ONSITE STORMWATER DETENTION DESIGN

Project: **KAREENA PRIVATE HOSPITAL EXTENSION**

OSD No: 1 Description: Under ground tank, detention volume = 32.5 cum., orifice dia.=202mm

Stage - Storage relationship:

H (RL)	Vol. (m3)
34.2	0
34.4	14.45
34.6	28.88
34.65	32.5
34.7	32.6
35.1	32.9

Tank plan area (m2) = 72.2

Catchment Areas:

	Predeveloped		Direct runoff		Proposed with OSD	
Area (ha)	0.19253		0		0.19253	
	Paved	Grassed	Paved	Grassed	Paved	Grassed
% of Area	37	63	0	0	84.5	15.5
Constant Time (mins)	2	2	0	0	6	2
Flow Path length (m)	50	60	8	0	75	10
Flow path Slope (%)	2	2	1	0	1	2
Flow path roughness	0.013	0.3	0	0	0.013	0.3
Lag (mins)		0		0	0	0

Results:

ARI	STORM	EXISTING PREDEV. FLOWS	POST DEVEL. DIRECT FLOWS	PERMISSIBLE SITE DISCHARGE	POST DEVEL. OSD PEAK FLOW	PEAK OVERFLOW FROM OSD	POST DEVEL. PEAK TOTAL FLOWS FROM OSD	PEAK VOL. OSD	Comments
		cum/s	cum/s	cum/s	cum/s	cum/s	cum/s	m3	
5	25	0.045	0.000	**0.045**	0.044	0.000	0.044	10.19	34.54 - PSD adopted
5	30	0.041	0.000	0.041	0.045	0.000	0.045	8.79	34.54
5	90	0.042	0.000	0.042	0.045	0.000	0.045	5.04	34.53
10	25	0.053	0.000	**0.053**	0.045	0.000	0.045	15.86	34.55 - PSD adopted
10	30	0.049	0.000	0.049	0.045	0.000	0.045	14.32	34.55
10	90	0.051	0.000	0.051	0.045	0.000	0.045	11.55	34.54
20	25	0.064	0.000	**0.064**	0.045	0.001	0.046	23.78	34.56 - PSD adopted
20	90	0.062	0.000	0.062	0.045	0.000	0.045	22.99	34.55
50	25	0.073	0.000	0.073	0.046	0.015	0.061	28.59	34.6
50	90	0.075	0.000	**0.075**	0.047	0.019	0.066	29.59	34.61 - PSD adopted
100	25	0.084	0.000	0.084	0.049	0.028	0.077	31.54	34.58
100	30	0.079	0.000	0.079	0.048	0.025	0.073	30.97	34.63
100	60	0.082	0.000	0.082	0.050	0.033	0.083	32.52	34.65
100	90	0.087	0.000	**0.087**	0.050	0.031	0.081	32.18	34.64 - PSD Adopted

Comments:

Head over outlet= 0.45 m

Max PSD = 0.045 cum/s

Suggested Orifice size 0.202 m

ONSITE STORMWATER DETENTION DESIGN

Project: **KAREENA PRIVATE HOSPITAL EXTENSION**

OSD No: 2 Description: Under ground tank, detention volume = 3 cum., orifice dia.=120mm

Stage - Storage relationship:

H (RL)	Vol. (m3)
33.2	0
33.4	0.75
33.6	1.50
33.8	2.3
34	3
34.15	3.1

Tank plan area (m2) = 3.75

Catchment Areas:

	Predeveloped		Direct runoff		Proposed with OSD	
Area (ha)	0.0435		0		0.0435	
	Paved	Grassed	Paved	Grassed	Paved	Grassed
% of Area	62	38	0	0	79.3	20.7
Constant Time (mins)	3	3	0	0	1	1
Flow Path length (m)	12	5	0	0	12	5
Flow path Slope (%)	1	1	0	0	1	1
Flow path roughness	0.013	0.3	0	0	0.013	0.3
Lag (mins)		0		0	0	0

Results:

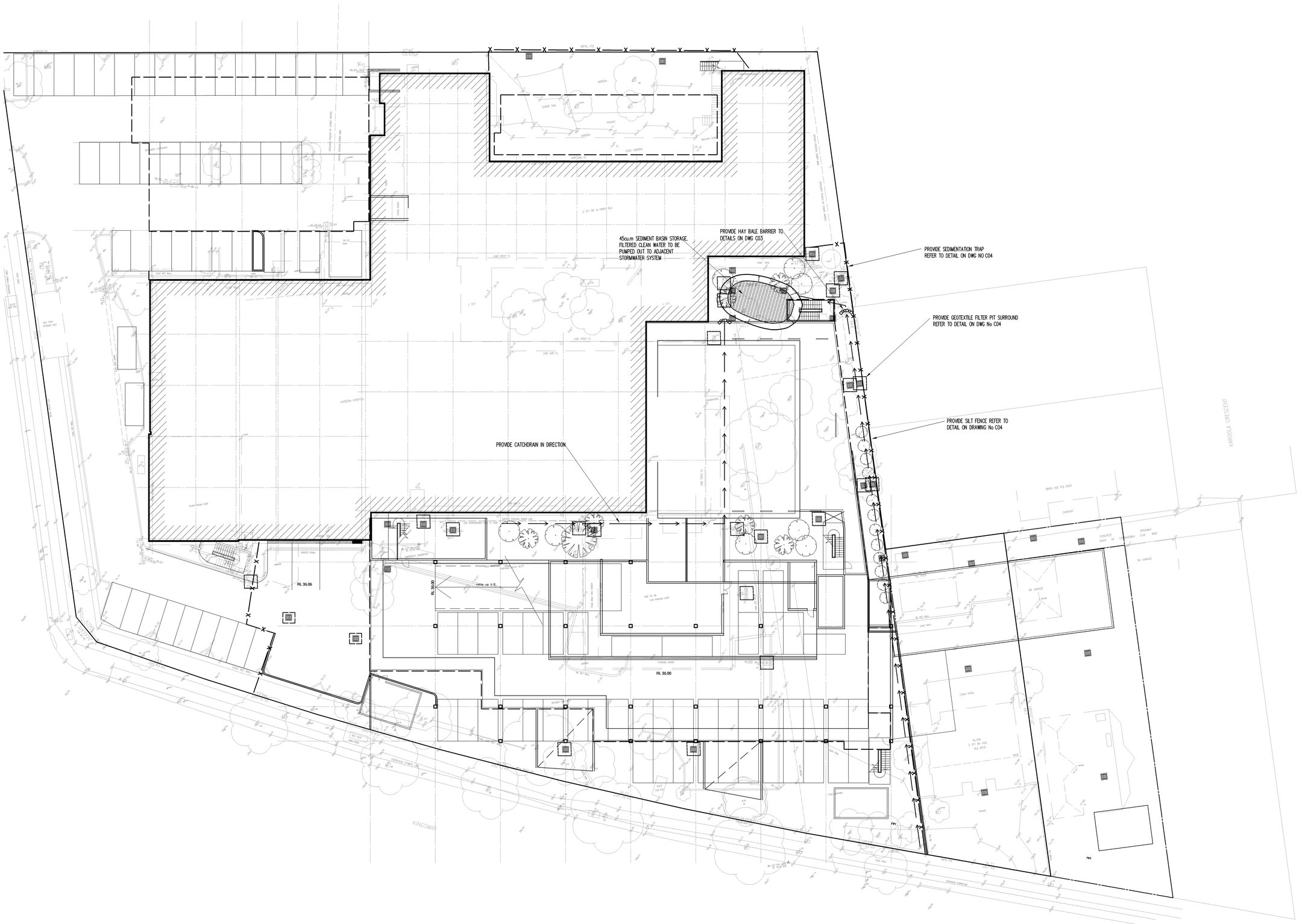
ARI	STORM	EXISTING PREDEV. FLOWS	POST DEVEL. DIRECT FLOWS	PERMISSIBLE SITE DISCHARGE	POST DEVEL. OSD PEAK FLOW	PEAK OVERFLOW FROM OSD	POST DEVEL. PEAK TOTAL FLOWS FROM OSD	PEAK VOL. OSD	Comments
		cum/s	cum/s	cum/s	cum/s	cum/s	cum/s	m3	
5	25	0.017	0.000	**0.017**	0.017	0.000	0.017	1.41	33.58 - PSD adopted
10	25	0.020	0.000	**0.020**	0.019	0.000	0.019	1.76	33.67 - PSD adopted
20	25	0.023	0.000	**0.023**	0.022	0.000	0.022	2.24	33.8 - PSD adopted
50	90	0.024	0.000	**0.024**	0.023	0.000	0.023	2.55	33.88 - PSD adopted
100	90	0.027	0.000	**0.027**	0.027	0.000	0.027	3.04	34.05 - PSD Adopted

Comments:

Head over outlet= 0.85 m

Max PSD = 0.017 cum/s

Suggested Orifice size 0.120 m



FOR NOTES AND LEGENDS
REFER TO DRAWING No C01.

Rev	Description	Eng	Draft	Date
P1	FOR COUNCIL DA	AL	DH	16-03-07

Project
KAREENA PRIVATE HOSPITAL

Sheet Subject
EROSION AND SEDIMENT CONTROL PLAN

Architect
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Taylor Thomson Whitting (NSW) Pty Ltd A.C.N. 113 578 377

Scale : B1	Drawn	Authorised
1:200	DH	___

Job No	Drawing No	Revision
061777	C04	P1

Plot File Created: Mar 16, 2007 - 5:48pm

PRELIMINARY

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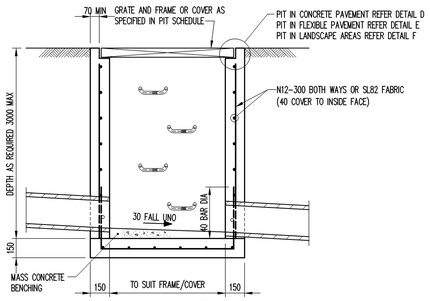
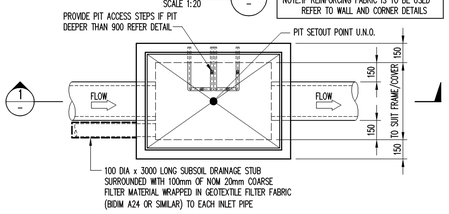
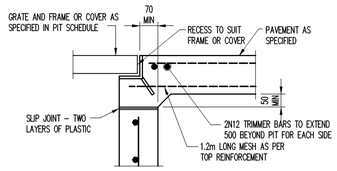


SECTION 1
SCALE 1:20

NOTE:IF REINFORCING FABRIC IS TO BE USED REFER TO WALL AND CORNER DETAILS



PLAN
SCALE 1: 20
PIT TYPE A



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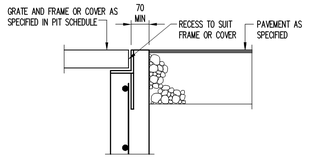

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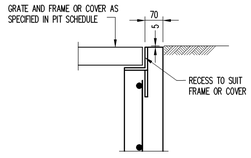

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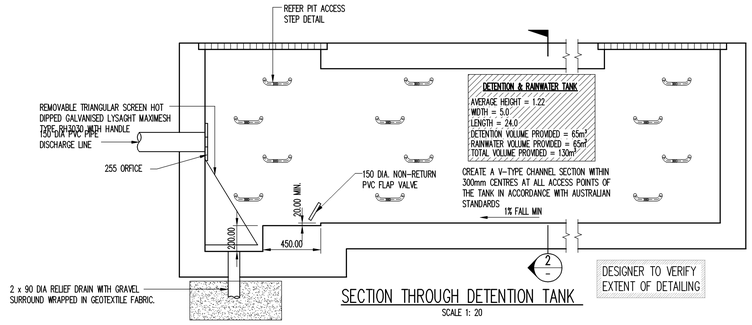
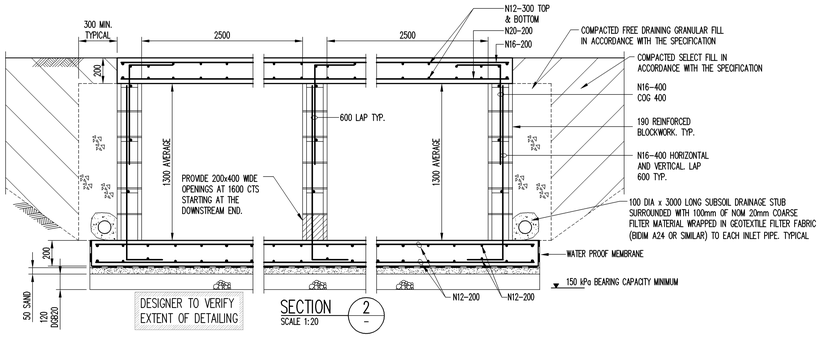
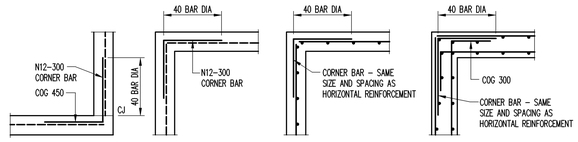


SECTION THROUGH DETENTION TANK
SCALE 1: 20



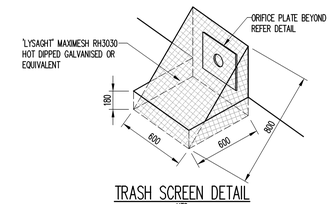
SECTION 2
SCALE 1:20



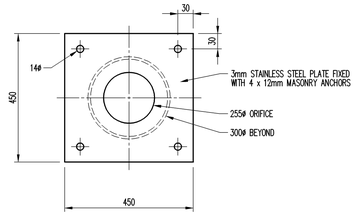
ELEVATION AT BASE | PLAN | PLAN-SINGLE LAYER | PLAN-DOUBLE LAYER

FABRIC REINFORCEMENT

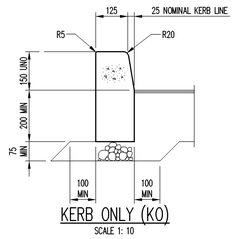
PIT CORNER DETAILS
SCALE 1: 20



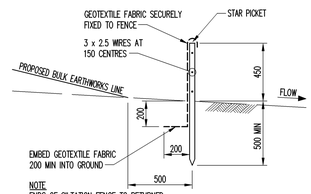
TRASH SCREEN DETAIL
NTS



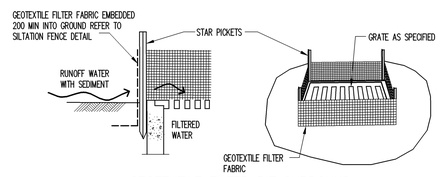
ORIFICE PLATE DETAIL
SCALE 1: 5



KERB ONLY (KO)
SCALE 1: 10



SILTATION FENCE DETAIL
SCALE 1: 20



GEOTEXTILE FILTER PIT SURROUND
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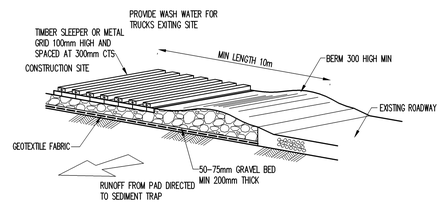
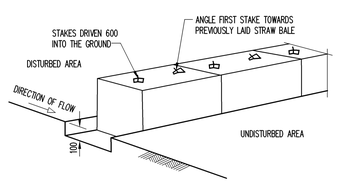
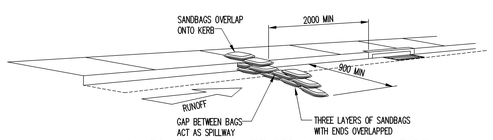


TEMPORARY CONSTRUCTION VEHICLE EXIT
NTS



STRAW BALE SEDIMENT FILTER
NTS
NOTE: STAKE TO BE EITHER TAR COATED STAR OR 50 x 50 HARDWOOD



SANDBAG KERB INLET SEDIMENT TRAP - TYPE A
NTS

FOR NOTES AND LEGENDS REFER TO DRAWING No C01.

Rev	Description	Eng	Drawn	Date
P2	FOR COUNCIL DA	AL	DH	16-03-07
P1	PRELIMINARY	AL	DG	14-02-07

Project
KAREENA PRIVATE HOSPITAL

Sheet Subject
DETAILS SHEET

Architect
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ARCHITECTS ADDRESS

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Scale : B1 | Drawn: DH | Authorised:
AS SHOWN

Job No 061777 | Drawing No C04 | Revision P2

Plot File Created: Mar 16, 2007 - 5:26pm

PRELIMINARY

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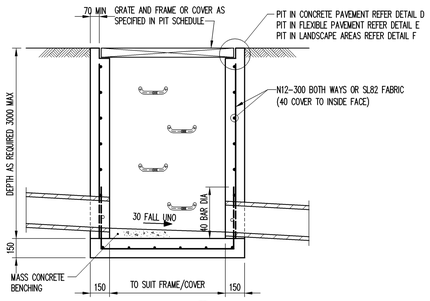
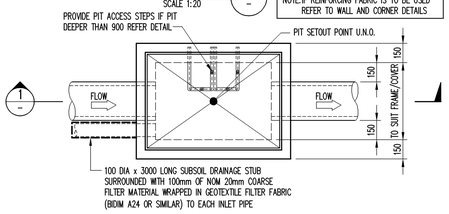
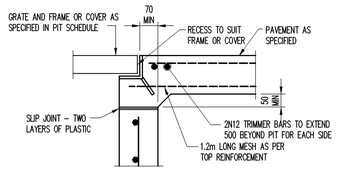


SECTION 1
SCALE 1:20

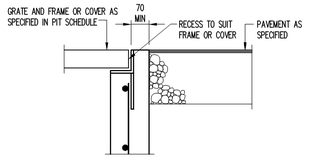
NOTE:IF REINFORCING FABRIC IS TO BE USED REFER TO WALL AND CORNER DETAILS



PLAN
SCALE 1: 20
PIT TYPE A



DETAIL D
SCALE 1: 10



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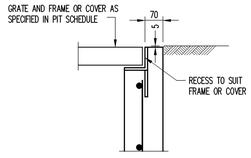
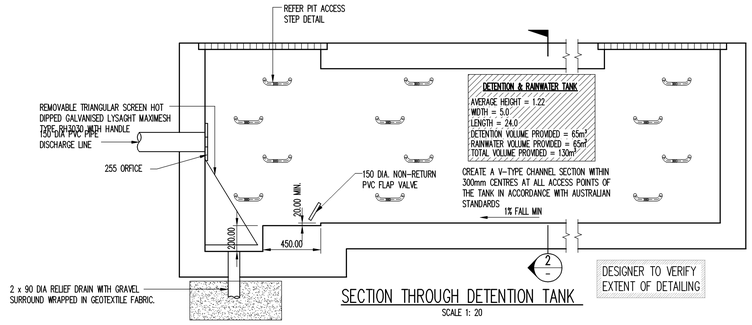
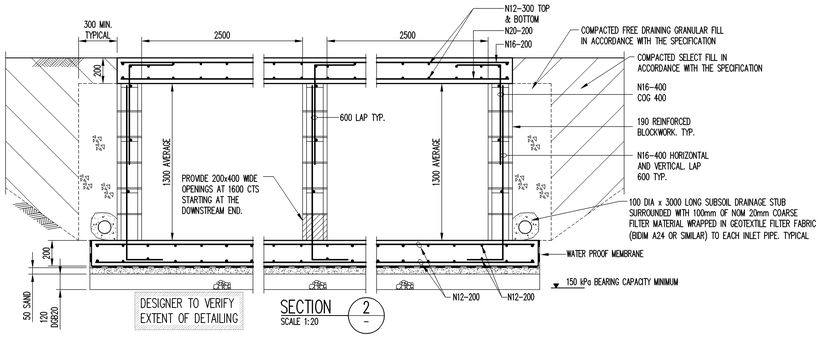


DETAIL F
SCALE 1: 10



SECTION THROUGH DETENTION TANK
SCALE 1: 20



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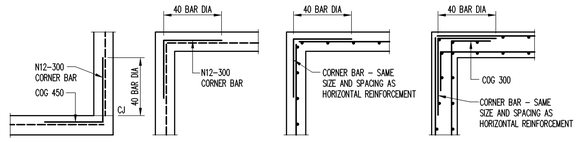
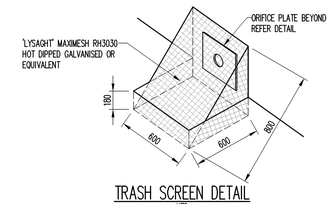
SCALE 1:20



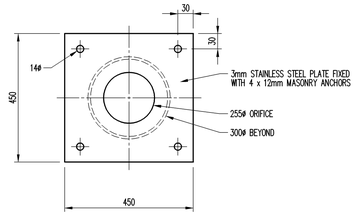
ELEVATION AT BASE | PLAN | PLAN-SINGLE LAYER | PLAN-DOUBLE LAYER

FABRIC REINFORCEMENT

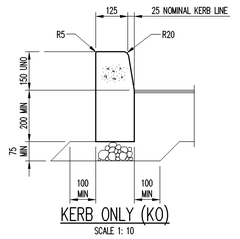
PIT CORNER DETAILS
SCALE 1: 20



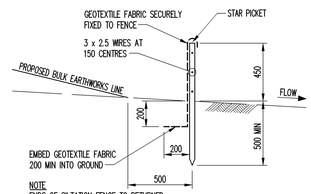
TRASH SCREEN DETAIL
NTS



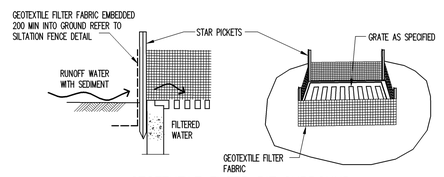
ORIFICE PLATE DETAIL
SCALE 1: 5



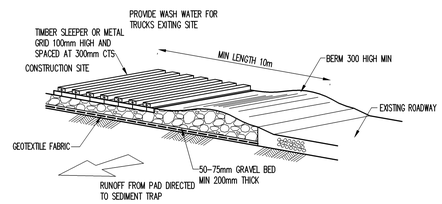
KERB ONLY (KO)
SCALE 1: 10



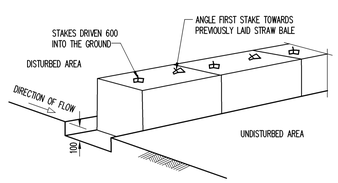
SILTATION FENCE DETAIL
SCALE 1: 20



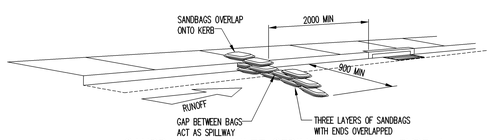
GEOTEXTILE FILTER PIT SURROUND
NTS



TEMPORARY CONSTRUCTION VEHICLE EXIT
NTS



STRAW BALE SEDIMENT FILTER
NTS
NOTE: STAKE TO BE EITHER TAR COATED STAR OR 50 x 50 HARDWOOD



SANDBAG KERB INLET SEDIMENT TRAP - TYPE A
NTS

FOR NOTES AND LEGENDS REFER TO DRAWING No C01.

Rev	Description	Eng	Drawn	Date
P2	FOR COUNCIL DA	AL	DH	16-03-07
P1	PRELIMINARY	AL	DG	14-02-07

Project
KAREENA PRIVATE HOSPITAL

Sheet Subject
DETAILS SHEET

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HASSELL
ARCHITECTS ADDRESS

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Taylor Thomson Whitting (NSW) Pty Ltd A.C.N. 113 578 377

Scale : B1 | Drawn: DH | Authorised:
AS SHOWN

Job No 061777 | Drawing No C04 | Revision P2

Plot File Created: Mar 16, 2007 - 5:26pm

PRELIMINARY

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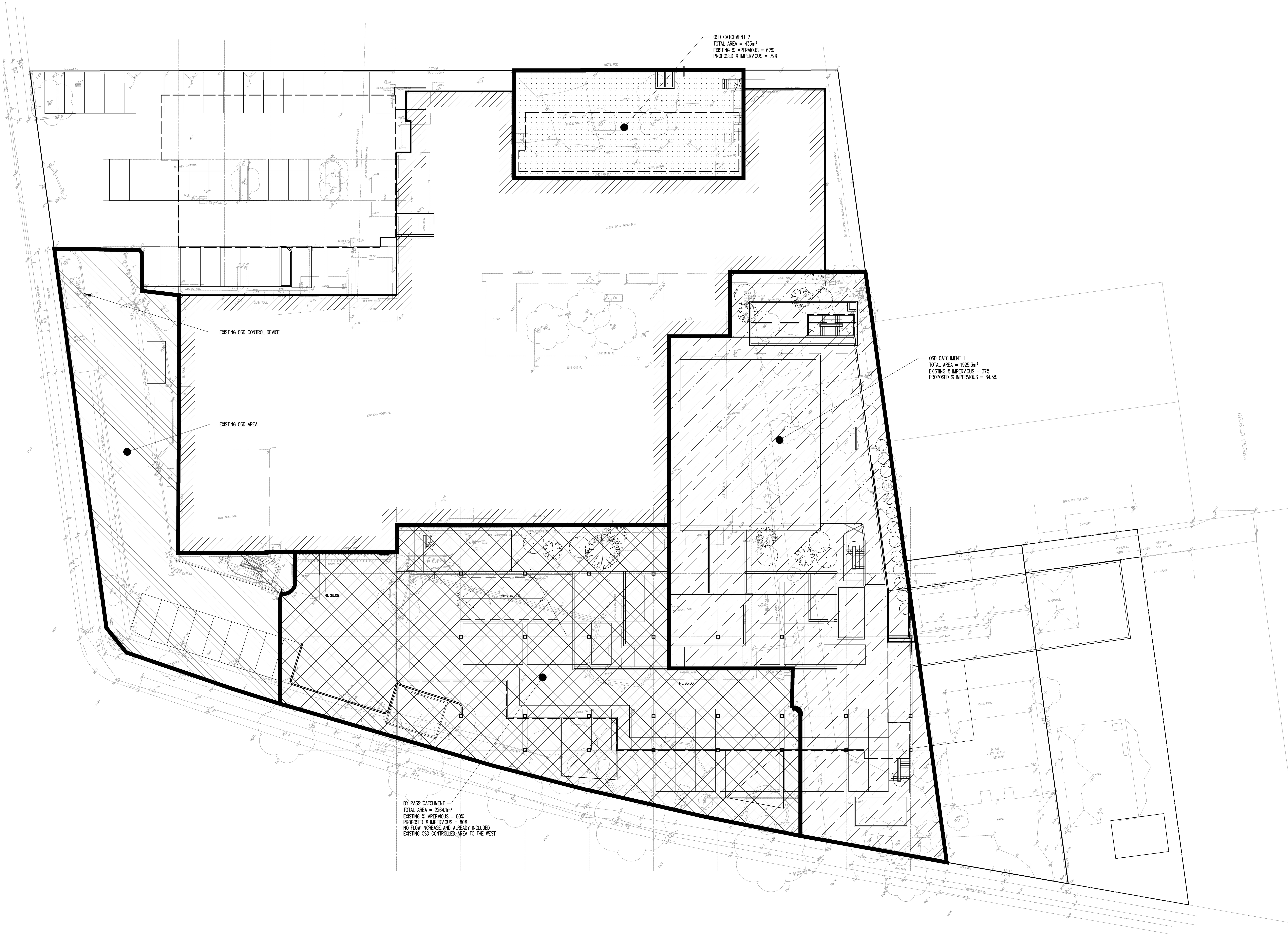

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B1 0 1 2 3 4 5 6 7 8 9 10

FOR NOTES AND LEGENDS REFER TO DRAWING No C01.

Rev	Description	Eng	Draft	Date
P1	FOR COUNCIL DA	AL	DH	16-03-07

Project
KAREENA PRIVATE HOSPITAL

Sheet Subject
STORMWATER CATCHMENT PLAN

Architect
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Taylor Thomson Whitting (NSW) Pty Ltd A.C.N. 113 578 377

Scale : B1	Drawn	Authorised
1:200	DH	___

Job No	Drawing No	Revision
061777	C02	P1

PRELIMINARY

Plot File Created: Mar 16, 2007 - 5:26pm

OSD TANK 2
CONSTRUCT MINIMUM 3cu.m ON SITE DETENTION TANK.
INTERNAL DIMENSIONS 2.5m x 1.5m x 0.8m DEEP.
CONNECT OUTLET PIPE TO EXISTING PIT & MAKE GOOD

EXISTING 225ø OUTLET PIPE

EXISTING KAREENA PRIVATE HOSPITAL BUILDING

EXISTING 225ø OUTLET PIPE

CONNECT 300ø RCP TANK OUTLET TO EXISTING PIT & MAKE GOOD

OSD TANK 1
CONSTRUCT MINIMUM 32.5cu.m ON SITE DETENTION & 130cu.m RAINWATER STORAGE TANK.
INTERNAL DIMENSIONS 5.45m WIDE x 13.75m LONG x AVERAGE 2.25M DEEP.

IL 33.45
300ø 'Z'
1%
Q= 2L/s
IL 33.30

IL33.60
300 ø 'Z'
1.0%
IL33.45

IL33.80
225 ø 'Z'
1.0%
IL33.65

IL 33.60
300ø RCP
1%
Q= 9L/s
IL 33.47

IL 33.75
300ø RCP
1%
Q= 9L/s
IL 33.65

IL 34.00
150ø 'Z'
1%
Q= 3L/s
IL 33.90

IL 34.09
375ø 'Z'
0.5%
Q= 9L/s
IL 34.04

IL 34.14
300ø 'Z'
0.5%
Q= 9L/s
IL 34.09

IL34.20
150 ø 'Z'
1.0%
IL34.10

PROVIDE ø300 STUB FOR FUTURE CONNECTION

CONSTRUCT BLOCKWORK RETAINING WALL TO DETAIL

IL 34.32
300ø 'Z'
0.5%
Q= 9L/s
IL 34.18

IL 34.40
300ø 'Z'
0.5%
Q= 9L/s
IL 34.32

KINGSWAY

KAROOLA CRESCENT

FOR NOTES AND LEGENDS REFER TO DRAWING No C01.

Rev	Description	Eng	Draft	Date
P2:	FOR COUNCIL DA	AL	DH	16-03-07
P1	PRELIMINARY	AL	DG	14-02-07

Project
KAREENA PRIVATE HOSPITAL

Sheet Subject
STORMWATER CONCEPT PLAN

Architect
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Scale : B1	Drawn	Authorised
1:200	DH	___

Job No	Drawing No	Revision
061777	C01	P2

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B1 0 1 2 3 4 5 6 7 8 9 10

GENERAL NOTES

1. Contractor must verify all dimensions and existing levels on site prior to commencement of works. Any discrepancies to be reported to the Engineer
2. Strip all topsoil from the construction area. All stripped topsoil shall be disposed of off-site unless directed otherwise.
3. Make smooth connection with all existing works.
4. Compact subgrade under buildings and pavements to minimum 98% standard maximum dry density in accordance with AS 1289 5.1.1. Compaction under buildings to extend 2m minimum beyond building footprint.
5. All work on public property, property which is to become public property, or any work which is to come under the control of the Statutory Authority is to be carried out in accordance with the requirements of the relevant Authority. The Contractor shall obtain these requirements from the Authority. Where the requirements of the Authority are different to the drawings and specifications, the requirements of the Authority shall be applicable.
6. For all temporary batters refer to geotechnical recommendations.

REFERENCE DRAWINGS

1. These drawings have been based from, and to be read in conjunction with the following Consultants drawings. Any conflict to the drawings must be notified immediately to the Engineer.

Consultant	Dwg Title	Dwg No	Rev	Date

PIT SCHEDULE

Note: Grate size does not necessarily reflect pit size, refer pit type details, shown on detail sheets – C???

Type	Description	Cover (Clear Opening)	Number
A	Kerb inlet pit 900 lintel	450 x 900 Class D galvanised mild steel grate hinged to frame	?????????
B	Surface inlet pit	600 x 900 Class D galvanised mild steel grate hinged to frame	?????????
C	Junction pit	600 x 900 Class D cast iron cover with concrete infill	?????????
D		Existing pit to be demolished and removed	?????????
E		Existing pit to remain	?????????

STORMWATER DRAINAGE NOTES

1 Stormwater Design Criteria :
- (A) Average recurrence interval –
  - 1:100 years for roof drainage to first external pit
  - 1:20 years for paved and landscaped areas
- (B) Rainfall intensities –
  - Time of concentration: 5 minutes
  - 1:100 years = 261 mm/hr
  - 1:20 years = 202 mm/hr
- (C) Runoff coefficients –
  - Roof areas: Cxx = 1.08
  - Roods and paved areas: Cxx = 0.91
  - Landscaped areas: Cxx = 0.58

2. Pipes 300 dia and larger to be reinforced concrete Class " 2 " approved spigot and socket with rubber ring joints U.N.O.
3. Pipes up to 300 dia shall be sewer grade uPVC with solvent welded joints.
4. Equivalent strength VCP or FCP pipes may be used subject to approval.
5. Precast pits may be used external to the building subject to approval by X
6. Enlargers, connections and junctions to be manufactured fittings where pipes are less than 300 dia.
7. Where subsoil drains pass under floor slabs and vehicular pavements, unslotted uPVC sewer grade pipe is to be used.
8. Grates and covers shall conform with AS 3996–2006, and AS 1428.1 for access requirements.
9. Pipes are to be installed in accordance with AS 3725. All bedding to be type H2 U.N.O.
10. Care is to be taken with levels of stormwater lines. Grades shown are not to be reduced without approval.
11. All stormwater pipes to be 150 dia at 1.0% min fall U.N.O.
12. Subsoil drains to be slotted flexible uPVC U.N.O.
13. Adopt invert levels for pipe installation (grades shown are only nominal).

SITEWORKS NOTES

1. All basecourse material to comply with RTA specification No 3051 and compacted to minimum 98% modified standard dry density in accordance with AS 1289 5.2.1.
2. All trench backfill material shall be compacted to the same density as the adjacent material.
3. All service trenches under vehicular pavements shall be backfilled with an approved select material and compacted to a minimum 98% standard maximum dry density in accordance with AS 1289 5.1.1

SURVEY AND SERVICES INFORMATION

SURVEY

Origin of levels :
Datum of levels : A.H.D. AUSTRALIAN HEIGHT DATUM
Coordinate system : ISG OR MGA OR LOCAL
Survey prepared by :
Setout Points : CONTACT THE SURVEYOR
CONTACT THE SURVEYOR

Taylor Thomson Whitting does not guarantee that the survey information shown on these drawings is accurate and will accept no liability for any inaccuracies in the survey information provided to us from any cause whatsoever.

UNDERGROUND SERVICES – WARNING

The locations of underground services shown on Taylor Thomson Whittings drawings have been plotted from diagrams provided by service authorities. This information has been prepared solely for the authorities own use and may not necessarily be updated or accurate.

The position of services as recorded by the authority at the time of installation may not reflect changes in the physical environment subsequent to installation.

Taylor Thomson Whitting does not guarantee that the services information shown on these drawings shows more than the presence or absence of services, and will accept no liability for inaccuracies in the services information shown from any cause whatsoever.

The Contractor must confirm the exact location and extent of services prior to construction and notify any conflict with the drawings immediately to the Engineer/Superintendent.

The contractor is to get approval from relevant the state survey department, to remove any survey mark. This includes but is not limited to; State Survey Marks (SSM), Permanent Marks (PM), cadastral reference marks or any other survey mark which is to be removed or adjusted in any way.
Taylor Thomson Whitting plans do not indicate the presence of any survey mark. The contractor is to undertake their own search.

EROSION AND SEDIMENT CONTROL NOTES

1. All work shall be generally carried out in accordance with
   - (A) Local authority requirements,
   - (B) EPA – Pollution control manual for urban stormwater,
   - (C) Department of conservation and land management manual– "Urban Erosion & Sediment Control".
2. Erosion and sediment control drawings and notes are provided for the whole of the works. Should the Contractor stage these works then the design may require to be modified. Variation to these details may require to be approved by the relevant authorities. The erosion and sediment control plan shall be implemented and adopted to meet the varying situations as work on site progresses.
3. Maintain all erosion and sediment control devices to the satisfaction of the superintendent and the local authority.
4. When stormwater pits are constructed prevent site runoff entering the pits unless silt fences are erected around pits.
5. Minimise the area of site being disturbed at any one time.
6. Protect all stockpiles of materials from scour and erosion. Do not stockpile loose material in roadways, near drainage pits or in watercourses.
7. All soil and water control measures are to be put back in place at the end of each working day, and modified to best suit site conditions.
8. Control water from upstream of the site such that it does not enter the disturbed site.
9. All construction vehicles shall enter and exit the site via the temporary construction entry/exit.
10. All vehicles leaving the site shall be cleaned and inspected before leaving.
11. Maintain all stormwater pipes and pits clear of debris and sediment. Inspect stormwater system and clean out after each storm event.
12. Clean out all erosion and sediment control devices after each storm event.

Sequence Of Works

1. Prior to commencement of excavation the following soil management devices must be installed.
1.1. Construct silt fences below the site and across all potential runoff sites.
1.2. Construct temporary construction entry/exit and divert runoff to suitable control systems.
1.3. Construct measures to divert upstream flows into existing stormwater system.
1.4. Construct sedimentation traps/basin including outlet control and overflow.
1.5. Construct turf lined swales.
1.6. Provide sandbag sediment traps upstream of existing pits.
2. Construct geotextile filter pit surround around all proposed pits as they are constructed.
3. On completion of pavement provide sand bag kerb inlet sediment traps around pits.
4. Provide and maintain a strip of turf on both sides of all roads after the construction of kerbs.

SITEWORKS LEGEND

- F22.20 — Finished surface level
- F22.00 — Finished contour
- K&G — Kerb and gutter
- KO — Kerb only
- FK — Flush kerb
- DD — Dish drain
- IL10.00 / 600 ø "x" / 1.25% / Q=345 L/s / IL9.65 — Stormwater pit, flow direction and line with; Invert level upstream; Pipe size and class; Pipe grade; Flow (Litres per second); Invert level downstream
- GD — Grated drain
- Subsoil drainage line (100 dia)
- FP — Flushing point
- DP — Down pipe
- Wheelstop
- RW# — Blockwork retaining wall
- RW# — Brickwork retaining wall
- DEJ — Dowelled expansion joint
- SJ — Sawn joint
- KJ — Keyed construction joint
- WPJ — Weakened plane joint
- EJ — Expansion joint
- TKJ — Tied keyed joint
- Grass catch drain
- Overland flow path

EROSION AND SEDIMENT CONTROL LEGEND

- Batter
- Siltation fence
- Stormwater pit with Geotextile filter surround
- Hay bale barriers
- Sandbag sediment trap
- Catch drain
- Overland flow path

KERBING NOTES

Includes all kerbs, gutters, dish drains, crossings and edges.

1. All kerbs, gutters, dish drains and crossings to be constructed on minimum 75mm granular basecourse compacted to minimum 98% modified maximum dry density in accordance with AS 1289 5.2.1.
2. Expansion joints (EJ) to be formed from 10mm compressible cork filler board for the full depth of the section and cut to profile. Expansion joints to be located at drainage pits, on tangent points of curves and elsewhere at 12m centres except for integral kerbs where the expansion joints are to match the joint locations in slabs.
3. Weakened plane joints to be min 3mm wide and located at 3m centres except for integral kerbs where weakened plane joints are to match the joint locations in slabs.
4. Broomed finished to all ramped and vehicular crossings, all other kerbing or dish drains to be steel float finished.
5. In the replacement of kerbs –
   Existing road pavement is to be sawcut 900mm from lip of gutter. Upon completion of new kerbs, new basecourse and surface is to be laid 900mm wide to match existing materials and thicknesses.
   Existing allotment drainage pipes are to be built into the new kerb with a 100mm dia hole.
   Existing kerbs are to be completely removed where new kerbs are shown.

SURVEY LEGEND

- +18.48 — Surface level
- 19 — Contour
- Kerb line
- Batter
- Retaining wall
- SW — Stormwater drainage line
- T — Telecommunications line
- G — Gas line
- W — Water main
- S — Sewer line
- EASEMENT FOR (...m WIDE) — Easement
- Fence
- Tree to be removed/be retained
- Boundary
- SIGN — Sign
- H — Hydrant
- MH — Manhole
- G — Gas
- SV — Stop Valve
- W — Water
- TEL — Telstra
- TRAP — Trap
- Gully
- Grate
- S — Sewer Manhole
- E — Energy Australia (Electricity)
- ELP — Electric Light Pole
- TL — Traffic Light
- TLL — Traffic Light Lid
- TLB — Traffic Light Box
- TB — Telephone Box
- PKM — Parking Meter
- PM 1234 — Permanent Mark
- BM 51.10 — Bench Mark
- BH 0 — Borehole
- TP No — Test Pit
- FC — Fuel Cock
- FL — Flood Light
- LH — Lamp Hole
- BUB — Bubbler
- LB — Letter Box
- FP — Flag Pole
- FP BOX — Flag Pole Box
- BOL — Bollard
- SEAT — Seat
- BIN — Bin
- KO — Kerb Outlet
- Monorail Pylon

FOR NOTES AND LEGENDS REFER TO DRAWING No C01.

Rev	Description	Eng	Draft	Date
P2	FOR COUNCIL DA	AL	DH	16-03-07
P1	PRELIMINARY	AL	DG	14-02-07

Project
KAREENA PRIVATE HOSPITAL

Sheet Subject
NOTES & LEGENDS

Architect
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