	2,000	2,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	4,000	4,000	4,000	4,000	4,000	69,000
Window Clean	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	125,000
Maintenance Operative (attending)	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	375,000
General Building Maintenance	8,000	8,000	8,000	8,000	8,000	10,000	10,000	10,000	10,000	10,000	14,000	14,000	14,000	14,000	14,000	22,000	22,000	22,000	22,000	22,000	25,000	25,000	25,000	25,000	25,000	385,000
Mechanical																										
Boilers	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	2,400	31,200
Pumps	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	7,800
Calorifiers	150	150	150	150	650	150	150	150	150	650	150	150	150	150	150	650	150	150	150	150	650	150	150	150	650	6,850
Radiators & Pipework	400	400	400	400	400	400	400	400	400	400	1,400	1,400	1,400	1,400	400	400	400	400	400	400	400	1,000	1,000	1,000	1,000	16,000
Controls	1,850	1,850	1,850	1,850	1,850	1,850	1,850	1,850	1,850	1,850	1,850	1,850	1,850	1,850	1,850	1,850	1,850	1,850	1,850	1,850	1,850	1,850	1,850	1,850	1,850	46,250
Water Tanks	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	12,500
Water Filtration Plant	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	75,000
Air Handling Plant	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	150,000
Medical Gases	1,200	1,600	1,200	1,600	1,200	1,600	1,200	1,600	1,200	1,600	1,200	1,600	1,200	1,600	1,200	1,600	1,200	1,600	1,200	1,600	1,200	1,600	1,200	1,600	1,200	33,600
Electrical																										
Stand By Generator	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	25,000
Lamp Replacement	1,500	1,500	1,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	81,500
Emergency Lighting	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	12,500
Fire Alarm System	700	700	700	700	700	700	700	700	700	700	700	700	700	700	700	700	700	700	700	700	1,000	1,000	1,000	1,000	1,000	18,300
Intruder Alarm	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	7,800
Nurse Call System	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	25,000
General Electrical Installation	100	100	100	100	500	100	100	100	100	500	100	100	100	100	500	100	100	100	100	500	100	100	100	100	500	4,500
Patient Tracking	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	5,000
Switchgear	100	100	100	100	500	100	100	100	100	500	100	100	100	100	500	100	100	100	100	500	100	100	100	100	100	4,100
Lifts	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	25,000
CCTV	800	800	800	800	800	800	800	800	800	800	800	800	800	800	800	800	800	800	800	800	800	800	800	800	800	20,000
Plumbing																										
Valve Service	700	700	700	700	1,700	700	700	700	700	1,700	700	700	700	700	1,700	700	700	700	700	1,700	700	700	700	700	1,700	22,600
Pump Checks	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	32,500
Replacement Valves	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	8,750
Clean Gutters	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	7,800
On Call / Call Out	5,550	5,550	5,550	5,550	5,550	5,550	5,550	5,550	5,550	5,550	5,550	5,550	5,550	5,550	5,550	5,550	5,550	5,550	5,550	5,550	5,550	5,550	5,550	5,550	5,550	138,750
Laundry Equipment	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	25,000
Grove 1 Equipment	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	25,000
Grove 2 & 3 Equipment	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	25,000
Night Time Call Out	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	250,000
Grounds And Estate	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	250,000
GRAND TOTAL	84,000	84,300	84,000	87,300	89,300	91,300	91,000	91,300	91,000	94,500	97,000	97,300	97,000	98,300	98,300	104,300	104,000	104,300	104,000	108,100	108,900	109,200	109,900	109,300	113,900	3,447,300

14/4/99

APPENDIX 2

Schedule of Preferred Equipment Manufacturers

1. Mechanical Services and Plumbing

	Element	Manufacturer
-	Boilers / Burners	Clyde Combustion Hamworthy / Hoval
-	Pumps	Pullen , Holden & Brooke / Grundfos
-	General: Ventilation Fans	Woods / Nuaire / Roof Units
-	Air Handling Units	Woods / Moducel / AAF/ Flakt
-	Air Diffusers, Grilles & Louvres	Trox / Gilberts / RCM
-	Attenuators	IAC / Sound Attenuators
-	Split Cooling Systems	Daikin / Mitsubishi / Toshiba
-	Tanks (General)	Nicholson Plastics / Brimar / Balmoral
-	BEMS / Automatic Controls	Andover / Trend
-	Kitchen Canopies	Heydal / Vianen
-	Radiators / Convectors	Hudevad / Thermal Radiators / Dunham Bush / SPC
-	Flues	Selkirk / Monodraught / Rite Vent
-	Drainage Pipework (cast iron)	Marley
-	Pressurisation Units	Holden & Brooke / Aquatech / Pullen
-	Inertia Bases & Isolators	Heating Appliances & Spares
-	Heating Valves	Hattersley / Crane / Holmes
-	Trace Heating	Raychem / Isopad

-	Gas Detection	Firewatch
-	Calorifiers	McCallum / IMI / McDonald Eng
-	Thermostatic Shower Valves	Safemix / Mira Gummers / Horne
-	Pressurisation Units	Aquatech Pullen Pumps Ltd Holden Brooke
2.	**Electrical Services**	
2.1	**Switchgear**	
-	Main LV Switchboard	Durham Switchgear / Dorman Smith / MEM
-	LV Sub-Switchboards	Durham Switchgear / Dorman Smith / MEM
-	Power Factor Correction	Merlin Gerin / Rectiphase
2.2	**Distribution System (main)**	
-	Main Cables – XLPE / SWA / LSF	BICC
-	Cable Trays	Swifts / Walsall
2.3	**Distribution Systems**	
-	Data / Voice Basket System	Mita Cablofil
-	Trunking / Tray	Swifts / Tegral / Walsall / Electrunk
-	Conduit	Walsall / Simplex
-	Circuit Cables	BICC
2.4	**Lighting System**	
-	Luminaires	Thorn / Philips / Moorlite
-	Car Park / Footpaths	Thorn / Holophane
2.5	**Small Power**	
-	Accessories	Wandsworth / Britmac / MK / Crabtree

The Argyll and Clyde Acute Hospitals NHS Trust
Vale of Leven Hospital
North Main Street
Alexandria

25 May 1999

Dear Sirs

Larkfield Hospital - cost of deep clean

With reference to the Project Agreement signed between LH Project Limited and you on 25th May 1999 for construction and operation of a new hospital at Larkfield, in respect of which we are construction contractor appointed by LH Project Limited, we hereby undertake to pay to you at Contractual Practical Completion as defined in the Project Agreement, the sum of £3,000 plus VAT in reimbursement of the cost of deep clean which you will conduct at the Hospital, subject to your submission to us of a valid VAT invoice.

Yours faithfully

Director
Melville Dundas Limited