

YOUNG SHIRE COUNCIL
ENGINEERING GUIDELINES
FOR
SUBDIVISIONS &
DEVELOPMENTS

PART 5

Guidelines for Design
of Sewerage Reticulation

Prepared by Engineering & Technical
Services Department
Young Shire Council

February, 1994

PART 5

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1. INTRODUCTION

This document outlines Young Shire Council's recommended practice for design of sewerage reticulation. It is in no way a comprehensive "Design Manual" and it is intended to be read in conjunction with and as a supplement to, relevant New South Wales Public Works Department publications.

All references to the Director should be interpreted as referring to the Engineering and Technical Services Director or his nominated representative.

The other parts of the Engineering Guidelines for Subdivisions and Developments are as follows:-

- Part 1 - General Requirements
- Part 2 - Guidelines for Design of Roads
- Part 3 - Guidelines for Design of Drainage
- Part 4 - Guidelines for Design of Water Reticulation
- Part 6 - Guidelines for Design of Landscaping and Control Measures for Erosion, Sedimentation and Dust
- Part 7 - Guidelines for Testing

2. SEWERAGE RETICULATION

2.1 Plan

The plan should be drawn at scale of 1:500 and show the following detail:-

- * Lot boundaries and lot numbers;
- * Location and chainages of manholes, junctions and dead-ends;
- * Location and size of mains;
- * Sewer main line number and manhole number;
- * Existing sewer mains, junctions and manholes;
- * For level lots, spot levels at the lot extremities to show that the whole of the lot can be sewerred.

2.2 Longitudinal Section

Longitudinal sections along the centreline of all sewer mains are required at scales of 1:500 horizontal and 1:100 vertical. The following detail is to be shown on the longitudinal section:-

- * Reduced levels for natural and design surface and pipe inverts at 20 metre intervals, manholes, dead-ends and at major variations in natural surface, such as roads, gullies, etc;
- * Invert levels for manhole inlets and outlets;
- * Size, type and class of pipe;
- * Grade of sewer between manholes;
- * Location, invert level and size of all drainage lines, water mains and other utility services crossing the main;

Notation regarding all joining lines.

Site contours should be included in the sewerage reticulation plans.

2.3 Rising Mains and Structures

Detailed engineering drawings are required for any rising mains and structures such as pumping stations and specialised manholes proposed for construction in conjunction with sewerage works.

3. SEWERAGE RETICULATION - DESIGN CRITERIA

All lots are to be provided with a sewer junction, so placed that the whole of the lot can be sewered assuming a grade of 1 in 60 for allotment sewer and minimum cover of 500mm at the most extreme point on the allotment.

3.1 Design Flows

The design flows should be calculated in accordance with the New South Wales Public Works Department Standards.

3.2 Design

The sewerage system components should be designed generally in accordance with Public Works Department standards. Council requirements are stated in Clauses 3.3 to 3.9 inclusive.

3.3 Pumping Stations

Wet well capacity is to be sufficient for the total ultimate Peak Wet Weather Flow (P.W.W.F.).

Pumps are to be sized for a maximum 10 starts per hour and provide a self-cleansing velocity of 0.6 metres per second in the rising main.

Minimum volume from top water level to bottom water level is to be the volume pumped in 90 seconds.

The combined detention time in the wet well and rising main should not exceed 4 hours.

Full stand-by pump capacity is required.

3.4 Rising Mains

Minimum pipe size is 100mm diameter (unless approved otherwise) and should be capable of withstanding maximum working head, including an allowance for water hammer and creep.

Velocity in the rising main should not exceed 3.0 metres per second.

3.5 Reticulation Mains

Sewer capacity should be greater than or equal to P.W.W.F. and grading sufficient to achieve self-cleansing velocity at Peak Dry Weather Flow (P.D.W.F.) Table 1 gives maximum and minimum allowable loadings for various diameter pipes. The maximum acceptable grade for any sewer is 1 in 10, minimum acceptable grades are as follows:-

<u>Pipe Size (mm)</u>	<u>Minimum Grade</u>
150	1 in 200
225	1 in 300
300	1 in 450
375	1 in 550
450	1 in 650
525	1 in 750
600	1 in 850

The minimum size for sewer mains is 150 millimetre diameter.

The values of roughness to be used in the design of gravity sewers are:-

Nominal Pipe Size (mm)	Full Flow - for estimation of Peak Hydraulic Capacity	Partial Flow - for estimation of Self-Cleansing Flows
150 - 300	k = 0.6mm	k = 1.5 normal k = 3.0 for control lines
375 - 600	k = 0.6mm	k = 3.0mm
Above 600	k = 1.5mm	k = 6.0mm

Note: Control Lines are those lines which effect the overall depth of system

3.6 Junctions

A 150 millimetre diameter sewer junction is to be provided within each lot. The depth of the junction is to be such that any location within the lot can be drained to it via a pipe with a minimum 300 millimetres of cover laid at a grade of 1 in 60.

Junctions exceeding 10 metres in length are considered to be a side line and require a manhole where they enter the main. When the sewer mains is outside the property boundary the service should be perpendicular to the sewer mains as shown on Drawing No. 6498.

3.7 Manholes

Sewer manholes are required at all changes of grade, deflections, line intersections and at all dead-ends exceeding 30 metres in length.

Maximum spacing for manholes should be as follows:-

<u>Pipe Size (mm)</u>	<u>Manhole Spacing (m)</u>
150	80
225	100
300	120
375 and above	150

3.8 Future Loadings

Sewerage components are to be sized to cater for proposed future development. Land zoning and Council's current sewerage strategy will be used as a guide in assessing requirements.

3.9 Plans and Calculations

Sewerage plans, as described in Clause 2 (Engineering Plans - Sewer Reticulation) together with calculations showing anticipated loadings in each line, are to be submitted for approval.

3.10 Materials

(a) Rising Mains

Rising mains from pumping stations may be constructed from any of the following pressure pipes manufactured in accordance with the relevant Australian Standards.

- Ductile Iron - Bitumen Coated - A.S. 2280
- u.P.V.C. - A.S. 1477

All pipes should be rubber ring jointed.

(b) Reticulation Mains

Reticulation pipelines and fittings may be of any of the following materials manufactured in accordance with the relevant Standards.

u.P.V.C. - A.S. 1260

Vitrified Clay - A.S. 1741 & A.S. 1693

All pipes should be rubber ring jointed.

u.P.V.C. pipes are to be maximum 3 metres in length.

(c) Manholes

Sewer manholes may be either cast-in-situ or precast. The developer is required to submit detailed drawings of proposed manhole structures for approval.

(d) Testing

Upon demand, the developer should supply to Council, documentary evidence that all materials intended for use in sewerage construction have been satisfactorily tested in accordance with the relevant Australian Standard.

3.11 General Requirements

(a) Rising Mains

Each pump discharge line is to be provided with a reflux valve and stop valve, the stop valve is to be positioned upstream from the reflux valve.

An approved air valve is required at high points in the main.

A scour valve and line is required to enable the rising main to be completely drained of sewage.

The receiving manhole is to be vented.

The developer is required to submit detailed drawings of rising mains and receiving manholes for approval.

All rising mains are to be tested to the satisfaction of the Director.

(b) Reticulation Mains and Fittings

Where sewer mains are located in the road reserve, the pipe centreline is to be 1.25 metres from the property boundary.

The sewer mains should cross the road centreline perpendicular to it unless otherwise approved by the Director.

Where sewer mains are located within lots adjacent to stormwater drainage lines, the sewer should be laid a minimum of 0.5 metres clear of the stormwater pipe.

Minimum cover required to mains and junctions is 750 millimetres in road carriageways and 450 millimetres elsewhere.

Where sewers of different diameters intersect or joint, the maximum depth of the smaller pipe is to be such that the pipe obverts are at the same level.

All sewer lines are to be tested to the satisfaction of the Director.

(c) Manholes

Sewer manholes should not be located in road carriageways.

An internal manhole drop between inlet and outlet is required as follows:-

<u>Deflection Angle</u>	<u>Drop (mm)</u>
0° to 45°	30
46° to 90°	50
91° to 135°	100

Deflections greater than 135° are not permitted.

All sewer manholes are to be tested to the satisfaction of the Director.

(d) Junctions

Where depth to the invert of the main exceeds 1.5 metres, sewer junctions are to be raised on a vertical shaft so that depth to invert is not greater than 1.5 metres.

3.13 Connection to Existing System

Where it is necessary to connect to existing Council sewerage system, this work should be carried out by Council Staff at the developer's expense.

The developer should give fourteen days notice of when connection is required.

All pipes and fittings required to complete the connection should be provided by the Developer.

3.14 Sewer Easements

Easements are required over Council's sewer mains. It is the responsibility of the developer to obtain a sewer easements from any other land if required. (The linen plan of subdivision will not be released until the above requirements have been complied with).

The developer should transfer to Council any sewer easements provided in the subdivision and execute a transfer and grant of easement in favour of Council pursuant to Section 88B of the Conveyancing Act 1919, as amended. The minimum width of sewer easement should be 3.0m.

3.15 Building over Council sewer mains

No industrial, commercial or residential building will be permitted to be constructed over Council's sewer reticulation system with the exception of pre-fabricated buildings with special floor slab design which are capable of easy removal. The Director will adjudicate any exception to this policy in extreme circumstances.

3.16 Marking of Junctions and Sidelines

The position of each riser, junction or end of a sideline should be clearly marked by the Contractor on completion of backfilling.

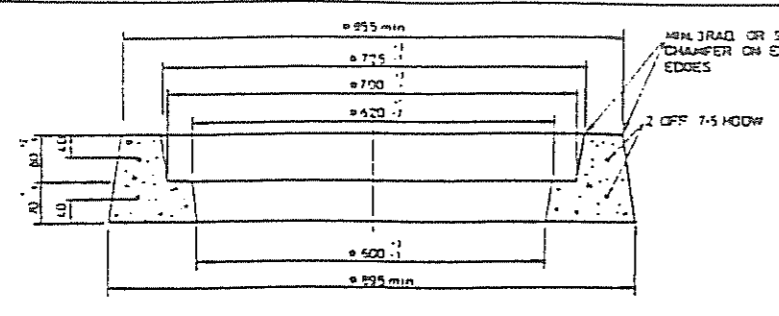
A white survey peg should be used to indicate the location of sewer junctions. The peg should be tied to an underground identification tape, connected to the sewer junction. The contractor should adjust the levels of pegs where necessary to conform to final surface level at the time of notification of completion.

3.17 Existing Manholes and Services

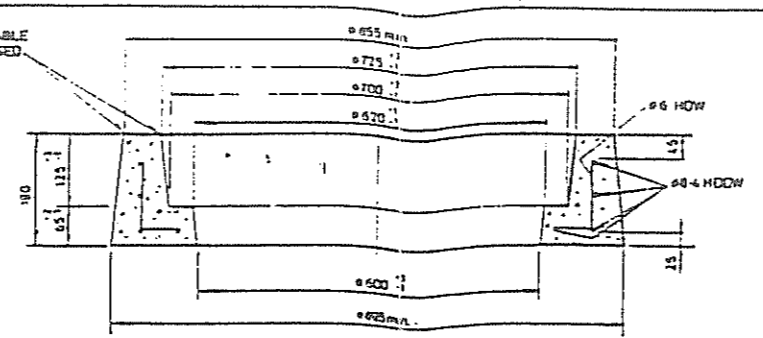
Where the development is utilising existing sewer mains or junctions, the mains, manholes or junctions must be upgraded to meet the current guideline requirements.

4. DRAWINGS

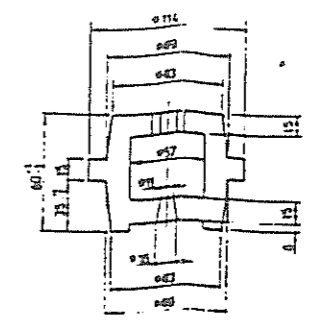
	<u>Drawing No.</u>
1. Grading Table for Gravity Sewers	
2. Sewerage Reticulation Manhole Covers	6495
3. Sewerage Reticulation - Manholes	6496
4. Precast Manhole Components	6497
5. Sewerage Reticulation Sideline Details	6498
6. Sewer Main Trench Details	6499



SECTION A

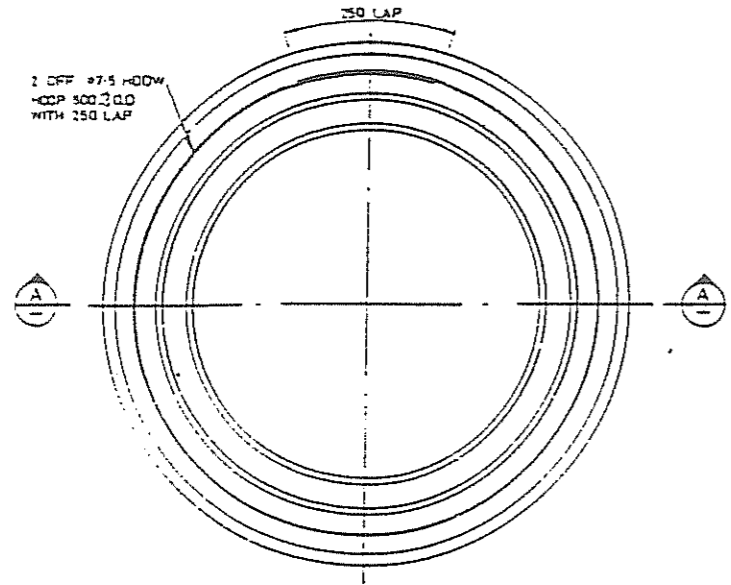


SECTION C

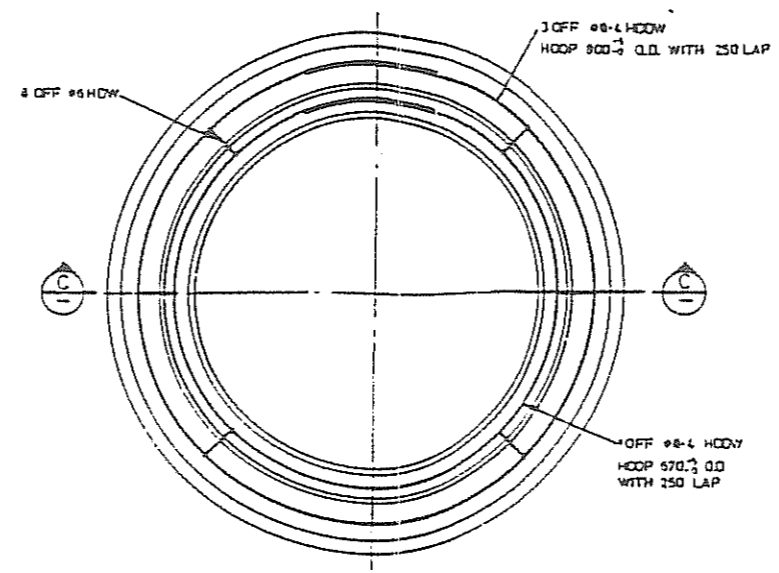


SECTION D

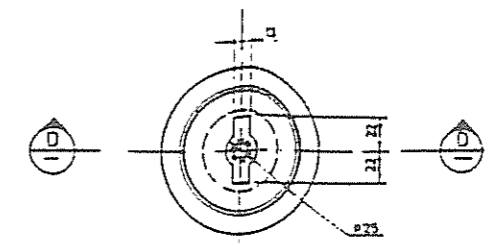
- NOTES.
1. STRENGTH OF CONCRETE GRADE 25
 2. CONCRETE FINISH F3.
 3. CEMENT TO BE TYPE 'D' OR TYPE 'C' CONTAINING NOT MORE THAN 5% C₁A
 4. AGGREGATE SHALL COMPLY WITH AS 1485 AND ONLY CRUSHED COARSE AGGREGATE SHALL BE PERMITTED.



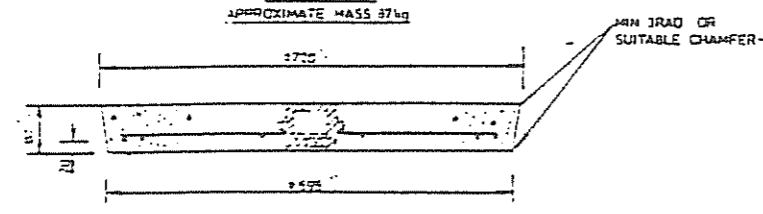
SURROUND
APPROXIMATE MASS 37 kg



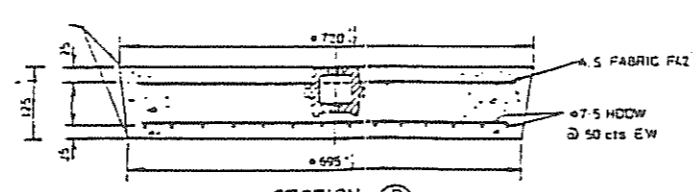
SURROUND
APPROXIMATE MASS 100 kg



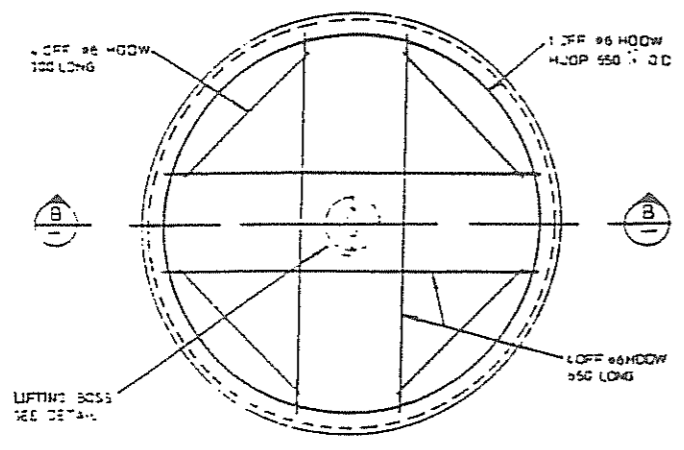
LIFTING BOSS
MATL - CAST IRON AS 1833 GRADE 7:00



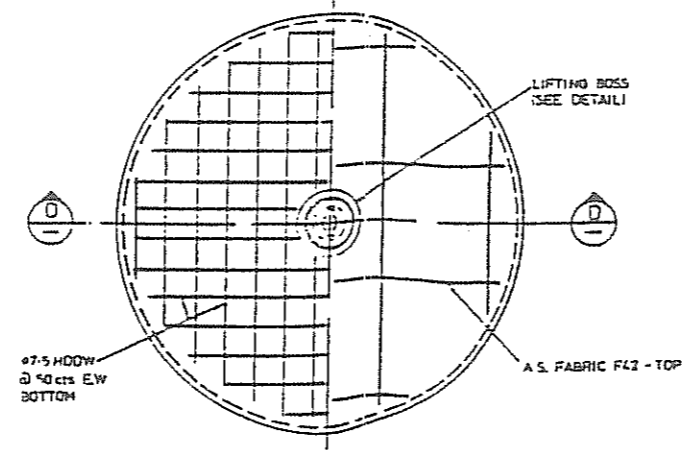
SECTION B



SECTION D



LIGHT TYPE COVER 'L'
APPROXIMATE MASS 75 kg



HEAVY TYPE COVER 'H'
APPROXIMATE MASS 120 kg

DESIGNED BY: [Signature]
DRAWN BY: [Signature]
CHECKED BY: [Signature]
DATE: [Date]

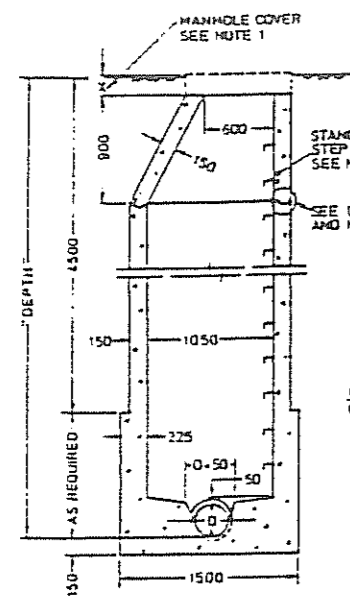
ALL LEVELS ARE IN METRES
ALL OTHER DIMENSIONS ARE
IN MILLIMETRES UNLESS STATED
OTHERWISE

DESIGNED BY: [Signature]
DRAWN BY: [Signature]
CHECKED BY: [Signature]
DATE: [Date]

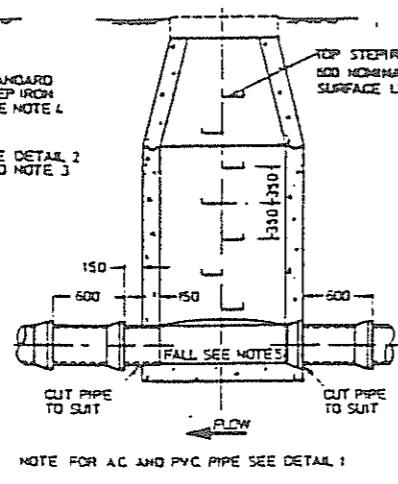
Public Works Department N.S.W.
DIRECTOR OF PUBLIC WORKS

SEWERAGE RETICULATION
MANHOLE COVERS

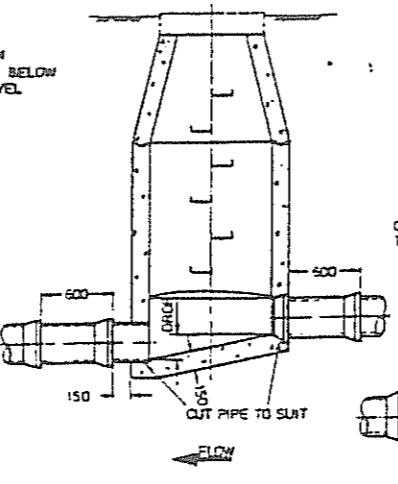
FILE
DRAWING
ST 501 A



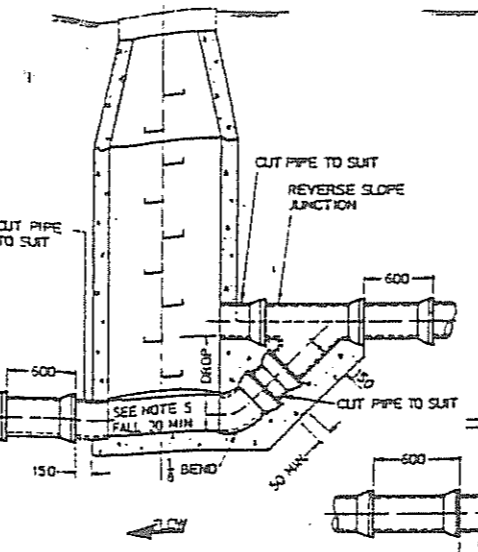
MANHOLE TYPE 1
FOR DEPTH GREATER THAN 4500



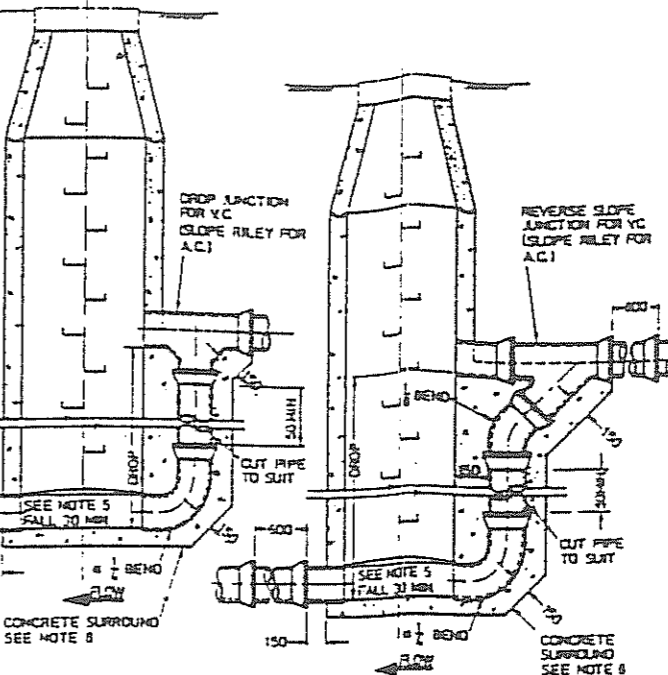
INLET	PIPE SIZE	DROP THROUGH M.M.
150	150	UP TO 90
225	100	UP TO 90
375	150	UP TO 90
525	500	UP TO 90



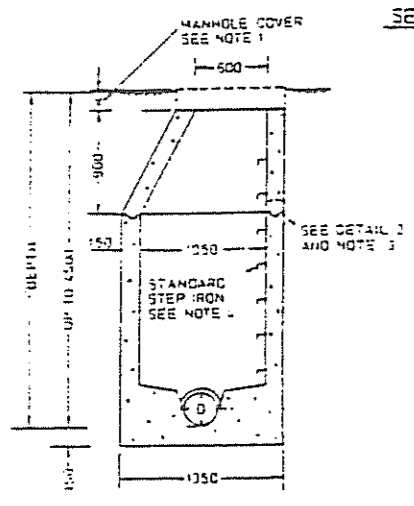
INLET	PIPE SIZE	DROP THROUGH M.M.
150	150	90 TO 300
225	300	90 TO 300
375	150	90 TO 400
525	500	90 TO 400



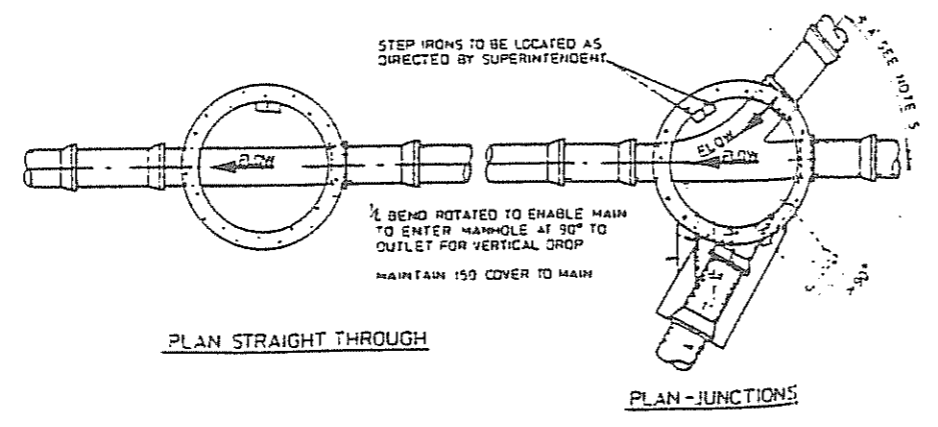
PIPE	CONCRETE	VC	AC	UPVC
150	150	150-630	150-770	150
225	150	150-770	150-840	150
300	150	150-910	150-1070	150
375	150	150-1100	150-1180	150
450	150	150-1340	150-1310	150
525	150	150-1770	150-1500	150
600	150	1000-1960	1000-1640	150



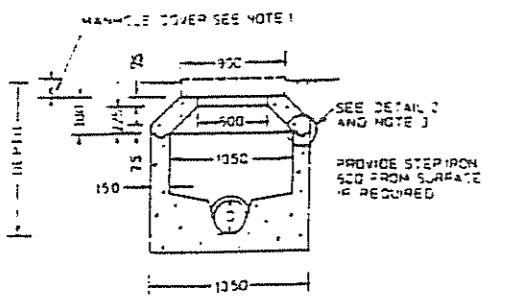
PIPE	CONCRETE	VC	AC	UPVC
150	150	OVER 430	OVER 770	150
225	150	OVER 770	OVER 840	150
300	150	OVER 970	OVER 1070	150
375	150	OVER 1100	OVER 1180	150
450	150	OVER 1340	OVER 1310	150
525	150	OVER 1770	OVER 1500	150
600	150	SPECIAL DESIGN REQUIRED		150



MANHOLE TYPE 2
FOR DEPTH UP TO 4500



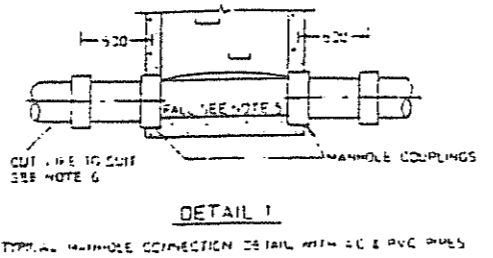
PLAN VIEWS MANHOLE TYPES 1, 2 & 3



MANHOLE TYPE 3

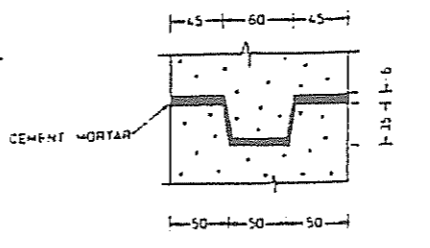
USE WHERE LESS THAN 1000 COVER OVER INLET PIPE & LESS THAN 1000 COVER OVER OUTLET PIPE (SEE ALSO NOTE 2)

CROSS SECTIONS



DETAIL 1

TYPICAL MANHOLE CONNECTION DETAIL WITH AC & PVC PIPES



JOINT DETAIL 2

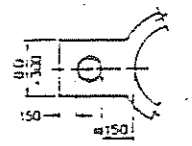
PRECAST TOP SECTIONS (SEE NOTE 3)

NOTES

- MANHOLE COVERS TO DRAWING ST 501, REINSTALLED 25mm ABOVE EXISTING SURFACE, FLUSH IN ROADS OR AS DIRECTED.
FOR LIGHT TYPE COVERS (1) DIMENSION "X" = 250 FOR HEAVY TYPE COVERS (1) DIMENSION "X" = 150 WHERE SURFACES ARE INCLINED, COVERS ARE TO BE INSTALLED PARALLEL TO THE EXISTING SURFACE.
- WHEN OUTLET PIPE COVER IS GREATER THAN 1000, THEN INLET PIPE COVER SHOULD BE GREATER THAN 1000 AND MANHOLE TYPES 1 & 2 USED.
- WHERE PRECAST TOP COVE UNITS ARE USED, JOINTS ARE TO BE AS SHOWN IF CAST IN PLACE, A PLAIN CONSTRUCTION JOINT MAY BE USED.
- GALVANISED MILD STEEL STEP IRONS TO DRAWING ST 504 TO BE CAST INTO WALLS.
- FALL THROUGH MANHOLE LEVELS SHOWN ON LONG SECTIONS ARE GRADE LINES EXTENDED TO CENTRE OF MANHOLE. THESE ALLOW FOR AN ADDITIONAL FALL ACROSS THE MANHOLE OF ANGLE THROUGH MM.

ANGLE THROUGH MM	SECTIONS A,C & D
2° < 'A' < 4.5°	30
4.6° < 'A' < 7.0°	50
7.1° < 'A' < 12.0°	100

 SOFFIT OF OUTLET TO BE GRADED FROM SOFFIT OF INLET, UNLESS SHOWN OTHERWISE.
- TO JOINT CUT AC PIPES ABOVE 150 DIA USE ADAPTOR COUPLINGS FOR MACHISED SPIGOT TO UNMACHINED SPIGOT ON CUT PIPE.
- MANHOLES ARE TO BE CONSTRUCTED OF GRADE 20 CONCRETE, WITH MIN 2 CEMENT RENDERING ON CHANNELS AND BENCHES. ALL BENCHES ARE TO SLOPE TOWARDS CHANNELS.
- CONCRETE SURROUNDS TO BE OF GRADE 20 CONCRETE, PROVIDE MIN 150 COVER AS SHOWN:



- MANHOLES ARE NOT TO BE CONSTRUCTED WITH DROPS IN THE FOLLOWING RANGES:

PIPE	DROP
150	300 TO 450
225	300 TO 540
300	300 TO 620
375	400 TO 760
450	400 TO 810
525	400 TO 920
600	400 TO 1000

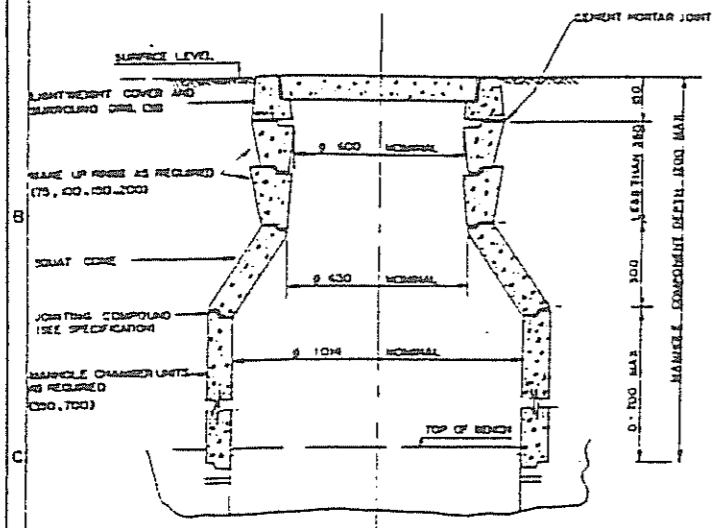
 TO AVOID A DROP BETWEEN THE ABOVE RANGES, LOWER THE LL OF THE INCOMING SEWER BY STEEPENING THE GRADE OF THE INCOMING LINE OR PROVIDING AN INTERMEDIATE THROUGH DROP MANHOLE.

B	STEP IRON SPACING AND LOCATION ALTERED		
A	REF CYCLOPS & EPNOTE "2" ADDED		
PROJ	DETAILS OF AMENDMENTS	APPROVED	DATE
DEPARTMENT OF PUBLIC WORKS N.S.W.			
S.E. PULL, DIRECTOR OF PUBLIC WORKS			
W.J. MILLER, CHIEF OF WORKS			
SEWERAGE RETICULATION			
MANHOLES			
(SEWER UP TO 600mm DIA)			
APPROVED	PRINCIPAL DESIGNER/ENGINEER	DRAWING	FILE
		ST. 500 B	

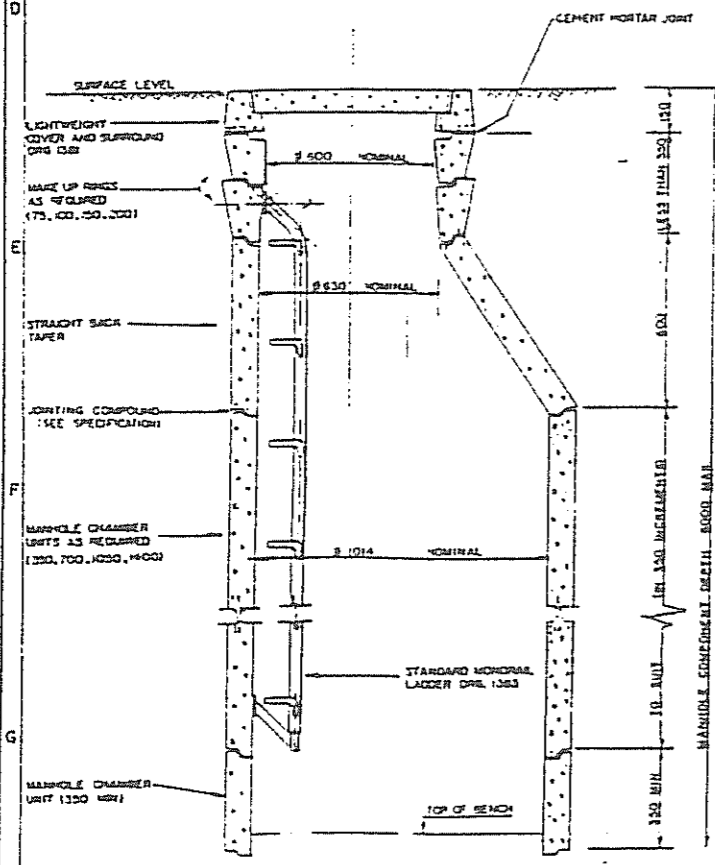
ALL LEVELS ARE IN METRES.
ALL OTHER DIMENSIONS ARE IN MILLIMETRES UNLESS STATED OTHERWISE



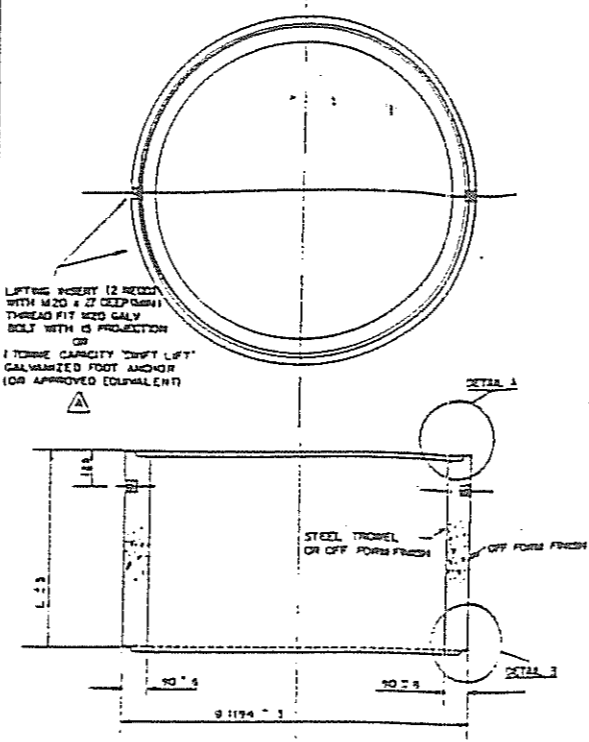
TYPICAL MANHOLE INSTALLATIONS



SEWER MANHOLE TYPE P1
FOR MANHOLES 450 TO 1200 COMPONENT DEPTH
NOTE ACCESS LADDER NOT REQUIRED IN SEWER MANHOLE TYPE P1

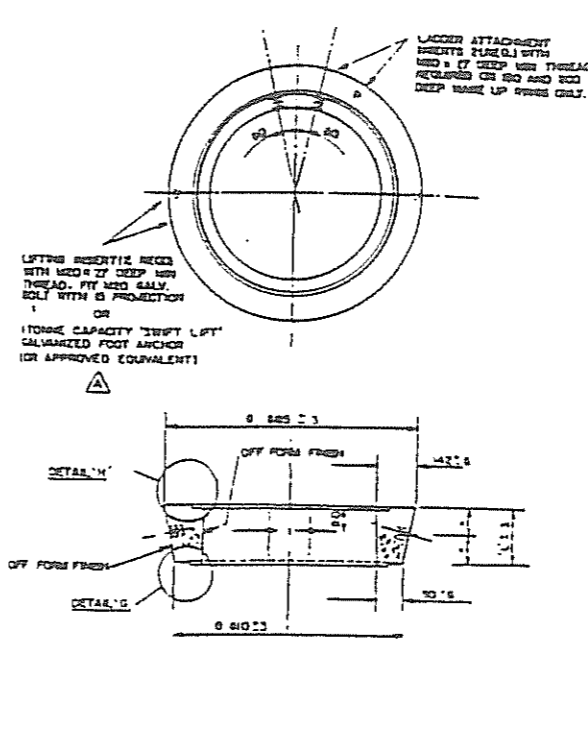


SEWER MANHOLE TYPE P2
FOR MANHOLES 1200 TO 3000 COMPONENT DEPTH
NOTE ACCESS LADDER TYPICAL ONLY FOR DETAILS AND METHOD OF FIXING SEE DRS OF 1363



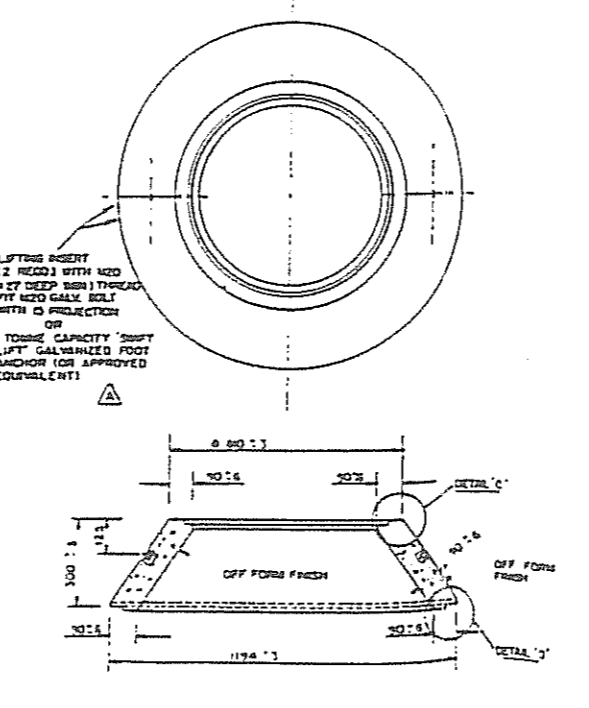
MANHOLE CHAMBER

LENGTH 'L'	350	700	1050	1400
APPROX MASS kg	260	520	780	1040



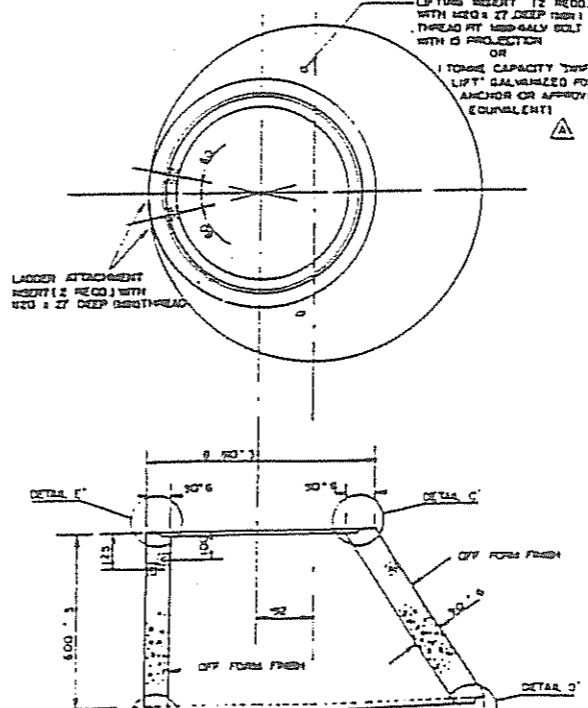
MAKE UP RING

LENGTH 'L'	75	100	150	200
APPROX MASS kg	40	55	80	110



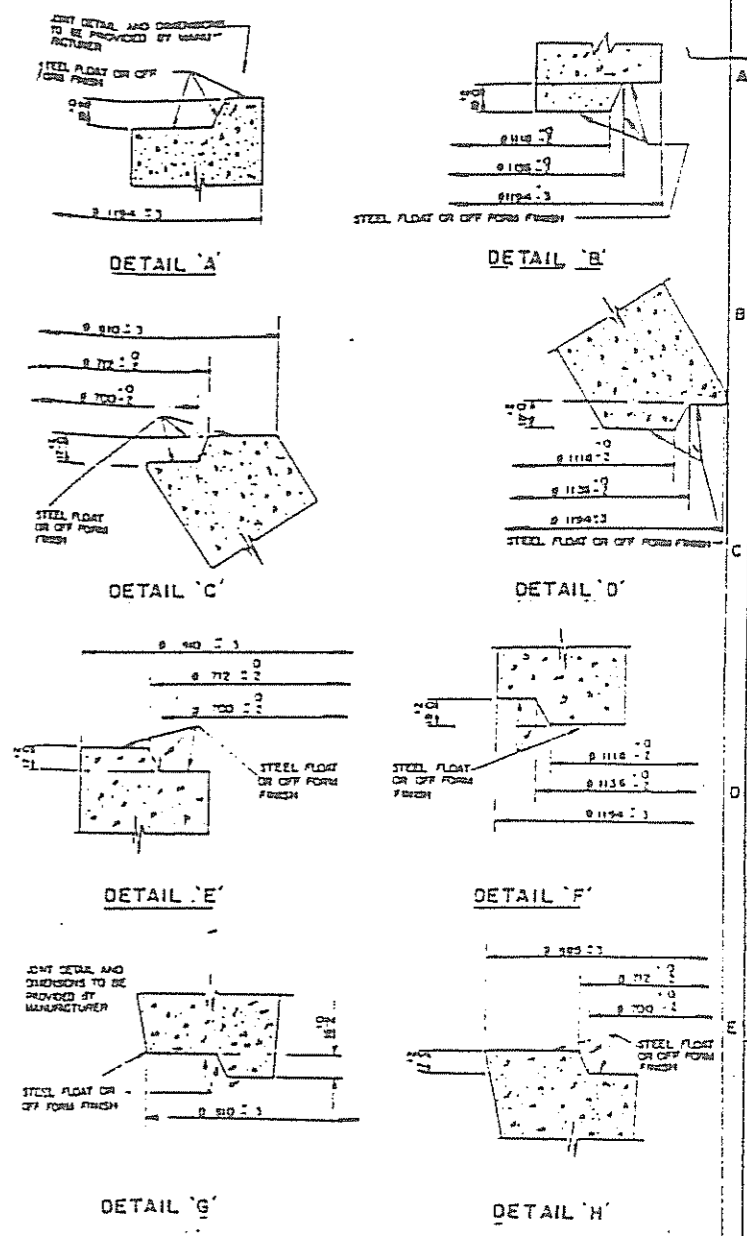
SQUAT CONE

APPROX MASS - 80 kg



STRAIGHT BACK TAPER

APPROX MASS - 360 kg

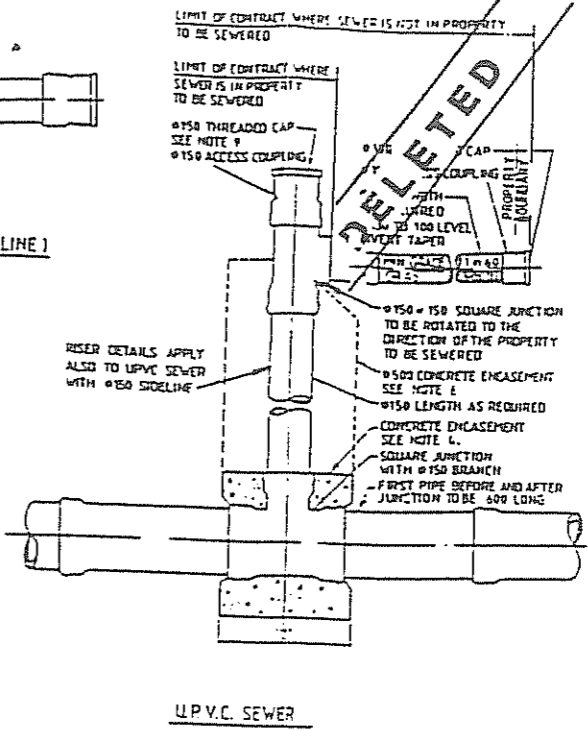
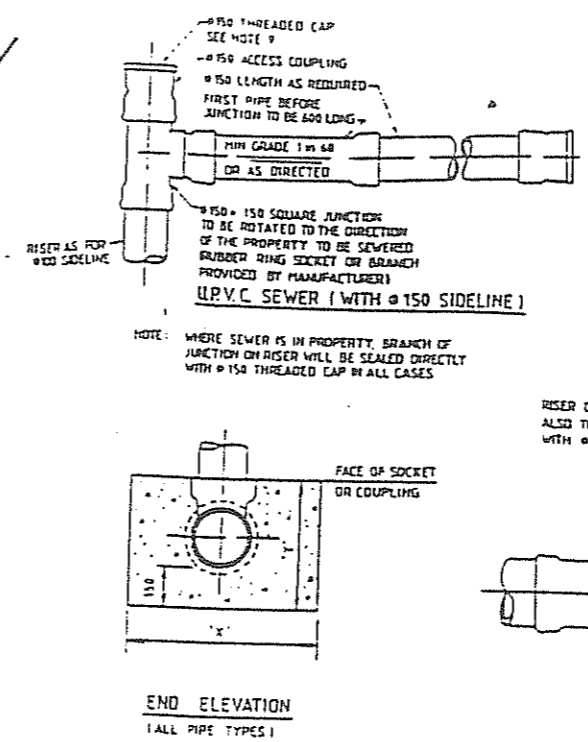
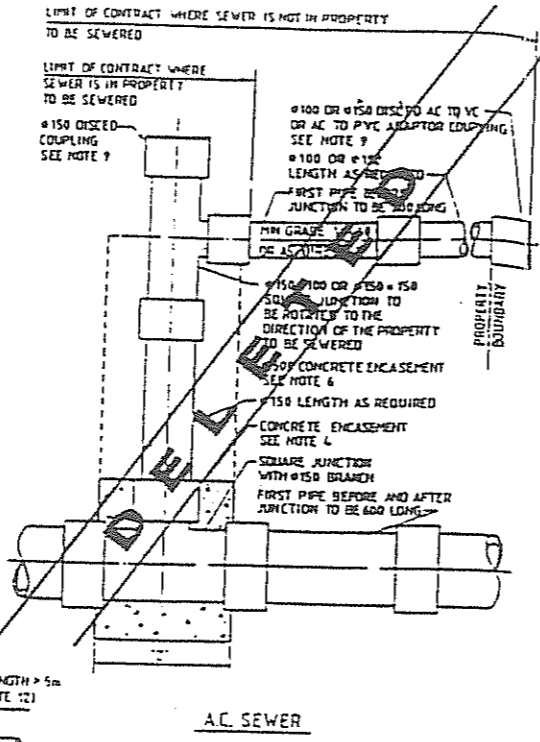
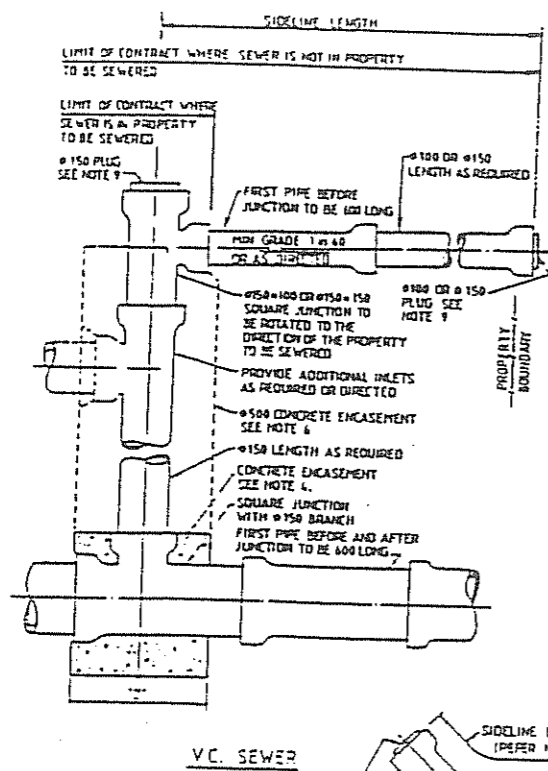


- NOTES:**
- CEMENT USED SHALL BE TYPE C LOW HEAT CEMENT IN ACCORDANCE WITH A.S. 1505 WITH A TRS CALCIUM SULFATE CONTENT NOT GREATER THAN 5%.
 - AGGREGATE SHALL COMPLY WITH A.S. 1465.
 - MAXIMUM SIZE OF AGGREGATE 20mm.
 - MINIMUM CLEAR COVER TO REINFORCEMENT SHALL BE 25mm.
 - REINFORCEMENT SHALL BE TO MANUFACTURERS DESIGN.
 - REINFORCEMENT SHALL BE SUPPORTED AND HELD IN POSITION IN THE MOLDING BY PLASTIC CHAIRS, SPACERS OR TIES OF METAL. SUPPORTS ARE USED THEY SHALL BE CAPPED WITH HARD PLASTIC OR STAINLESS STEEL WASHERS.
 - MANUFACTURE INSPECTION AND TESTING OF COMPONENTS SHALL BE IN ACCORDANCE WITH N.S.W. GOVERNMENT AUTHORIZED STANDARD SPECIFICATION.

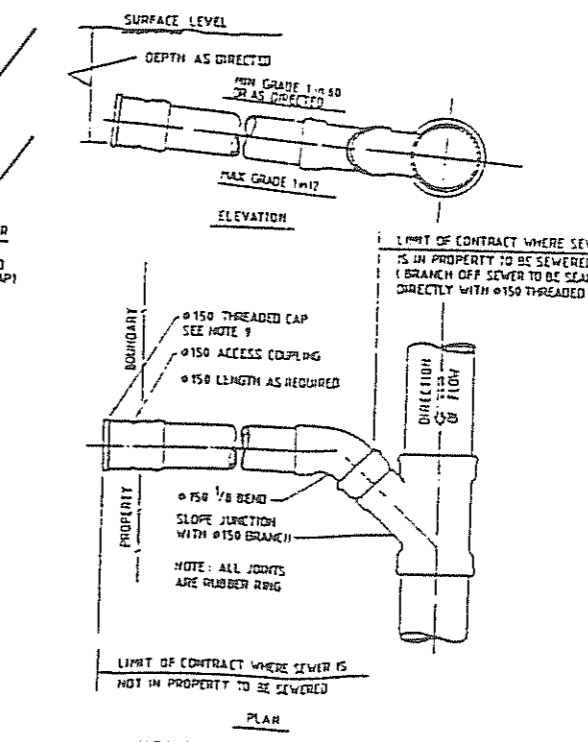
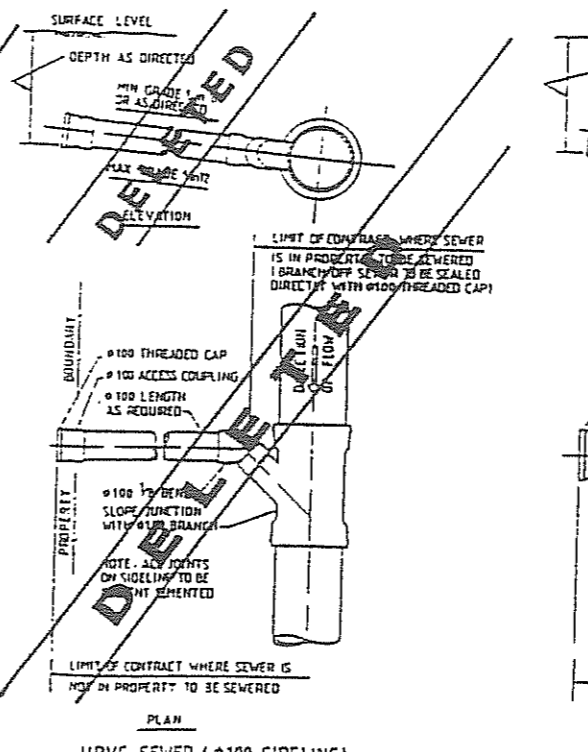
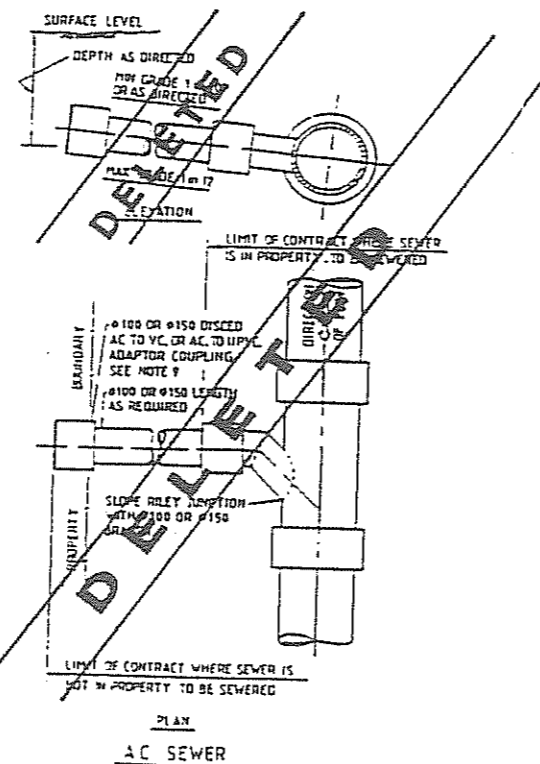
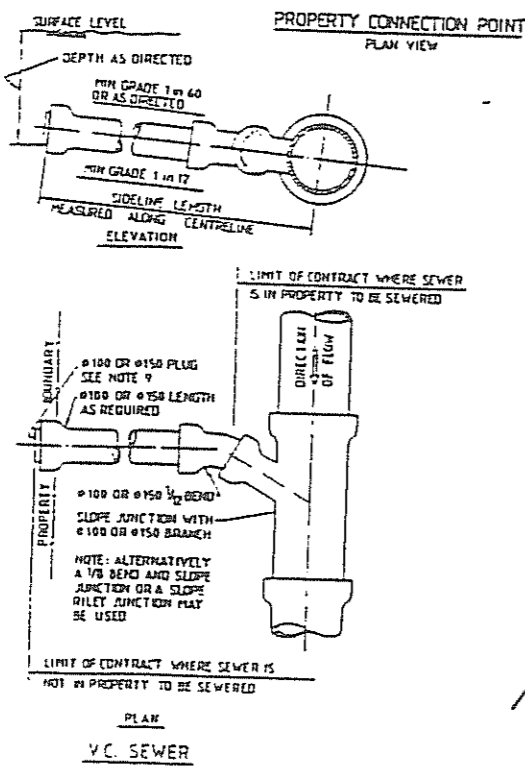
REFERENCE DRAWINGS:

- LIGHTWEIGHT MANHOLE COVER AND SURROUNDING D.R. 1361
- HEAVY TYPE MANHOLE COVER AND SURROUNDING D.R. 1362
- STANDARD MONORAIL LADDER 1363

N.S.W. GOVERNMENT SEWERAGE STANDARD			
PRECAST MANHOLE COMPONENTS		N.S.W. G.S.S. NO.	1380
		ISSUING AUTHORITY	NY
DATE OF REVISION	DETAIL OF ASSIGNMENT	APPROVED BY	DATE
11/11/82		APPROVED	APPROVED
		METROPOLITAN WATER SUPPLY & SEWERAGE DEPT. OF PUBLIC WORKS	APPROVED



DETAILS FOR SEWERS AT DEPTHS OF 2000mm AND GREATER



DETAILS FOR SEWERS AT DEPTHS LESS THAN 2000mm AND DEEPER WHERE DIRECTED

- NOTES**
- UNLESS OTHERWISE SPECIFIED OR INSTRUCTED BY THE DIRECTOR ALL SIDE LINES ARE TO BE 150
 - EXCEPT WHERE CONCRETE ENCASUREMENT IS DIRECTED THE BACKFILL AROUND RISERS IS TO BE SAND UP TO THE TOP OF THE SOCKET OR COUPLING ON THE HIGHEST BRANCH OFF THE RISER. THE SAND IS TO BE PLACED AND COMPACTED BY FLOODING FOR THE FULL WIDTH OF THE TRENCH AND FOR A MINIMUM DISTANCE OF 300mm BOTH UPSTREAM AND DOWNSTREAM OF THE RISER CENTRELINE. RISERS ARE TO BE FULLY SUPPORTED DURING BACKFILLING AND COMPACTION
 - GRADE IS CONCRETE IS TO BE USED FOR ALL ENCASEMENT
 - CONCRETE ENCASUREMENT AT THE BASE OF RISERS MAY BE EXTENDED IF THE SUPERINTENDENT CONSIDERS THE GROUND TO HAVE INSUFFICIENT BEARING CAPACITY
 - DIMENSION 'X' SHALL BE NOT LESS THAN THE MINIMUM WIDTH OF TRENCH SHOWN IN SCHEDULE TO SPECIFICATION SECTION E.2.
 - DIMENSION 'Y' SHALL BE FROM 150 BELOW THE BOTTOM OF THE PIPE BARREL TO THE TOP FACE OF THE SOCKET OR COUPLING ON THE BRANCH OF THE JUNCTION
 - DIMENSION 'Z' SHALL BE AS DIRECTED BY THE SUPERINTENDENT BUT SHALL AT LEAST EXTEND 250 EACH SIDE OF THE VERTICAL CENTRELINE OF THE RISER.
 - WHERE PIPES ARE TO BE CONCRETE ENCASED, A FLEXIBLE JOINT IS TO BE PROVIDED ADJACENT TO THE FACE OF THE CONCRETE
 - a) FOR SLOTTED PIPE ENDS, THE CONCRETE SHALL BE STOPPED 75mm FROM THE FACE OF THE MATING SOCKET OR COUPLING
 - b) FOR SOCKETED PIPE ENDS, THE CONCRETE SHALL BE TAKEN TO THE FACE OF THE SOCKET
 - IN ALL CASES CARE IS TO BE TAKEN TO ENSURE THE ENCASEMENT DOES NOT INTERFERE WITH THE FLEXIBILITY OF THE JOINT AND THAT JOINTS ARE KEPT CLEAN OF MORTAR
 - CONCRETE ENCASUREMENT FOR RISERS OF ALL PIPE MATERIAL TYPES IS TO BE PROVIDED WHERE DIRECTED. CONCRETE ENCASUREMENT MAY BE DIRECTED FOR RISERS LOCATED IN ROADWAYS AND OTHER AREAS SUBJECT TO VEHICULAR LOADING
 - a) AREAS NOT SUBJECT TO VEHICULAR LOADING - MINIMUM 450mm
 - b) AREAS SUBJECT TO VEHICULAR LOADING
 - i) IN ROAD - MINIMUM 750mm
 - ii) NOT IN ROAD - MINIMUM 600mm
 - WHERE DUE TO THE METHOD OF EXCAVATION, THE MAIN SEWER TRENCH HAS BATTERED SIDES SIDE LINES FROM RISERS SHALL BE LAID IN 600 LONG PIPE LENGTHS TO THE POINT WHERE UNDISTURBED FOUNDATION IN THE TRENCH EXISTS
 - DURING TESTING PLUGS (DISKED COUPLINGS OR CAPS) ON SIDE LINES AND THE TOP OF RISERS ARE TO BE RESTRAINED AGAINST MOVEMENT BY SUITABLE ANCHORAGES. ANCHORAGES MAY BE REMOVED AFTER TESTING
 - PROPERTY CONNECTION POINTS SHALL BE MARKED AS REQUIRED IN SCHEDULE TO SPECIFICATION SECTION E.2.
 - NO JUNCTION SHALL BE LONGER THAN 10m
 - ANY SIDE LINE LONGER THAN 5m SHALL BE PROVIDED WITH A SLOPE JUNCTION AT THE UPSTREAM END. THE PROPERTY MAY BE CONNECTED THROUGH THE BRANCH OF THAT JUNCTION AND THE MARKING TAPE ATTACHED THERE TO. WHERE SIDE LINES ARE EXTENDED OFF A SEWER TERMINATING AT A DEAD END, THE DISTANCE FROM THE DOWNSTREAM MANHOLE TO THE END OF THE SIDE LINE SHALL NOT EXCEED 30m.
 - MULTIPLE CONNECTIONS MAY BE PERMITTED THROUGH A SINGLE JUNCTION ON A SEWER - MORE THAN ONE JUNCTION MAY BE PROVIDED ON RISERS TO SERVE ADJACENT PROPERTIES. EACH SIDE LINE IS CONSIDERED SEPARATE FROM THE OTHER
 - a) TWO CONNECTION MAY BE MADE TO ONE SIDE LINE IN THE CASE OF TWO JUNCTIONS ON A RISER, FOUR CONNECTIONS WOULD THEREFORE, BE POSSIBLE ON A SINGLE JUNCTION ON THE SEWER WHERE A SIDE LINE OFF A SIDE LINE HAS BEEN USED. THE TOTAL LENGTH OF SIDE LINE SHALL NOT EXCEED 10m AND NOTE 12 APPLIES
 - b) MAXIMUM FLOW ON 300mm SIDE LINE SHALL NOT EXCEED THAT FROM 150

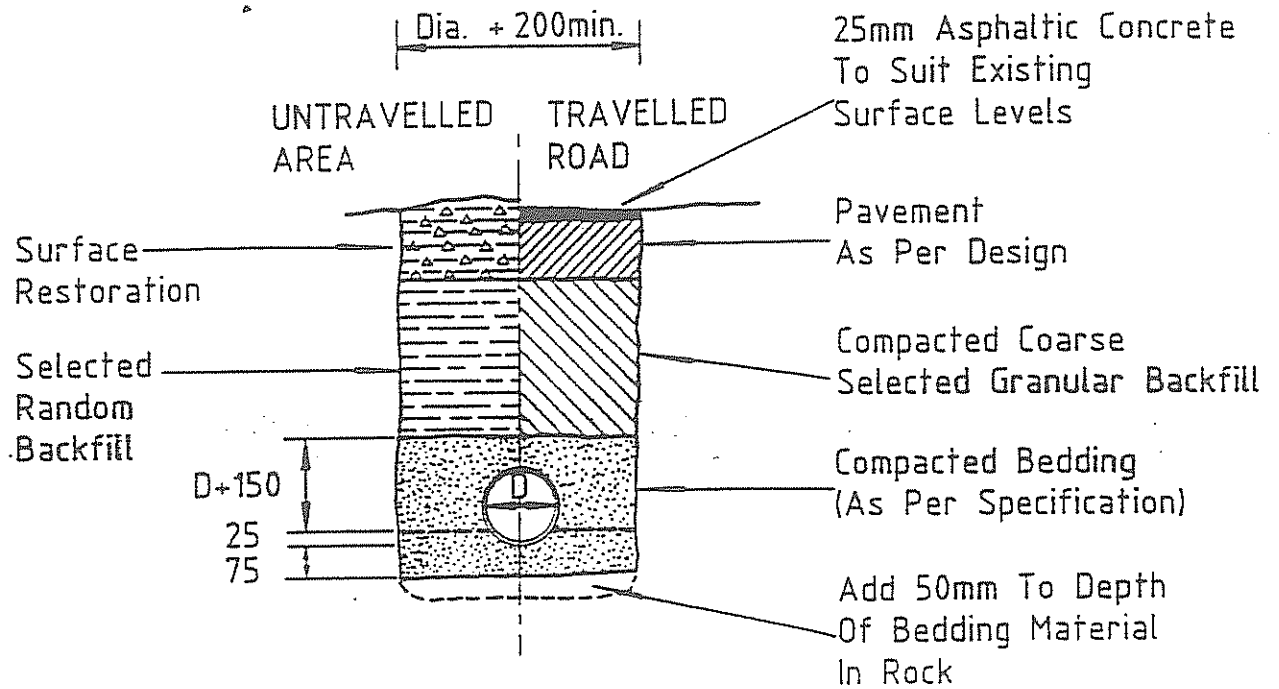
REVISIONS AND REDRAWN FROM 07/03/2005
 DETAILS OF WORKS PERFORMED APPROVED BY: _____

ALL LEVELS ARE IN METRES
 ALL OTHER DIMENSIONS ARE IN MILLIMETRES UNLESS STATED OTHERWISE

RELEASED BY: _____ DATE: 12/10/05
 PUBLIC WORKS DEPARTMENT N.S.W.
 DIRECTOR OF PUBLIC WORKS
 CHIEF ENGINEER

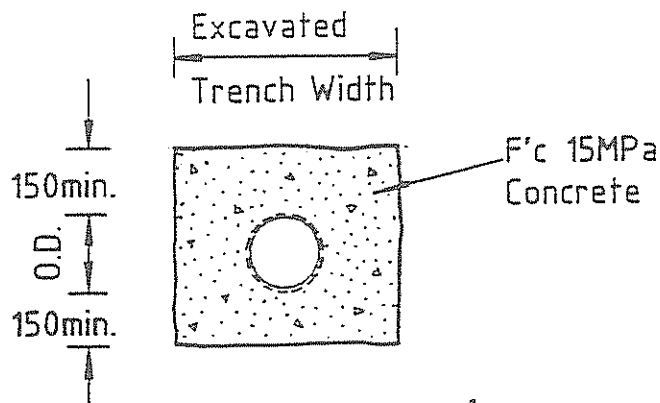
SEWERAGE STANDARD
 SEWERAGE RETICULATION
 SIDE LINE DETAILS
 (SEWERS UP TO 600mm DIA ONLY)

FILE NO. 5744/8
 DRAWING NO. ST 5030



PIPE TRENCH DETAIL

Not To Scale



CONCRETE ENCASEMENT DETAIL

Not To Scale

SEWER MAIN TRENCH DETAILS	SCALES AS SHOWN		DIR. W & T SERVICES	DATE
	DRAWN		A4	DRAWING No. 6499
	TRACED			
	CHECKED			