

THESE DRAWINGS HAVE BEEN PREPARED FOR CONSTRUCTION CERTIFICATE. All discrepancies or variations to the design shown on these drawings shall be referred to the Design Engineer.

- STORMWATER DRAINAGE**
- S STORMWATER DRAINAGE
 - SEWER (SOLID WASTE)
 - WATER (SOLID WASTE)
 - C TELSTRA
 - GAS
 - TELSTRA
 - AGILITY
 - ENERGY AUSTRALIA
 - STONEY WATER
 - UE COMM
 - ENERGY AUST.

EXTERNAL WORKS
All activities and works referred to the site, or that affect public roads, are to be carried out in accordance with Council's codes and standards.
Public footpaths shall be reconstructed to the satisfaction of Council's Director of Engineering Services. A road opening permit shall be obtained for all works carried out on public or Council Controlled Road. Reinstatement of footpaths, roads and public works shall be to Council's requirements. All other reinstatement shall be to the satisfaction of the relevant parties.
These works are undertaken on public roads, adequate traffic control and directions to motorists shall be provided.

INSPECTIONS AND APPROVALS
The Contractor is to provide notices to the Council Engineer at least 14 days prior to the commencement of any works. Approvals are required by the Council's specification. Provide notices to the relevant authority prior to connection to the Authorities drainage/sewerage or water supply systems. If required, the connection shall be carried out under the supervision of the Authorities officers.
The Contractor shall allow for the copying off, inspection and removal (if required) of all existing services in areas affected by the works. The Contractor shall ensure, at all times, services to all buildings not affected by the works are not disrupted.
The Contractor shall conduct temporary services to maintain existing supply to buildings remaining areas required. Once the works are complete and commissioned, the Contractor shall remove all such temporary services and make good of disturbed areas.

LEGEND - PIPEWORK

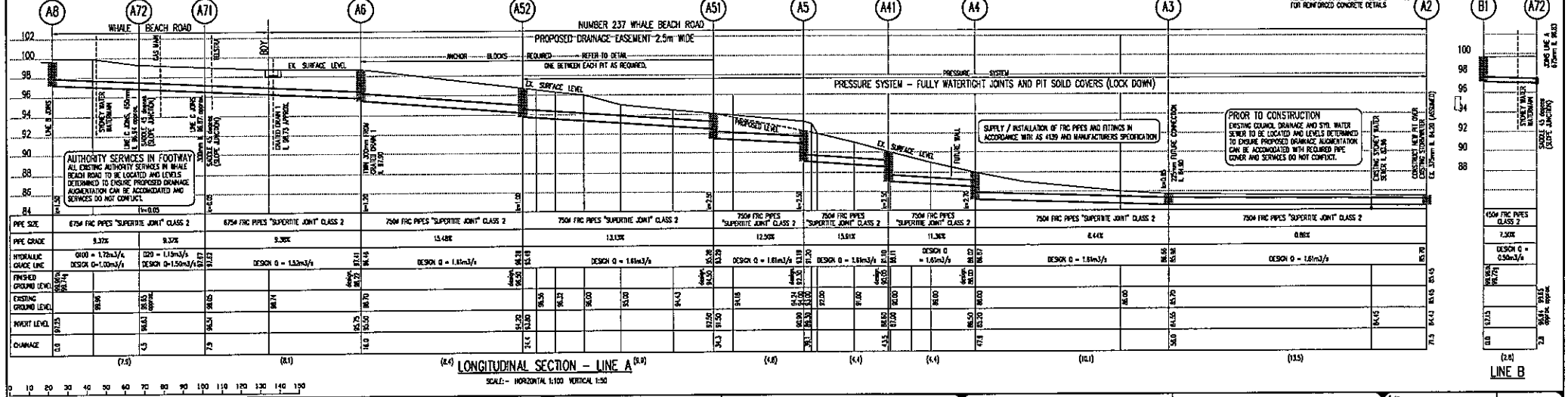
- STORMWATER DRAINAGE
- DIRECT EXIT OUTLET (HEADWALL)
- SEWER DRAINAGE
- GRADED DRAIN
- SEWER TO BE DISASSED
- SEWER DRAIN CLEAN-OUT POINT
- FLOW DIRECTION
- OVERLAND FLOW PATH

LEGEND - SYMBOLS

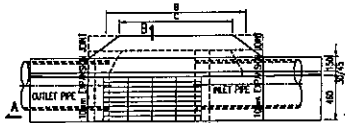
- SEWER ACCESS CHAMBER
- END CAP
- PROPOSED FINISHED SURFACE LEVEL
- STR. INSPECTION PIT
- STR. GRADED PIT
- CLASS B CONCRETE FRAMES IN NON-TRAFFIC AREAS
- CLASS C CONCRETE FRAMES IN TRAFFIC AREAS
- ROCK WALLINGS

DRAINAGE DESCRIPTION

GRADED DRAIN 1	NOMINAL CLEAR INTERNAL SIZE - 500mm wide x 500mm deep HIGH END - GRADE RL 98.22, 98.23, 98.24 (PARALLEL LINE TO OUTLET) OUTLET - GRADE RL 98.14, 98.15 SUMP AT OUTLET 1500 LONG x 500 WIDE x 2000 DEEP A SUMP 98.13 DISCHARGE - 75mm 300mm PIPES TO FIT AN GRADE TYPE - CASTIC MESH GRATE & FRAME (CODE J31520) EXTRA HEAVY DUTY - GAL. WILD STEEL 500mm CLEAR OPENING
GRADED DRAIN 2	NOMINAL CLEAR INTERNAL SIZE - 400mm wide x 500mm deep HIGH END - GRADE RL 98.22, 98.23, 98.24 OUTLET - GRADE RL 98.22, 98.23 18' FALL TO OUTLET, DISCHARGE DIRECTLY TO PIT AN GRADE TYPE - CASTIC MESH GRATE & FRAME (CODE J31520) EXTRA HEAVY DUTY - GAL. WILD STEEL 500mm CLEAR OPENING



<p>MR AND MRS GRANT</p> <p>CONTRACTOR: CONCRETE CONCRETE - CONCRETE APPROVAL</p> <p>DATE: 25/09/06</p>	<p>COPYRIGHT</p> <p>BY: A K Y CIVIL ENGINEERING</p>	<p>STORMWATER DRAINAGE CERTIFICATION</p> <p>I AM AN APPROVEDLY REGISTERED AND COMPETENT PERSON IN THE STATE OF NEW SOUTH WALES IN THE NATIONAL PROFESSION REGISTERED PROFESSION (NSP) AND AS SUCH CAN CERTIFY THE DESIGN</p> <p>NAME OF ENGINEER: GUY DE COMPAGNE</p> <p>QUALIFYING DESIGNER: GUY DE COMPAGNE</p> <p>REGISTERED PROFESSIONAL ENGINEER (NSP) 2008</p> <p>REG. NO. 10157</p>	<p>A K Y Civil Engineering</p> <p>Consulting Civil Engineers ABN 77 595 503 088</p> <p>Unit 11, 13 Busocco Road, Marsfield NSW 2122</p> <p>Phone (02) 9868 4834 Fax (02) 9868 4834</p> <p>mobile 0411897499</p> <p>email akyc@willies.com.au</p>	<p>PROPOSED NEW DWELLING</p> <p>237 WHALE BEACH ROAD</p> <p>WHALE BEACH NSW 2107</p>	<p>STORMWATER DRAINAGE PLAN</p> <p>LONG SECTION LINES A AND B</p>	<p>Scale: 1:100 at A1</p> <p>Date: 25/09/06</p> <p>Drawn by: AKY</p> <p>Checked by: AKY</p> <p>Project No: 03191</p> <p>Sheet: C-01 of 8</p>
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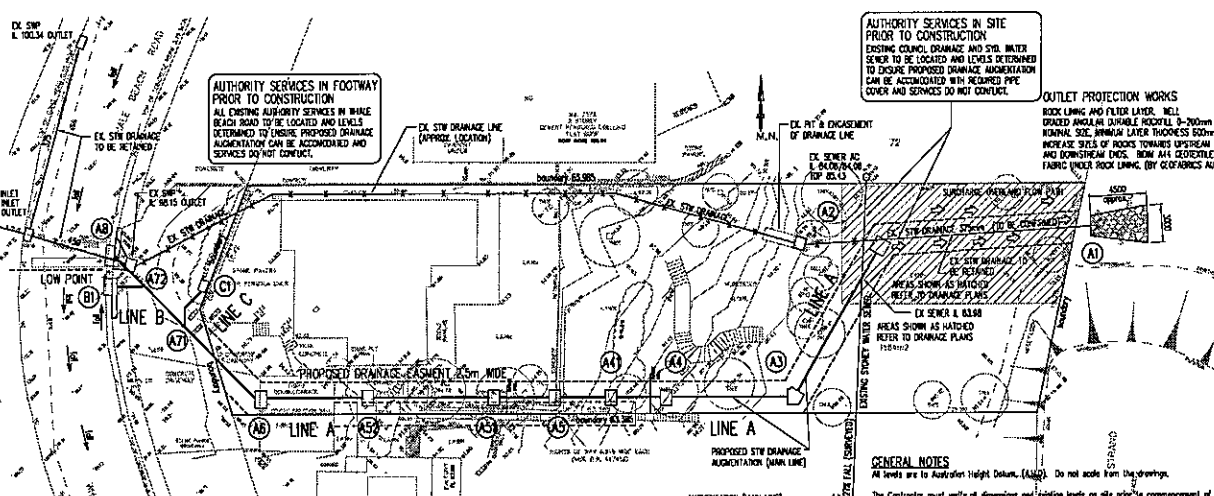


TYPICAL GRADED KERB INLET PIT PLAN
(PIT LOCATED ON GRADE)

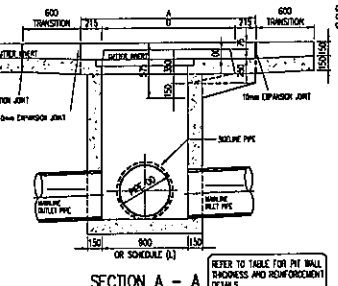
PRECAST CONCRETE LINTEL

TYPE	A mm	B mm	C mm	D mm	WEIGHT
L-8	2438	2063	1778	2007	415
L-24	3048	2697	2388	2636	552

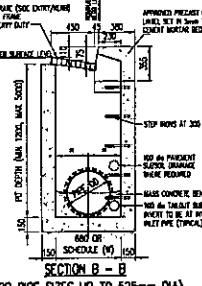
CATCHMENT DRAINAGE CALCULATIONS
 DRAINAGE TO ROADWAY LOW POINT
 UPSTREAM CATCHMENT AREA 3.33 ha
 TIME OF CONCENTRATION 7 min (interpolated)
 FRACTION IMPERVIOUS 0.65
 Q10 DISCHARGE (L/S) 1.72 m³/s
 DISCHARGE (APPROXIMATE) 1.55 m³/s
 EX. PIPE SYSTEM CAPACITY ACROSS ROAD (450mm PIPE) 0.36 m³/s
 EX. PIPE SYSTEM CAPACITY THROUGH SITE (150mm PIPE) 0.32 m³/s



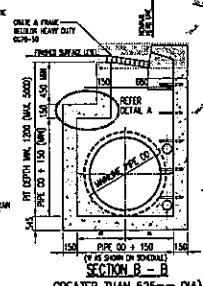
SITE PLAN
SCALE 1:100



SECTION A - A
(REFER TO TABLE FOR PIT WALL THICKNESS AND REINFORCEMENT DETAILS)



SECTION B - B
(FOR PIPE SIZES UP TO 525mm DIA)

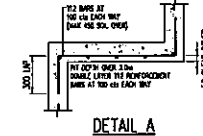


SECTION R - R
GREATER THAN 525mm DIA

MAINLINE PIPE SIZE vs PIT WIDTH (W) SIDELINE PIPE SIZE vs PIT LENGTH (L)

PIT LOCATED ON GRADE OR SAG			
MAINLINE PIPE SIZE	MINIMUM MAINLINE PIT DEPTH (min)	STEP	
425 TO 452.5	680	1400	-
450	900	1450	300
475	900	1550	300
475	1050	1650	370

PIT LOCATED ON GRADE OR SAG			
PIPE SIZE	LENGTH (min)	PIT DEPTH (min)	STEP
425 TO 450	800	1400	-
450	900	1550	-
475	1100	1650	200



DETAIL A
STEP IN PIT UP TO 1000mm IN ONE OR TWO WAYS

PIT SCHEDULE

LABEL	PIT TYPE	PIT SIZE (L x W)	NOTES
A1	EXISTING OUTLET	-	CONSTRUCT OUTLET PROTECTION WORKS REFER TO SITE PLAN.
A2	GRADED SURFACE PIT	1200 x 1200	SURFACE PIT WITH MULTIPLE PART LOCK DOWN GRATE & FRAMES TO SUIT OPENING CLASS C.
A3	JUNCTION PIT - SPECIAL DETAIL	REFER TO DETAIL	3000x600 SOLID COVER CLASS B COVER TO BE SOLID WATERPROOF LOCK DOWN.
A4	JUNCTION PIT - DROP	900 x 1200	900 SQUARE SOLID COVER CLASS B COVER TO BE SOLID WATERPROOF LOCK DOWN.
A41	JUNCTION PIT - DROP	900 x 1200	900 SQUARE SOLID COVER CLASS B COVER TO BE SOLID WATERPROOF LOCK DOWN.
A5	JUNCTION PIT - DROP	900 x 1200	900 SQUARE SOLID COVER CLASS B COVER TO BE SOLID WATERPROOF LOCK DOWN.
A51	JUNCTION PIT - DROP	900 x 1200	900 SQUARE SOLID COVER CLASS B COVER TO BE SOLID WATERPROOF LOCK DOWN.
A52	JUNCTION PIT - DROP	900 x 1200	900 SQUARE SOLID COVER CLASS B COVER TO BE SOLID WATERPROOF LOCK DOWN.
A53	JUNCTION PIT - DROP	900 x 1200	900 SQUARE SOLID COVER CLASS B COVER TO BE SOLID WATERPROOF LOCK DOWN.
A6	JUNCTION PIT - DROP	900 x 1200	900 SQUARE SOLID COVER CLASS B COVER TO BE SOLID WATERPROOF LOCK DOWN.
A7	JAMES HARVEY FIC SADDLE (4% SLOPE)	-	MAIN LINE 875mm BRANCH LINE 300mm FIC SUPERFIC BRANCH FIC SADDLE SLOPE FROM JAMES HARVEY FIC PIPES.
A72	JAMES HARVEY FIC SADDLE (4% SLOPE)	-	MAIN LINE 875mm BRANCH LINE 450mm FIC SUPERFIC BRANCH FIC SADDLE SLOPE FROM JAMES HARVEY FIC PIPES.
A8	GRADED KERB INLET PIT 2.6m EXTENDED KERB INLET	1200 x 900	REFER TO DETAIL.
B1	GRADED KERB INLET PIT 2.6m EXTENDED KERB INLET	900 x 600	REFER TO DETAIL.
C1	GRADED SURFACE INLET PIT	900 x 600	INLET PIT WITH LOCK DOWN GRATE & FRAMES TO SUIT OPENING CLASS D LOCK DOWN.

NO VARIATION IN GRATE PIT ACCESS COVER AND GRATES POINTED UNLESS OTHERWISE APPROVED FROM COUNCIL OBTAINED

1200x1200 GRADED SURFACE PIT LOCK DOWN TO BE GALV CALD MILD STEEL FABRICATED TO SUIT. GRATE AND FRAME TO BE BASED ON LEAST CLEAR OF FRACTION GRADING.

3000x600 AND 900x1200 SOLID COVERS WATERPROOF LOCK DOWN TO BE GALV CONCRETE IN-FILLED TO NOMINAL SIZE AND LOAD CLASS AS SHOWN (I PART, CODE J01C)

DAILY GRATE FOR KERB INLET PIT LOCK DOWN GRATE SHALL BE GALV CALD MILD STEEL TO NOMINAL SIZE AND LOAD CLASS AS SHOWN (CODE J31C4H-1007)

CONCRETE PIPES
Pipe storage on site must be secure to prevent pipes from rolling.

Pipes must not be pushed or rolled around the site. They must be fixed in the correct way, by using the lifting lugs or by using a hoisting sling in the correct position.

Pipes must be installed, bedded and backfilled in accordance with the designers specification.

Leaky pipes on steep slopes with bucket facing up the grade.

If ground water is likely to be a problem, special drainage shall be provided, discharging to natural outlets.

If anchor blocks are specified, anchor blocks must be designed and installed so that they do not differentially support a pipe in a manner likely to overstress the pipe longitudinally or to interfere with the flexibility of a joint.

Existing pipes which form no part of the drainage system shall be covered or sealed.

Flow lengths measured between pit centers.

All pipe junctions and tapers shall be via purpose made fittings.

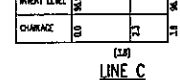
DRAINAGE PITS
Benching to be half outgoing pipe depth. Concrete for benching to be 20MPa mass concrete.

Approved precast pits may be used.

Diameter 100mm hole for subsoil drainage outlet to be located 100mm above invert of all inlet pipes. Consider 100mm subsoil drainage to extend for a distance of 1.0m upstream of pit (at each inlet trench) with the upstream and sealed.

All connections to existing drainage pits shall be made in a 1:2 gradient to the corner and the invert of the pit at the point of entry and be cement rendered to ensure a smooth finish.

Pit grates and solid covers shall be Class D in non-traffic areas and Class B in traffic areas in accordance with AS 3996.



LINE C

AUTHORITY SERVICES IN SITE PRIOR TO CONSTRUCTION
EXISTING COUNCIL DRAINAGE AND STW WATER SENIOR TO BE LOCATED AND LEVELS DETERMINED TO ENSURE PROPOSED DRAINAGE AUGMENTATION CAN BE ACCOMMODATED WITH REQUIRED PVE COVER AND SERVICES DO NOT CONTACT.

OUTLET PROTECTION WORKS
ROCK LINING AND FILTER LAYER, WELL GRADED ANTI-SUBSIDENCE ROCKFILL 0-200mm NOMINAL SIZE, MINIMUM LAYER THICKNESS 500mm, AUGMENTATION OF ROCKS TOWARDS UPSTREAM AND DOWNSTREAM ENDS, BIRM 414 GEOTEXTILE FABRIC UNDER ROCK LINING, (BY GEOTECHNICALS AUSTRALIA)

GENERAL NOTES
All levels are to Australian Height Datum (AHD). Do not scale from drawings.
The Contractor must verify all dimensions and existing levels on site prior to commencement of works. Report any discrepancies to the Superintendent or Design Engineer.
Read these plans in conjunction with approved architectural, structural, hydraulic and mechanical drawings and specifications.
Where new work entails existing, the Contractor shall ensure that it smooth over profile, free from sharp changes, is obtained.
The Contractor shall arrange all survey work to be carried out by a registered surveyor.
Care is to be taken when excavating near existing services. No mechanical excavators are to undertake any excavation or electrical applications without approval in three areas.
All building surrounds shall be graded to ensure overland flow from rooflines, areas cut into around the foundations, walls and buildings. Grate finished surface to fall into the correct fall pits and gullies.
All excavation, shoring of excavation and stability of adjacent structures shall be the responsibility of the Contractor.
Workmanship and materials shall conform with the requirements of the relevant SAA Codes, BCA requirements and the specification, by-laws and ordinances of the relevant Authorities.
Proprietary products used shall be installed to manufacturer's specification and to the satisfaction of the Superintendent.
Council's tree preservation orders shall be strictly adhered to. No trees shall be removed.
Vehicular access and existing services shall be maintained at all times in adjacent properties during the construction period.

CONCRETE PIPES
Pipe storage on site must be secure to prevent pipes from rolling.

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Leaky pipes on steep slopes with bucket facing up the grade.

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Flow lengths measured between pit centers.

All pipe junctions and tapers shall be via purpose made fittings.

DRAINAGE PITS
Benching to be half outgoing pipe depth. Concrete for benching to be 20MPa mass concrete.

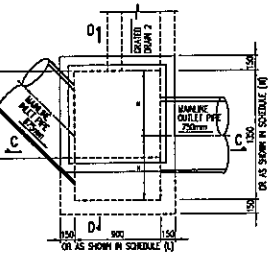
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Pit grates and solid covers shall be Class D in non-traffic areas and Class B in traffic areas in accordance with AS 3996.

THESE DRAWINGS HAVE BEEN PREPARED FOR CONSTRUCTION CERTIFICATE
All discrepancies or variations to the design shown on these drawings shall be referred to the Design Engineer

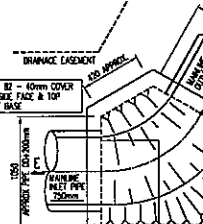


TYPICAL JUNCTION PIT PLAN
(SHOW FOR PIT A6, OTHER PITS SIMILAR)

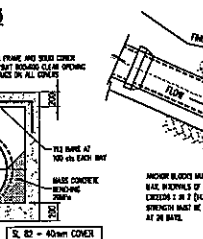
PIT REINFORCEMENT & WALL THICKNESS DETAILS

PIT DEPTH	WALL THICKNESS	WALL & FLOOR REINFORCEMENT	STANDARD BARS	DEPT. PIPES	DEPT. PIPES
<1.2m	150mm	SL 82 - 40mm COVER HOSE FACE & TOP OF BASE	#12 @ 200	NO	NO
1.2m - 1.5m	150mm	SL 82 - 40mm COVER HOSE FACE & TOP OF BASE	#12 @ 200	YES	YES
1.5m - 1.8m	175mm	SL 82 - 40mm COVER HOSE FACE & TOP OF BASE	#12 @ 200	YES	YES
>1.8m	225mm	DOUBLE LAYER THROUGH LAYWAY	#12 @ 200	YES	YES

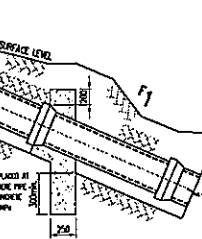
40mm COVER TO ALL FACES (LAP ALL BARS 400mm, 90% REINFORCING BARS UNLAP CONCRETE STRENGTH, FC 25MPa AT 28 DAYS, SLUMP 75mm, MINIMUM AGGREGATE SIZE 20mm, NO ADMIXTURES SHALL BE USED. MASS CONCRETE BENCHING TO ALL PIT BASES TO FORM SMOOTH TRANSITION AT PIT BASE FOR PITS A2 TO A6. FC 20MPa AT 28 DAYS. LOCATE DRAINAGE PIPES CENTRALLY OVER DRAINAGE CASSETT. ALL REINFORCEMENT AND MATERIALS IN ACCORDANCE WITH AS 3900 (CURRENT EDITIONS)



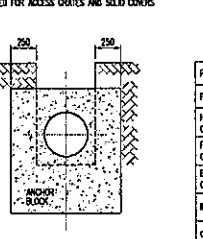
JUNCTION PIT A3



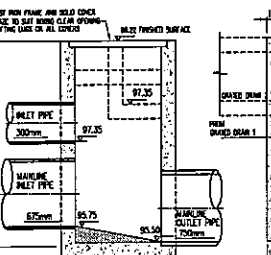
SECTION E - E



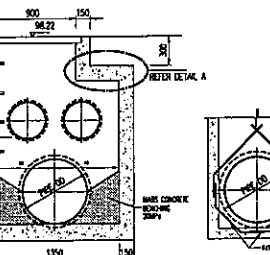
ANCHOR BLOCK DETAIL
NOT TO SCALE



SECTION F - F



SECTION C - C
(REFER TO TABLE FOR PIT WALL THICKNESS AND REINFORCEMENT DETAILS)



SECTION D - D
(REFER TO TABLE FOR PIT WALL THICKNESS AND REINFORCEMENT DETAILS)

PIPES CAST IN PIT
PIPE SIZE > 600 dia. AND PIT WALL UP TO 175mm BRICK THICKNESS BOTH FACES BENCHING WALL THICKNESS IS 225mm