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15 December 2010 101418

PRINCE OF WALES HOSPITAL MENTAL HEALTH INTENSIVE CARE UNIT, RANDWICK
STORMWATER DESIGN STATEMENT

The stormwater concept is designed to provide stormwater drainage, and erosion and sediment control documentation in accordance with Randwick City Council policies and best practice principles.

The design includes the following:

- Provision of an on-site detention (OSD) system to ensure no negative impact on the existing stormwater drainage regime.
- Erosion and sediment control to minimise the effect of construction on the environment.
- Gross pollutant trap for on-going water quality control.

The total site area is approximately 0.22ha. The proposed roofed areas drain directly to the rainwater reuse storage to be reused for on-site non-potable use. The overflow from the rainwater storage flows into the detention tank. Currently we are indicating two options for the connection of the OSD tank's outlet to existing stormwater systems.

Option 1 Connecting all the way across to the existing council stormwater system on Avoca Drive.

Option 2 Short connection into the existing hospital stormwater system to the south of the site.

The preferred connection would be option 2 but our initial site investigations have confirmed that the majority of the existing stormwater system to the south of the site is blocked and its capacity is unknown. We have previously requested that the hospital maintenance department arrange for the pipes and pits to be cleaned out so that the risk of flooding to existing infrastructure is reduced and that the capacity of the existing system can be confirmed.

Overland flowpath around the site is provided including overflow path from the OSD tank to the south. The final layout of the overflow path will be determined once additional survey to the south of the site is obtained. Adequate freeboard to habitable floor levels will be provided above the calculated 1 in 100-year water level within the OSD tank. Layout of the proposed stormwater disposal system is shown in **Appendix A**.

Mass Curve Analysis in accordance with Australian Rainfall Runoff (AR&R) was used to size the detention storage to cater for storms up to and including the 100-year average recurrence interval (ARI) event with maximum permissible discharge (PSD) limited to the site's 5-year 1 hour pre-development peak flow of 28.7 litres/second. The calculated minimum detention storage required is 130cu.m. For OSD storage and PSD calculations, refer to **Appendix B** for details.

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Structural
Civil
Traffic
Facade
Engineers

Water quality treatment will be provided for the proposed stormwater system to improve the existing stormwater quality. The treatment will be in the form of a gross pollutant trap (GPT) with oil and silt capacity (CDS unit or equivalent) to treat the stormwater discharge.

Based on the above, it is our opinion that;

- The downstream stormwater system would not be adversely affected by the provision of OSD.
- That the proposed works comply with Council's policies, Australian Rainfall and Runoff, & best practice principles.

Yours Faithfully
TAYLOR THOMSON WHITTING (NSW) PTY LTD

CRAIG SMITH
Civil Engineer

Authorised by:
TAYLOR THOMSON WHITTING (NSW) PTY LTD

STEPHEN BRAIN
Technical Director - Civil

P:\2010\1014\101418\Reports\101215 MHICU Stormwater Design Statement.dj.doc

Appendix A: Proposed Stormwater System

PRINCE OF WALES HOSPITAL

MENTAL HEALTH INTENSIVE CARE UNIT

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Rev	Description	Eng	Draft	Date
P1	PRELIMINARY	CS	EN	10.12.10

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
CRAIG & RHODES	DETAIL SURVEY	096-10	1	23.08.10
BVN	FLOOR PLAN LOWER GRD	AR-MHICU-DA-D-B1	06	02.12.10

PIT SCHEDULE

Note: Grate size does not necessarily reflect pit size, refer pit type details, shown on detail sheets - C10
Final internal pit dimensions are to comply with AS3500

Type	Description	Cover (Clear Opening)	Number
A	Kerb inlet pit 1800 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	????????

SURVEY AND SERVICES INFORMATION

SURVEY

Origin of levels : SSM. 51804 RL.65.572
Datum of levels : A.H.D. AUSTRALIAN HEIGHT DATUM
Coordinate system : MGA
Survey prepared by : CRAIG & RHODES
Setout Points : SSM. 50498
SSM. 51804

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 the relevant state survey department, to remove/adjust 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.

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

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: 6 minutes
1:100 years = 254 mm/hr
1:20 years = 200 mm/hr
(C) Runoff coefficients -
Roof areas: C∞ = 1.0
Roads and paved areas: C∞ = 0.9
Landscaped areas: C∞ = 0.6

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 FRP pipes may be used subject to approval.
5. Precast pits may be used external to the building subject to approval by Engineer
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 LEGEND

- ● F22.20 — Finished surface level
- F22.00 — Finished contour
- K&G — Kerb and gutter
- KO — Kerb only
- IL10.00 / 600 ø 'Z' / 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
- IR — Intermediate riser with subsoil drainage line (100 dia)
- FP — Flushing point with subsoil drainage line (100 dia)
- DP — Down pipe
- RP — Rodding point
- Concrete encased stormwater line
- Stormwater line with pipe taper and flow direction
- Taper kerb to zero height over 500 mm
- 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
- Guard Rail

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
- SGN — Sign
- H — Hydrant
- MH — Manhole
- G — Gas
- SV — Stop Valve
- W — Water
- TEL — Telecomunications
- TRAP — Trap
- Gully
- Grate
- S — Sewer Manhole
- E — 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

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) LANDCOM NSW - Managing Urban Stormwater: Soils and Construction ("Blue Book").
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 be required to be modified. Variation to these details may require approval 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.

PAVEMENT LEGEND

NOTES
1. Asphaltic concrete shall conform to AS2150 and the specification
2. Pavement based on geotechnical report by ????????????? Reference XYZ Date 06.06.08

- mm Thick asphaltic concrete (AC10) on mm Compacted thickness fine crushed rock (DGB20) on mm Compacted thickness fine crushed rock (DGS40)
- mm Thick asphaltic concrete (AC10) on mm Compacted thickness fine crushed rock (DGB20) on mm Compacted thickness fine crushed rock (DGS40)
- mm Thick concrete (f'c=32MPa) with SL92 fabric (40 top cover) on mm Compacted thickness fine crushed rock (DGB 20)
- mm Thick concrete (f'c=25MPa) with expansion joints at max 6.0m centres and weakened plane joints at max 1.5m centres on mm Sand bedding
- mm Pavers to Architects specification on mm Thick mortar bedding on mm Thick concrete (f'c=32MPa) with SL72 fabric (40 top cover) on mm Compacted thickness fine crushed rock (DGB20)

CONCRETE NOTES

EXPOSURE CLASSIFICATION : External : B1

CONCRETE

Place concrete of the following characteristic compressive strength f'c as defined in AS 1379.

Location	AS 1379 f'c MPa at 28 days	Specified Slump	Nominal Agg. Size
Paths	S25	80	20
Pits	S25	80	20
Footings	S32	80	20
Driveways	S32	80	20

1. Use Type 'GP' cement, unless otherwise specified.
2. All concrete shall be subject to project assessment and testing to AS 1379.
3. Consolidate by mechanical vibration. Cure all concrete surfaces as directed in the Specification.
4. For all falls in slab, drip grooves, reglets, chamfers etc. refer to Architects drawings and specifications.
5. Unless shown on the drawings, the location of all construction joints shall be submitted to Engineer for review.
6. No holes or chases shall be made in the slab without the approval of the Engineer.
7. Conduits and pipes are to be fixed to the underside of the top reinforcement layer.
8. Slurry used to lubricate concrete pump lines is not to be used in any structural members.
9. All slabs cast on ground require sand blinding with a Concrete Underlay
10. (170) Indicates Slab or Band thickness variation.

FORMWORK

1. The design, certification, construction and performance of the formwork, falsework and backpropping shall be the responsibility of the contractor. Proposed method of installation and removal of formwork is to be submitted to the superintendent for comment prior to work being carried out.

REINFORCEMENT NOTES

1. Fix reinforcement as shown on drawings. The type and grade is indicated by a symbol as shown below. On the drawings this is followed by a numeral which indicates the size in millimetres of the reinforcement.

N.	Hot rolled ribbed bar	grade D500N
R.	Plain round bar	grade R250N
SL.	Square mesh	grade 500L
RL.	Rectangular mesh	grade 500L

2. Provide bar supports or spacers to give the following concrete cover to all reinforcement unless otherwise noted on drawings.

Footings - 40 top, 40 bottom, 40 sides.
Slabs - 40 top, 40 bottom, 40
- 40 when exposed to weather or ground.
Walls - 40 generally.
- 40 when cast in forms but later exposed to weather or ground.
- 40 when cast directly in contact with ground.

3. Cover to reinforcement ends to be 50 mm u.n.o.
4. Provide N12-450 support bars to top reinforcement as required , Lap 450. U.N.O.
5. Maintain cover to all pipes, conduits, reglets, drip grooves etc
6. Laps in reinforcement shall be made only where shown on the drawings unless otherwise approved. Lap lengths shall be 40 bar dia. unless noted otherwise.
7. All cogs to be standard cogs unless noted otherwise.
8. Fabric end and side laps are to be placed strictly in accordance with the manufacturers requirements to achieve a full tensile lap. Fabric shall be laid so that there is a maximum of 3 layers at any location.

FABRIC LAPS — 25

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Health Infrastructure

PROJECT
PRINCE OF WALES HOSPITAL
MENTAL HEALTH INTENSIVE CARE UNIT

TTW PROJECT NUMBER
101418

BUILDING
POW MHICU

DESIGN STAGE
SCHEMATIC DESIGN

STATUS
PRELIMINARY

Scale at A1 | Drawn EN | Authorised

DRAWING TITLE
NOTES AND LEGENDS SHEET

DRAWING NUMBER CI-MHICU-001 | ISSUE P1

Plot File Created: Dec 15, 2010 - 10:08am

PRELIMINARY

FileName: CI-MHICU-001.dwg - USER: enash - Plot File Created: Dec 15, 2010 - 10:08am

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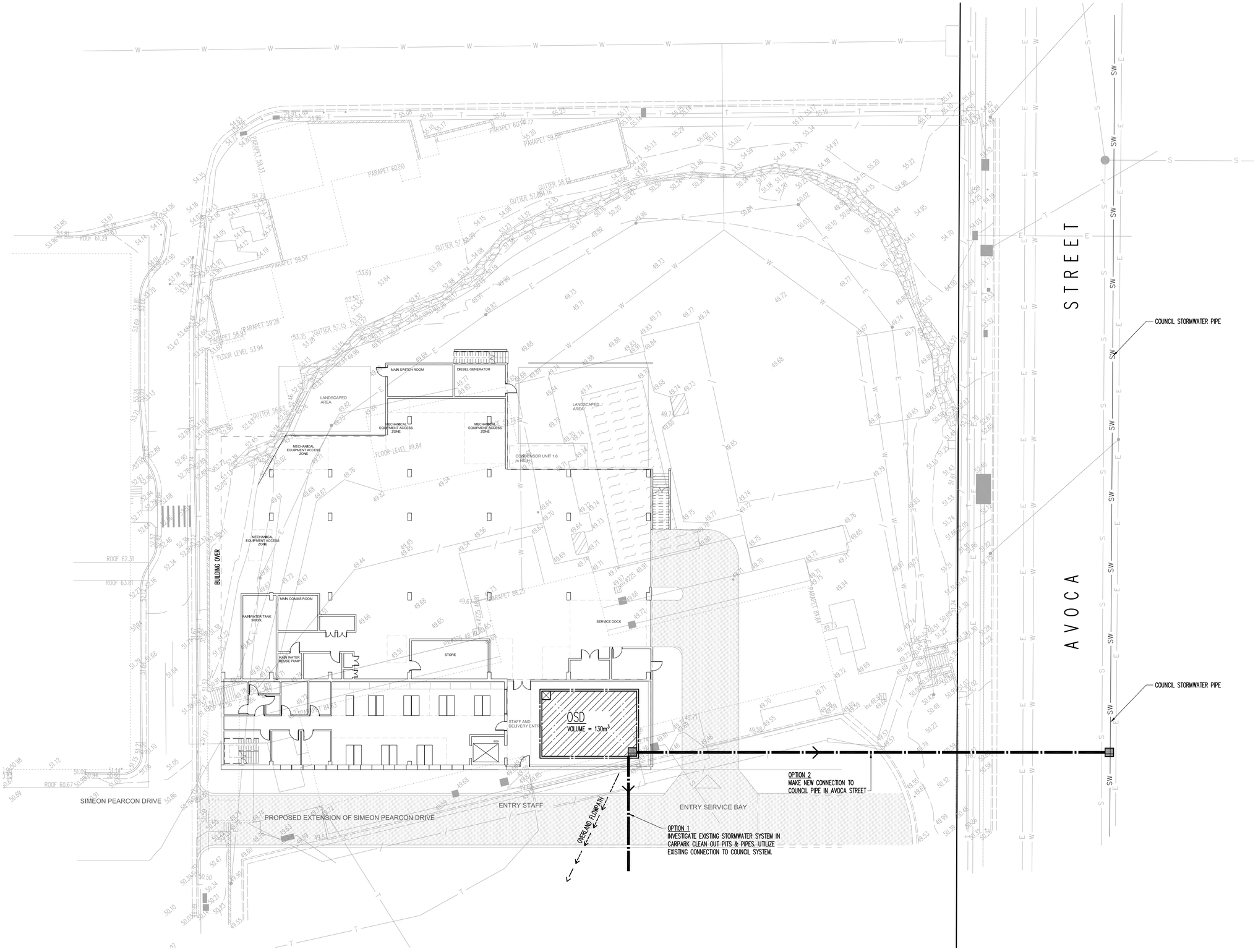
Rev	Description	Eng	Draft	Date
P1	PRELIMINARY	CS	EN	10.12.10



FOR NOTES AND LEGENDS REFER TO DRAWING No C01.

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MENTAL HEALTH INTENSIVE CARE UNIT

TTW PROJECT NUMBER
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BUILDING
POW MHICU

DESIGN STAGE
SCHEMATIC DESIGN

STATUS
PRELIMINARY

Scale at A1	Drawn	Authorised
1:200	EN	___

DRAWING TITLE
STORMWATER CONCEPT PLAN

DRAWING NUMBER	ISSUE
CI-MHICU-002	P1

Plot File Created: Dec 15, 2010 - 10:08am

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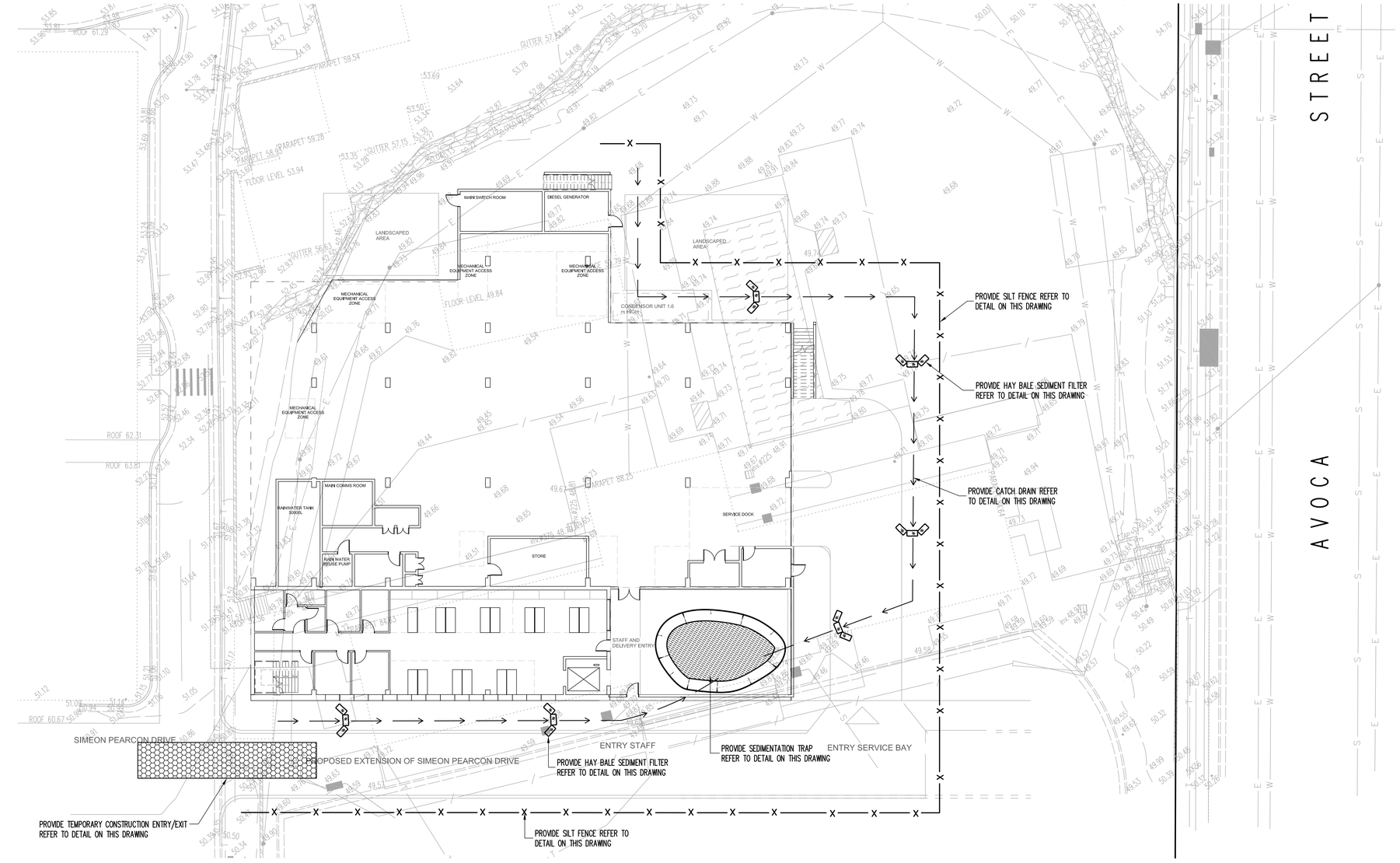

EROSION AND SEDIMENT CONTROL NOTES

1. All work shall be generally carried out in accordance with
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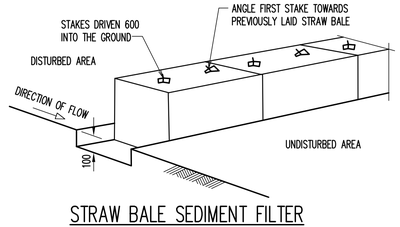
2. Construct geotextile filter pit surround around all proposed pits as they are constructed.
3. On completion of pavement provide sand bag kerb inlet sediment traps around pits.
4. Provide and maintain a strip of turf on both sides of all roads after the construction of kerbs.

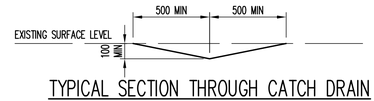
EROSION AND SEDIMENT CONTROL LEGEND

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

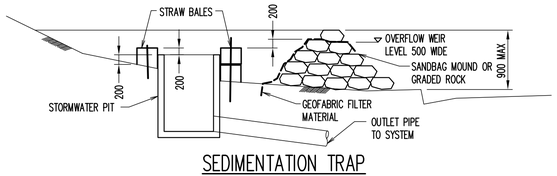
FOR NOTES AND LEGENDS REFER TO DRAWING No C01.



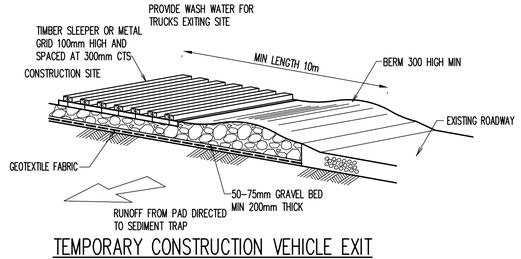
STRAW BALE SEDIMENT FILTER
NTS
NOTE: STAKE TO BE EITHER TAR COATED STAR OR 50 x 50 HARDWOOD



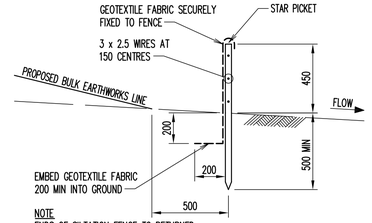
TYPICAL SECTION THROUGH CATCH DRAIN
SCALE 1: 20



SEDIMENTATION TRAP
NTS



TEMPORARY CONSTRUCTION VEHICLE EXIT
NTS



NOTE
ENDS OF SILTATION FENCE TO RETURNED UP SLOPE TO PREVENT RUNOFF

SILTATION FENCE DETAIL
SCALE 1: 20

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BUILDING
POW MHICU

DESIGN STAGE
SCHEMATIC DESIGN

STATUS
PRELIMINARY

Scale at A1	Drawn	Authorised
1:200 uno.	EN	

DRAWING TITLE
EROSION AND SEDIMENT CONTROL PLAN

PRELIMINARY

DRAWING NUMBER	ISSUE
CI-MHICU-003	P1

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Appendix B: Calculations

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Project POW MHICU | Job No 101418 | Page No 1

Subject On-Site Detention - PSD | By CHS | Date 2/12/10

Site Area = 2200 m²

Impervious % = 100% = fc

I_5 = 55 mm/hr (from App A of RCC Private SW code)

$'C_{10}$ = 0.6054 (for pervious area runoff coefficient for RCC)

$\Rightarrow C_{10} = 0.9 \times fc + {}'C_{10} \times (1 - fc)$ [AR&R VIII-17]

$= 0.9 \times 1 + 0.6054 \times (1 - 1)$

$= 0.9$

$\Rightarrow C_y = F_y \cdot C_{10}$

$C_5 = F_5 \cdot C_{10}$

$= 0.95 \times 0.9$

$= 0.855$

$\therefore PSD = \frac{C_5 \, I_5 \, A}{3600} = \frac{0.855 \times 55 \times 2200}{3600}$

$= 28.7 \, l/s.$

Mass Curve Detention Analysis

Prince of Wales Hospital - Mental Health and ICU 101418

Catchment Area =	2200	sq.m
Time of concentration =	5	min
Runoff Coefficient =	1	
ARI =	100	Years
Discharge rate =	0.0287	cu.m/s

	I mm	Vol cu.m	Cumulative	Allowable	**Storage**	I mm	Vol cu.m	Cumulative	Allowable	**Storage**	I mm	Vol cu.m	Cumulative	Allowable	**Storage**
	15 Minute		Volume	Volume	**Required**	**20 Minute**		Volume	Volume	**Required**	**25 Minute**		Volume	Volume	**Required**
Time	189.5		cu.m	cu.m	cu.m	165		cu.m	cu.m	cu.m	151.5		cu.m	cu.m	cu.m
0	181.92	33.352	33.352	8.61	**24.742**	125.4	22.99	22.99	8.61	**14.38**	128.775	23.60875	23.60875	8.61	**14.99875**
5	284.25	52.1125	85.4645	17.22	**68.2445**	283.8	52.03	75.02	17.22	**57.8**	212.1	38.885	62.49375	17.22	**45.27375**
10	102.33	18.7605	104.225	25.83	**78.395**	198	36.3	111.32	25.83	**85.49**	295.425	54.16125	116.655	25.83	**90.825**
15			104.225	34.44	**69.785**	52.8	9.68	121	34.44	**86.56**	68.175	12.49875	129.15375	34.44	**94.71375**
20			104.225	43.05	**61.175**			121	43.05	**77.95**	53.025	9.72125	138.875	43.05	**95.825**
25			104.225	51.66	**52.565**			121	51.66	**69.34**			138.875	51.66	**87.215**
30			104.225	60.27	**43.955**			121	60.27	**60.73**			138.875	60.27	**78.605**
35			104.225	68.88	**35.345**			121	68.88	**52.12**			138.875	68.88	**69.995**
40								121	77.49	**43.51**			138.875	77.49	**61.385**
45								121	86.1	**34.9**			138.875	86.1	**52.775**
50													138.875	94.71	**44.165**
55															
60															
65															
70															
75															
80															
85															
90															
95															
100															
105															
110															
115															

I mm	Vol cu.m	Cumulative	Allowable	**Storage**	I mm	Vol cu.m	Cumulative	Allowable	**Storage**	I mm	Vol cu.m	Cumulative	Allowable	**Storage**	I mm	Vol cu.m	Cumulative	Allowable	**Storage**
30 Minute		Volume	Volume	**Required**	**45 Minute**		Volume	Volume	**Required**	**60 Minute**		Volume	Volume	**Required**	**90 Minute**		Volume	Volume	**Required**	**120 Minute**		Volume	Volume	**Required**
138		cu.m	cu.m	cu.m	117.1		cu.m	cu.m	cu.m	96.2		cu.m	cu.m	cu.m	79.3		cu.m	cu.m	cu.m	62.4		cu.m	cu.m	cu.m
132.48	24.288	24.288	8.61	**15.678**	50.5872	9.27432	9.27432	8.61	**0.66432**	45.0216	8.25396	8.25396	8.25396	**0**	45.6768	8.37408	8.37408	8.37408	**0**	32.9472	6.04032	6.04032	6.04032	**0**
207	37.95	62.238	17.22	**45.018**	149.6538	27.4365	36.71085	17.22	**19.49085**	80.808	14.8148	23.06876	16.86396	**6.2048**	84.2166	15.4397	23.81379	16.98408	**6.82971**	79.3728	14.55168	20.592	14.65032	**5.94168**
273.24	50.094	112.332	25.83	**86.502**	260.3133	47.7241	84.434955	25.83	**58.604955**	193.9392	35.5555	58.62428	25.47396	**33.15032**	208.4004	38.2067	62.02053	25.59408	**36.42645**	46.4256	8.51136	29.10336	23.26032	**5.84304**
74.52	13.662	125.994	34.44	**91.554**	192.8637	35.3583	119.7933	34.44	**85.3533**	138.528	25.3968	84.02108	34.08396	**49.93712**	117.0468	21.4586	83.47911	34.20408	**49.27503**	73.3824	13.45344	42.5568	31.87032	**10.68648**
91.08	16.698	142.692	43.05	**99.642**	100.1205	18.3554	138.14873	43.05	**95.098725**	267.8208	49.1005	133.12156	42.69396	**90.4276**	148.4496	27.2158	110.69487	42.81408	**67.88079**	143.7696	26.35776	68.91456	40.48032	**28.43424**
49.68	9.108	151.8	51.66	**100.14**	122.2524	22.4129	160.56167	51.66	**108.901665**	116.5944	21.3756	154.4972	51.30396	**103.19324**	299.754	54.9549	165.64977	51.42408	**114.22569**	77.8752	14.27712	83.19168	49.09032	**34.10136**
		151.8	60.27	**91.53**	79.0425	14.4911	175.05279	60.27	**114.78279**	102.7416	18.836	173.33316	59.91396	**113.4192**	77.0796	14.1313	179.78103	60.03408	**119.74695**	269.568	49.4208	132.61248	57.70032	**74.91216**
		151.8	68.88	**82.92**	64.2879	11.7861	186.83891	68.88	**117.958905**	65.8008	12.0635	185.39664	68.52396	**116.87268**	75.6522	13.8696	193.6506	68.64408	**125.00652**	185.7024	34.04544	166.65792	66.31032	**100.3476**
		151.8	77.49	**74.31**	34.7787	6.3761	193.215	77.49	**115.725**	55.4112	10.1587	195.55536	77.13396	**118.4214**	62.8056	11.5144	205.16496	77.25408	**127.91088**	83.8656	15.37536	182.03328	74.92032	**107.11296**
		151.8	86.1	**65.7**			193.215	86.1	**107.115**	35.7864	6.56084	202.1162	85.74396	**116.37224**	44.2494	8.11239	213.27735	85.86408	**127.41327**	46.4256	8.51136	190.54464	83.53032	**107.01432**
		151.8	94.71	**57.09**			193.215	94.71	**98.505**	30.0144	5.50264	207.61884	94.35396	**113.26488**	61.3782	11.2527	224.53002	94.47408	**130.05594**	49.4208	9.06048	199.60512	92.14032	**107.4648**
		151.8	103.32	**48.48**			193.215	103.32	**89.895**	21.9336	4.02116	211.64	102.96396	**108.67604**	48.5316	8.89746	233.42748	103.08408	**130.3434**	62.8992	11.53152	211.13664	100.75032	**110.38632**
							193.215	111.93	**81.285**			211.64	111.57396	**100.06604**	29.9754	5.49549	238.92297	111.69408	**127.22889**	64.3968	11.80608	222.94272	109.36032	**113.5824**
							193.215	120.54	**72.675**			211.64	120.18396	**91.45604**	34.2576	6.28056	245.20353	120.30408	**124.89945**	31.4496	5.76576	228.70848	117.97032	**110.73816**
							193.215	129.15	**64.065**			211.64	128.79396	**82.84604**	31.4028	5.75718	250.96071	128.91408	**122.04663**	32.9472	6.04032	234.7488	126.58032	**108.16848**
												211.64	137.40396	**74.23604**	18.5562	3.40197	254.36268	137.52408	**116.8386**	50.9184	9.33504	244.08384	135.19032	**108.89352**
															21.411	3.92535	258.28803	146.13408	**112.15395**	28.4544	5.21664	249.30048	143.80032	**105.50016**
															18.5562	3.40197	261.69	154.74408	**106.94592**	17.9712	3.29472	252.5952	152.41032	**100.18488**
																	261.69	163.35408	**98.33592**	14.976	2.7456	255.3408	161.02032	**0**
																	261.69	171.96408	**89.72592**	34.4448	6.31488	261.65568	169.63032	**0**
																				13.4784	2.47104	264.12672	178.24032	**0**
																				19.4688	3.56928	267.696	186.85032	**0**

Storage Required = 130.34 cu.m