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Integrated Waste Services
Lot 254 Cnr Hines & Wingfield Rd
Wingfield SA 5013

Mr. Lee Webb

Chief Environmental Officer
Department of Planning, Transport and Infrastructure
Major Development Branch - Adelaide SA

Electronic Copy Distribution:

Environmental Protection Authority (SA) – Kate Hamer (License Coordinator #11275)

APPLICATION (FINAL)
VARIATION OF GOVERNORS
MAJOR DEVELOPMENT AUTHORISATION

IWS Northern Balefill, Lower Light

Dear Lee,

IWS are pleased to present the application for a variation of Governors Major Development Authorisation. On Tuesday, 14 August 2012, the future plan for the ongoing development of the Northern Balefill was presented to the Planning department. This presentation details the 10 year master plan for the site and included the following milestones:

1. RESOURCE PAD AND SITE INFRASTRUCTURE - Establishment of the 'Resource Pad' for establishment of site infrastructure (inc. Service roads, screen mounds and revegetation areas) updating existing landscape and revegetation plan
2. LOOSE FILLING MODIFICATION - Modified management practice to enable an increase to the existing amount of loose fill to be deposited in balefill cells (i.e. using a litter net system)
3. BIOREMEDIATION PAD - Establishment of a bio-remediation pad in modification to the existing MWTF
4. CAPPING DESIGN - Modified design for landfill capping (i.e. an ACAP or phyto-cap)

The milestones numbered above determine the subsequent section numbering in this letter for ease of reference.

1	RESOURCE PAD AND SITE INFRASTRUCTURE	5
1.1	Background.....	5
	Table 1.1a: Resource types – density assumptions.....	5
	Table 1.1b: Resource demand capacity summary.....	6
	Table 1.1c: Resource supply components for re-use	7
1.1.1	Clarification on infrastructure changes/upgrades.....	8
1.2	Suggested Changes	10
1.2.1	Suggested gazettal changes	10
1.2.2	Suggested License Changes	10
1.3	Risk assessment – Existing resource management versus Resource pad	11
1.4	Design and Function.....	12
1.4.1	Design & Construction.....	12
1.4.2	Function & Maintenance.....	12
1.4.3	Receipt and record keeping	13
1.4.4	Resource Pad Commissioning / Decommissioning	13
1.5	Methodology	13
1.5.1	Product specifications	13
	Table 1.5: Product type and corresponding processing and criteria requirements.....	14
1.5.2	Operating times	14
1.5.3	Stockpile management.....	14
1.5.4	Surface water management	14
2	LOOSE FILLING MODIFICATION	15
2.1	Background.....	15
	Table 2.1: Increased pressures in the waste industry.....	15
2.2	Suggested Changes	16
2.2.1	Suggested gazettal changes	16
2.2.2	Suggested License Changes	17
2.3	Risk assessment – baled versus loose waste	18
2.4	Design and Function.....	19
2.4.1	Netting	19
2.4.2	Support Structure	19
2.4.3	Raising and Lowering.....	19

2.4.4	Mobility and adjustment.....	19
2.4.5	Maintenance.....	19
2.5	Methodology.....	20
	Diagram 2.1: Loose fill compaction method.....	20
3	BIOREMEDIATION PAD	21
3.1	Background.....	21
	Chart 3: MWTF determination of treatment method and location.....	21
3.2.1	Suggested Gazettal Changes.....	22
3.2.2	Suggested License Changes.....	22
3.3	Risk assessment – Outdoor Bioremediation.....	23
3.4	Design and Function.....	24
3.5	Methodology.....	24
	Table 3.5: Methodology differentiation summary.....	25
4	CAPPING DESIGN	26
4.1	Background.....	26
4.2	Suggested Changes.....	26
4.2.1	Suggested gazettal changes.....	26
4.2.2	Suggested License Changes.....	26
5	CONCLUSION	27



Attachments (at rear of document)

Appendix A – Resource Pad

- A1 Vegetation and Revegetation Management Plan (2001) *LEMP extract*
- A2 Figure 1 Phase 1: Preliminary capacity
- A3 Figure 2 Phase 2: Full Site Capacity Analysis
- A4 Tables A to F – Resource Demand Calculations
- A5 Application #1A – Change in Process
- A6 Application #1B – Alteration to Plant & Equipment
- A7 Location, layout and cross-sectional view

Appendix B – Loose Filling Modification

- B1 3D design
- B2 Engineering specification
- B3 Application #2A – Change in Process
- B4 Application #2B – Alteration to Plant & Equipment

Appendix C – Bioremediation Pad

- C1 Layout plan
- C2 Cross-sectional view
- C3 Application #3A – Change in Process
- C4 Application #3B – Alteration to Plant & Equipment

Appendix D – Capping Design

- D1 Preliminary water balance assessment: Precipitation / Evapotranspiration
- D2 Preliminary blends: Laboratory Results

1 RESOURCE PAD AND SITE INFRASTRUCTURE

1.1 Background

Current

The original 2001 Approved Vegetation and Revegetation Management Plan (extract from EPA approved LEMP) is presented in Appendix A1, and details the preliminary and future goals set for vegetation management and revegetation objectives.

Proposed

Following on from the current plan above, the infrastructure required at Dublin is summarised as follows (and clarified in Section 1.1.1):

- 11 km – Perimeter access roads (Service roads)
- 7 km – Landfill access ‘all-weather’ roads (Internal Roads)
- 450,000 m³ – LLCW cell sub-grade base
- 210 ha – Cell Module protective layer, topsoil and mulch area
- 5 km – Vegetation mounding for site buffering
- 57 ha – Re-vegetation zones and mounds requiring landscaping mulch

Road and mound construction specifications are presented in Figures 1 and 2 (Appendix A2 and A3), and show the vertical square meters (height*width) measured in the cross-section profiles. Tables A to F (Appendix A4) show the calculations used to derive volumes. Tonnages are estimated (Table 1.1a) using a ‘density multiplier’, which has been determined based on the material characteristics.

Figures 1 and 2 (Appendix A2 and A3) show the areas measured across the site. The total amount of estimated volumes and tonnages are summarised in Table 1.1b (below), and presented in full in Tables A, B, C, D, E and F (at rear of document).

Table 1.1a: Resource types – density assumptions

Resource Type	Characteristics	Density multiplier (t/m ³)
Road base	Contains mainly rock, brick and/or bitumen; low moisture capacity	2
Fill / soil / topsoil	Miscellaneous soils – sandy clay, clayey sand, gravelly sand etc.; contains some organic matter; slightly porous	1.5
Mulch	Mainly organic; very porous; high moisture capacity	0.7



Table 1.1b: Resource demand capacity summary

Demand areas	Volume (m ³)	Density Multiplier (t/m ³)	Mass (t)	% PER END USE	% TOTAL DEMAND
A: ROAD BASE DEMAND					
Fire Roads (FR) Road Surface	7,599.8	2	15,199.5	45.6	
Internal Roads (IR) Road Surface	9,058.9	2	18,117.8	54.4	
<i>Sub-total</i>	16,658.7	2	33,317.4	100	1.0
B: FILL DEMAND					
Fire Roads (FR) Road Fill	16,285.2	1.5	24,427.8	1.1	
Internal Roads (IR) Road Fill	25,783.1	1.5	38,674.6	1.8	
LLCW cell Sub-Grade (SG)	450,000.0	1.5	675,000.0	31.3	
Cell module (M) capping 450mm protective layer	947,688.3	1.5	1,421,532.5	65.8	
<i>Sub-total</i>	1,439,756.6	1.5	2,159,634.9	100	61.6
C: SOIL DEMAND					
Vegetation mounds (VM) Mound Core	134,479.4	1.5	201,719.0	100	5.7
D: TOP SOIL DEMAND					
Vegetation mounds (VM) Top Soil	50,301.4	1.5	75,452.2	13.7	
Cell module (M) capping 150mm Top Soil Layer	315,896.1	1.5	473,844.2	86.3	
<i>Sub-total</i>	366,197.5	1.5	549,296.3	100	15.7
E: LANDSCAPE MULCH DEMAND					
Vegetation mounds (VM) Surface Mulch	32,336.6	0.7	22,635.6	18.9	
Revegetation Zones (RZ) Surface Mulch	138,442.6	0.7	96,909.8	81.1	
<i>Sub-total</i>	170,779.2	0.7	119,545.4	100	3.4
F: COMMERCIAL MULCH DEMAND					
Cell module (M) capping Surface Mulch	631,792.2	0.7	442,254.5	100	12.6
TOTAL	2,759,663.6	-	3,505,767.6	-	100



Table 1.1c: Resource supply components for re-use

		Waste to resource streams														
		Brick	Concrete	Asphalt	Rubble	Screened / Crushed fill	Oversize fill (>200mm)	Clean Soils	Waste Soils	Street sweepings*	Organics bay fines*	Dirt / grass*	Clean green*	Clean Timber	Chipboard	MDF / Gyp-rock
A	Road base	X	X	X	X	X										
B	Fill					X	X	X	X	X						
C	Soil							X	X	X		X				
D	Top soil							X	X	X	X					
E	Landscape Mulch												X	X		
F	Commercial Mulch												X		X	X

* Requires pasteurisation before re-use due to the potential presence of plant propagules/pathogens (refer Section 1.5)

NOTES:

- 'Waste Soils' may include Intermediate Waste Soils, which is subject to a Waste Derive Fill reuse audit protocol.
- Materials requiring pasteurisation must be processed at the bioremediation pad before undergoing further blending processes at the Resource Pad.
- 'Clean Green' refers to organic waste produced from landscaping and vegetation clearing activities only (i.e. branches, tree trunks and prunings).
- 'Clean Timber' refers to timber wastes created from pallets and boxes and does not including any chemically treated timber or plastic and may only include minor amounts of nails/straps/paper.

Each component will be crushed, screened, shredded and/or blended to achieve the appropriate characteristics for the end use. There will be varying proportions of each component per 'batch' due to the variable characteristics of the waste streams caused by numerous sources.

In summary the following tonne's have been estimated for the ongoing activities:

- 33,300 tonne of Road base
- 2,160,000 tonne of Fill
- 201,000 tonne of Soil
- 550,000 tonne of Topsoil
- 120,000 tonne of Landscape Mulch
- 442,000 tonne of Commercial Mulch.

The existing amount of green/timber waste received at the Wingfield Transfer station is approximately 15,000 t /annum. So therefore **it is clearly identified that this annual receipt must increase to ensure there is adequate and ongoing supply.**

The proposed capping works for Module 1 is estimated to require 65,000 t of Commercial Mulch. So under current incoming tonnages, this demand alone would not be satisfied for up to 4 years. Therefore, IWS consider the ability to receive dry organics in the form of



timber and green waste at Dublin will ensure IWS ability to utilise the maximum possible amount of recycled organics for the proposed works.

1.1.1 Clarification on infrastructure changes/upgrades

The infrastructure categories listed above in Section 1.1 are discussed further here to clarify on the necessity to change from existing 2001 infrastructure plans/layouts.

1.1.1a Service roads

Existing perimeter tracks are basic, cleared tracks with no levelling or consistent composition. Tracks have no guaranteed accessibility in wet weather. They are also prone to weeds and seasonally impacted by rabbit warren activity in numerous areas.

To ensure appropriate and regular access, raising the roads will prevent weather and pest plants/animals from impacting these sections of road.

Perimeter access is critical to achieving the management of:

- Perimeter fencing/gate condition
- Fire risk
- Pest plant/animal control/monitoring
- Vandalism / unauthorised access occurrence's
- Illegal dumping occurrence's

Constructing perimeter roads with inclusion of crushed aggregate as the trafficable surface will significantly improve these roads and also prevent pest plant/animal impacts, ensuring the roads do not degrade over time reducing maintenance requirements.

1.1.1b Internal Roads

Continuous progression at the facility subsequently means continuous road construction to ensure appropriate cartage routes are available for site management objectives. These roads are required to be very durable for heavy freight use and all weather accessibility. The construction of these roads is also critical in establishing the overall 'framework' of the site and allows effective forward planning once in place. Therefore the use of recycled materials is ideal and the most cost effective solution and will only include mineralogical based materials. Limestone acquired during onsite excavations will also be utilised for this purpose.

1.1.1c LLCW Subgrade

Construction of any Low Level Contaminated Waste Cell requires the construction of a raised subgrade bed which creates a separation zone from natural groundwater levels below. Subsequently there is a significant volume of fill (soil) required to construct this base and therefore use of recycled soils including Waste Fill and Waste Derived Fill will be of significant aid in the construction process. Most importantly, it will not impact on clay resources attainable on site and heavily relied on for liner construction and cover material.

No waste will be used to construct the subgrade, only materials from mineralogical origins.

1.1.1d Vegetation mounding - Existing

Existing vegetation mounds consist of historic excavated soils from below cap rock (i.e. 2-5 m below ground level). This soil is highly plastic clay with high salt content and has resulted in stunted growth of most planted trees on these mounds. To improve existing mounds, the application of mulch and organic blended soil will improve water retention and organic content, ultimately improving tree growth and enhancing the functionality of the mounds to overcome low rainfall non irrigated conditions. Secondly, this will also improve natural seed germination and tree recruitment.

Fire is a potential risk at all perimeter mounding's at the site boundaries, however current conditions at the vegetation mounding create significant grass and weed undergrowth in the vegetated areas which is not easily managed over large areas and is currently only controllable by hand, to ensure no damage occurs to existing trees and shrubs.

The introduction of mulch will also prevent extensive grass and weed undergrowth throughout the vegetation mounding. The ignition point of dried grasses/weeds is significantly lower than



timber mulches, and therefore the grasses/weeds are more likely to ignite and spread fire in these areas more rapidly. Subsequently, mulch is considered to mitigate this risk. It is important to note that mulch application will be controlled to ensure excessive mulch use does not occur as this can deoxygenate the soil. The appropriate amount of mulch cover is considered to be a nominal thickness of 75 mm (and no greater) for soil improvement and effective weed control.

1.1.1e Vegetation mounding - additional

Development approvals given in 2001 were based on the facility operating a single landfill cell with baled MSW as the primary disposal need for IWS. Currently, IWS now operate:

- dual landfill cells (continuous)
- LLCW cells (continuous)
- MWTF, and
- continuous earthworks (previously subcontracted to civil contractors periodically)

In addition, the proposed Bioremediation pad, Resources Pad, Loose Filling Modifications mean there will be an increase in activity at the site which was previously unforeseen, therefore additional vegetation mounding will aid in mitigating potential increases in noise, dust and windblown litter.

1.1.1f Revegetation zones

Zones marked for revegetation are areas that have no specific current or future use (e.g. buffer land). These areas are commonly degraded weed infested areas with no or little topsoil and serve no benefit to the land use and continually impact surrounding areas by promoting weed recruitment and dust generation/erosion. Planting of trees in the lands current condition will result in a high rate of failure and stunted growth due to the lack of irrigation, topsoil or general organic matter.

These zones are to be gradually improved by slashing and turning of the soil, and with the introduction of organics and organic blended soil (in accordance with Australian Standards). This is to be followed by the planting of indigenous tree and shrub seedlings. Enabling the success rates of seedlings to be increased, will help overcome the low moisture environment and will subsequently yield taller and broader vegetation coverage. Hence the organic matter in blended soils and mulch are an important and justified resource to this application.

1.2 Suggested Changes

1.2.1 Suggested gazettal changes

N/A

1.2.2 Suggested License Changes

1.2.2a **Application #1a – CHANGE IN PROCESS**

Change in process (waste) – according to Section 60. (400-347):

Section 6: (67-287) - The licensee must not receive the following categories of waste at the premises unless: ...

4. *Green waste has been shredded or baled.*

[REQUEST TO OMIT FROM LICENSE]

Application #1a is presented in Appendix A5.

1.2.2b **Application #1b – ALTERATION TO PLANT & EQUIPMENT**

Alterations to plant and equipment – according to Section 61. (400-348):

In conjunction with the Resource Demand Plan (*DRAFT* 2011), the following infrastructure upgrades proposed will comprise:

- 90,000 m² hard pad with recycled road base surface and sloped for drainage,
- 16 product storage bays,
- Stationary mulching, crushing and/or screening for the purpose of processing dry organics, and also inert materials (i.e. brick, concrete, rock etc.).

Application #1b is presented in Appendix A6.

1.3 Risk assessment – Existing resource management versus Resource pad

Risk	Current resource management	Risk Rating	Control	Revised method	Resource Pad	Risk Rating	Control	Revised method
Fire	Stockpiles and cartage routes in various, undefined locations for use in vegetation works Inert stockpiles are not applicable	High	<i>Unacceptable risk level</i> <ul style="list-style-type: none"> Access limited for water truck to be utilised to dampen dry organics stockpiles as required Varying locations creates unmanageable access tracks to stockpile locations Stockpile sizes are undefined may grow to undesirable heights 	Med	Stockpiles of unprocessed or processed dry organics may combust and spread fire to neighbouring scrub or waste repositories	High	<i>Unacceptable risk level</i> <ul style="list-style-type: none"> Water truck to be utilised to dampen dry organics stockpiles as required Maintain a perimeter fire road around resource pad to allow access from any side Use of concrete retaining walls to segregate and isolate stockpiles reduces risk of fire spreading Stockpiled materials not to exceed bay areas and limited to a 5 m maximum stockpile height Shredding/crushing to occur outside of high wind events and high ambient temperatures 	Low
Noise	Potential for random noise risk occurrences at random times/locations	High	<i>Unacceptable risk level</i> <ul style="list-style-type: none"> Operations within buffer zones to be avoided where possible, except where application of materials is required within these areas Noise levels will vary depending on the location of any given operation, consequently distance from neighbouring residents may vary 	High	General processing activities of dry organic and inert materials will create intermittent noise from shredding and crushing operations	High	<i>Unacceptable risk level</i> <ul style="list-style-type: none"> Water truck to be utilised as required to suppress dust generated by crushing/shredding, traffic or stockpile dust control Outside existing buffer zones (520 m) Existing dwellings >1km away Increased noise buffering from existing landfill cell mounds directly screening two closest residents Shredding/crushing to occur outside of high wind events 	Low
Dust	Potential for random dust risk occurrences at random times/locations	High	<i>Unacceptable risk level</i> <ul style="list-style-type: none"> Access limited for water truck to be utilised to dampen dry organics stockpiles as required Varying locations increases complexity of management and maintenance of access tracks to numerous stockpile locations 	Med	General processing activities of dry organic and inert materials will create intermittent dust from shredding and crushing operations	High	<i>Unacceptable risk level</i> <ul style="list-style-type: none"> Water truck to be utilised as required when crushing/shredding is occurring Water truck to be kept full from tertiary aquifer bore located on site (already in use for dust suppression/road maintenance) Existing dwellings >1km away Shredding/crushing to occur outside of high wind events 	Low
Windblown litter	General processing activities of dry organic and inert materials creates the potential for windblown litter to be generated from a processing area	Medium	<i>Undesirable risk level</i> <ul style="list-style-type: none"> All materials received must go through a source separation process prior to receipt at the Northern Balefill Residual waste accumulated from processing activities is to be disposed of in bale voids within the active general waste landfill cell 	Low	General processing activities of dry organic and inert materials creates the potential for windblown litter to be generated from the Resource Pad	Medium	<i>Undesirable risk level</i> <ul style="list-style-type: none"> All materials received must go through a source separation process prior to receipt at the Northern Balefill: Resource Pad Residual waste accumulated from processing activities is to be disposed of in bale voids within the active general waste landfill cell Shredding/crushing to occur outside of high wind events 	Low

1.4 Design and Function

1.4.1 Design & Construction

The design of the Resource Pad is simplistic, with a 1 m crest running through the centre of the pad to create a 'roof top' shape, to ensure there is no pooling of water across the operational surface. Overall slope will be constructed to a minimum 2% cross fall with a minimum slope of 1%. Precipitation will shed either side of the resource pad and be collected by spoon drains and detained in a sedimentation swale directly down gradient.

The pad is to be constructed with compacted clay to 95%, overlain with a minimum of 200mm rubble working surface compacted to 95%.

The proposed location, proposed layout and the cross section of the Resource Pad are shown in Appendix A7.

1.4.2 Function & Maintenance

IWS will manage the storage and preparation of the recycled resources by allocating numerous bays and processing areas. The recycled resources on this pad will be obtained from a source separation, collection or recycled sorting process. Resources will be actively monitored for undesirable amounts of foreign materials (e.g. plastic, metal etc.)

The Resource Pad will consist of 14 product storage bays, mulching, crushing and screening area. Storage bays will have resources attributed depending on operational requirements, including hopper locations and frequent cart areas.

Storage bays will be segregated and organised using 1 m³ recycled concrete blocks as retention walls, stacked a maximum of two blocks high. Concrete blocks are joined by male/female connections as shown in Photos 1.4a and 1.4b.



Photo 1.4a: Recycled concrete block structure

Photo 1.4b: Recycled Concrete block joins



1.4.3 Receipt and record keeping

The receipt of dry organics will be similar to existing framework associated with categorization and billing of waste disposal loads to specific customers. A specific product code will exist for each recyclable product and will also include mixed categories, similarly to the Wingfield weighbridge. Subsequently, tonnages for each recyclable category received will be available to the EPA to ensure the appropriate management of levy and where it applies.

Approximate volumes will be logged for all processes to ensure material tracking is possible and volumes will be attributed to specific end use area codes.

1.4.4 Resource Pad Commissioning / Decommissioning

The construction of the resource pad is currently underway with completion expected to be Summer 2012/13. A temporary resource storage area has been allocated in the interim which is located directly adjacent to the resource pad (see Diagram 1 above).

The existing dry organics stockpiles in temporary storage comprise of approximately 5,000 t of clean greens, timber and gyprock. The initial phase will be to shred and screen all stockpiled recyclable organics into one or more stockpiles for the intended use on existing vegetation mounds and the initial capping works/trials. This is projected to occur before the completion and commissioning of the Resource Pad.

The temporary resource storage area will then remain clear of materials unless capacity or access issues arise.

Decommissioning of the resource pad will most likely occur either at:

- the commencement of construction for the 7th LLCW cell (#37), which is located within the footprint of the Resource Pad, or
- the completion of all cells, after the receipt of waste has ceased, vegetation is stable and final capping works is complete.

Due to the anticipated success and benefit of the Resource Pad, it is expected that this process and methodology will be applied for the life of the site, irrespective of the specific location where materials are being processed. The EPA will be notified of any proposed changes to location and methodology in the receipt, handling and reuse of recycled organics.

1.5 Methodology

1.5.1 Product specifications

Soils production is to comply with the following guidelines and criteria according to their proposed end use and is presented in Table 1.5.

Table 1.5: Product type and corresponding processing and criteria requirements

Product type	Processing activities	Specification / Acceptance criteria
A Road base	Crushing [#] ; Screening	<ul style="list-style-type: none"> PM20
B Fill	Screening	<ul style="list-style-type: none"> EPA License (Waste Fill); or WDF
C Soil	Screening; Blending [#]	<ul style="list-style-type: none"> EPA License (Waste Fill); or WDF
D Top soil	Screening; Blending	<ul style="list-style-type: none"> EPA License (Waste Fill); or WDF AS4419-2003 (Organic soil blend)
E Landscape Mulch	Shredding; Pasteurisation [#] ; Screening;	<ul style="list-style-type: none"> AS4454-2012 (pasteurised product) AS4454-2012 (non-pasteurised, raw mulch)*
F Commercial Mulch	Shredding; Pasteurisation [#] ; Screening	<ul style="list-style-type: none"> AS4454-2012 (pasteurised product) AS4454-2012 (non-pasteurised, raw mulch)*

[#] Processing activity to occur only if necessary

* Non pasteurised 'raw mulch' may only be produced from single known plant material type that, by virtue of the nature and source of the material, embodies minimal risk of plant propagules, pathogens and other contaminants (Australian Standard AS4454-2012).

1.5.2 Operating times

Hours of operation will be dependent on daily weather conditions as a primary function to mitigate dust and fire risks associated with the proposed activities.

Crushing and shredding is not to occur during periods of high wind speeds to prevent dust migration off the site. Daily observations will be made during crushing periods to determine if dust migration is occurring. Any dust observed migrating off site will result in the crushing activities ceasing on that given day.

Shredding is also not to occur during days with a daily maximum temperature reported by the Bureau of Meteorology in excess of 40°C to reduce fire risk.

1.5.3 Stockpile management

The following stockpile controls will be enforceable at the Resource Pad for risk mitigation of fire, noise, dust and windblown litter, as detailed in Section 1.3 and 1.4:

- Storage bays are not to exceed 75 m in width
- Stockpiles are not to exceed storage bay perimeters
- Stockpiles are not to exceed 5 m in height (relative to pad ground level)
- Stockpiles surfaces are to be wetted down during load out (for end use application)
- Storage bays comprising of organics, including soils and mulches, are to be emptied within a maximum time period of 6 months and no longer.

1.5.4 Surface water management

All runoff from the Resource Pad will be collected in lined vegetated sedimentation ponding adjacent to the resource pad and will either be evaporated or reused for irrigation purposes.

Materials will mainly be inert in composition such as soils and aggregates. No materials being processed will be subject to decomposition and therefore no leachate generation will occur.

2 LOOSE FILLING MODIFICATION

2.1 Background

IWS propose an increase in loose disposal of residual solid waste at the IWS Northern Balefill. Recent discussions held with both SA EPA and Planning SA have indicated consent to the proposed development upgrade.

In these discussions with the relevant authorities, the following requirements have been identified and are summarised below:

- Residual waste must be disposed of within an enclosure to prevent windblown litter and vermin control
 - Comparative to best practice at other facilities locally and globally
- All methods and management controls must be incorporated in the existing LEMP for the Northern Balefill
 - Ratio of baled % and unbaled % waste to increase from 80:20 to 50:50 largely due to increase in recycling rates in SA significantly changing residual waste composition.

Due to significant changes in the residual waste stream, similarly operational management methods have changed also. The timeline in Table 2.1 shown below illustrates this progression.

Section 5.2.1 – ‘Baled and non-baled waste’ in the LEMP (Draft), submitted to the EPA on 10 February 2012, details the original and existing ratio of 80% baled and 20% unbaled.

Materials can be deemed to be ‘unbaleable’ for a whole range of reasons, including material:

- That is too large and/or bulky to be put through the conveyor and baler receiving chutes
- of significant maintenance risk causing mechanical damage
- that is too abrasive (i.e. large amounts of soil or broken glass)
- that presents a safety risk to baler operators, when applying the baler bag to end of chute
- that presents a damage risk to bale bags hence creating litter risks

Note: IWS has already increased the potential for more material being baleable by adopting the bagging system, as opposed to the original wire strapping system.

As indicated in the table below (Table 2.1), pressures caused on the baling system from the 80:20 mix is no longer practical however a 50:50 mix can be maintained and provide an outcome of the same environmental performance, largely the equivalent compaction of rubbish and control of litter/vermin.

Table 2.1: Increased pressures in the waste industry

Time	Governance	Levy Approx.	Private enterprise
2001	No existing framework / policy for waste (other than CDL)	\$2/t	Wire strapped bale effective in handling diverse waste stream
2004	Formation of ZeroWaste SA Establishment of active waste management policy to current hierarchy	First major levy increase \$12/t	
2005	-	-	Establishment of major Visy facility at IWS for source separated recyclables Establishment of link with new Jeffries composting facility for source separated organics diversion



Time	Governance	Levy Approx.	Private enterprise
2007	-	Levy is doubled \$24.20 /t	Implementation of EnviroBale system to cover and manage bales due to significant changes in waste composition.
2008	-		Greater decreases in organic composition of residual waste
2010	Establishment of the EPA EPP, and a requirement for resource recovery processes prior to landfill		IWS build commercial and industrial recycling centre and expanding existing C&D recycling processes
2011	-	Levy increase \$35/t	
2012	-	Levy increase \$42/t Introduction of Carbon Price Mechanism	IWS expands recycling activities and diversion from landfill IWS requiring implementation of a bi-modal system for waste disposal of EnviroBale in conjunction with a netting system due to significant changes to the residual waste composition since 2001.

2.2 Suggested Changes

2.2.1 Suggested gazettal changes

Current

Existing gazette conditions (for ease of reference) relating to this application are currently as follows:

15. Subject to Conditions 25, 26 and 27, all waste received for disposal at the facility shall be shredded and baled.

16. Unbaled green waste or unbaled construction or demolition waste of appropriate particle sizes may be placed and compacted in any voids unavoidably occurring between bales and the inclined surface of the cells in which those bales are placed to the reasonable satisfaction of the Environment Protection Authority and in accordance with any applicable requirements of a relevant environmental authorisation.

17. Waste materials received for disposal at the facility need not be shredded before baling where shredding of those materials is not required for the purpose of producing bales of a density and structural integrity that satisfy the applicable requirements of any relevant environmental authorisation.

18. Non-friable asbestos waste shall not be shredded or baled but shall be disposed of in accordance with the applicable requirements of any relevant environmental authorisation.

Proposed

IWS suggest the following changes shown blue underline:

Condition 15

To reference conditions 16, 17, 18; and not 25, 26, 27.

Condition 16

Unbaled green waste or unbaled commercial/industrial or construction or demolition waste of appropriate particle sizes may be placed and compacted:

- a) *in any voids unavoidably occurring between bales and the inclined surface of the cells in which those bales are placed, or*
- b) *within a suitable netting system.*

to the reasonable satisfaction of the Environment Protection Authority and in accordance with any applicable requirements of a relevant environmental authorisation.



2.2.2 Suggested License Changes

2.2.2a Application #2a – CHANGE IN PROCESS

Change in process (waste) – according to Section 60. (400-347):

Section 6: (67-287) - The licensee must not receive the following categories of waste at the premises unless: ...

- x. *commercial/industrial or construction/demolition waste, which is unbaleable, is disposed within an enclosed netting system approved by the EPA (without limiting condition 67-286)*

[REQUEST TO ADD TO LICENSE]

Application #2a is presented in Appendix B3.

2.2.2b Application #2b – ALTERATION TO PLANT & EQUIPMENT

Alterations to plant and equipment – according to Section 61. (400-348):

Infrastructure upgrades will include:

- Large spanning, enclosed net with entry/exit points
- Shipping containers with masts for net suspension
- Winch arrangement for net lowering in undesirable weather conditions

Application #2b is presented in Appendix B4.

2.3 Risk assessment – baled versus loose waste

Risk	EnviroBale	Risk Rating	Control	Revised method	Loose Fill	Risk Rating	Control	Revised method
Windblown litter	Bagged bales (using EnviroBale) significantly reduce windblown litter, by creating a physical barrier for litter	Medium	<i>Undesirable risk level</i> Daily cover on horizontal surfaces	Low	Loose filling means potentially significant increases in windblown litter when temporarily exposed, with greater potential for waste to be carried by strong winds	High	<i>Unacceptable risk level</i> <ul style="list-style-type: none"> • Mobile netting system to overarch tipping zone • Use of bales for wall construction creating wind protected voids • Daily cover inside net • Tipping face and net entrance to be positioned according to prolific wind directions (i.e. facing North, Northeast or West only) 	Low
Odour	Bagged bales (using EnviroBale) significantly reduces odour, due to increased density and therefore reduced porosity as well as creating a physical barrier preventing exposure of waste winds	Medium	<i>Undesirable risk level</i> Daily cover on horizontal surfaces	Low	Loose filling means potentially significant increases in odour when temporarily exposed, with greater potential for odour to be spread due to increased porosity	High	<i>Unacceptable risk level</i> <ul style="list-style-type: none"> • Mobile netting system to overarch tipping zone • Landfill compactor to decrease waste porosity • Use of bales for wall construction creating wind protected voids • Daily cover inside net 	Low
Noise	Bagged bales (using EnviroBale) is indifferent in comparison to other methods as it incorporates at least 2 machines for disposal to be carried out.	Low	<i>Acceptable risk level</i> Outside existing buffer zones (520 m) No further risk mitigation necessary	Low	Loose filling noise risks are indifferent in comparison to other methods as it incorporates machinery to push and compact waste as it is received.	Low	<i>Acceptable risk level</i> <ul style="list-style-type: none"> • Outside existing buffer zones (520 m) • No further risk mitigation necessary 	Low
Vermin & Pests	Bagged bales (using EnviroBale) significantly reduces vermin access to waste by creating a physical barrier.	Medium	<i>Undesirable risk level</i> Daily cover on horizontal surfaces eliminates damaged bale's from machines	Low	Loose filling means significant increase in vermin and pests due to exposed wastes.	High	<i>Unacceptable risk level</i> <ul style="list-style-type: none"> • Mobile netting system to overarch tipping zone • Landfill compactor to decrease waste porosity • Daily cover inside net 	Low



2.4 Design and Function

A 3-dimensional image is presented in Appendix B1 illustrating the net's application.

2.4.1 Netting

Netting will comprise of an engineered and manufactured net, up to 80 wide x 13.5 metres high. The net will be produced by a firm having previous local experience in this type of net structure:

- The lower 1.5 metres of the side walls will be constructed of a lead weighted net material to prevent the net from lifting in the wind, this also assists the net in following bumps and dips in the ground surface.
- The remainder of the walls are of a 5 mm rope, and the roof of a lighter 3 mm rope.
- All sections of the net are 75 mm aperture. Ropes supporting the net structure will be permanently sewn into the net itself.
- An opening 30 m x 11 m will be incorporated in both ends with rope attachments allowing quick ease of opening and closing doors for access.

2.4.2 Support Structure

The entire net will be supported by 12 posts attached to 20 ft. shipping containers. Each post or mast will be braced to the container as per engineer's specifications, eliminating the need for wire guy ropes. Each container will require a quantity of ballast as per engineer specification to firmly secure down each fixing point. Container and mast assemblies can be moved as one, or the mast structure can be removed from the end of the container.

2.4.3 Raising and Lowering

The net will be raised and lowered using electric winches attached to each mast. Each winch will be attached to the net using '7x19' flexible wire rope, via rigging blocks at the top of the mast, to eyelets incorporated in the net support ropes. Each winch will have up and down hand controls and a power lead. The power leads will plug into four work vehicles with large "Anderson" plugs.

The '7x19' refers to the flexibility of the rope it means that the rope is made of 7 wires that consist of 19 strands this is decided on what the rope is going to be used for.

2.4.4 Mobility and adjustment

The net structure is designed to be moved to different locations within the general waste cell for optimisation of cell filling stages. Height increases are also possible by increasing the perimeter wall heights with the use of baled waste to create even further protection from winds and increased use of a single filling area. The net can also be expanded in width or length if necessary.

2.4.5 Maintenance

Scheduled maintenance of all cables, winches, masts and the net will be periodically inspected by the installer every 12 months for any defects, wear or breakages occurring from adjustments, mobilisation and general weather exposure, or as required during any 12 month period.

2.5 Methodology

Waste disposal methodology is to be in accordance with existing management processes as detailed in Section 5.2.1 – ‘Baled and non-baled waste’ in the LEMP (Draft), submitted to the EPA on 10 February 2012. This particular methodology also is presented in previously approved LEMP’s including the original LEMP (2001) in Section 3.5 – ‘Waste Disposal’.

Adjustments to this methodology are as follows:

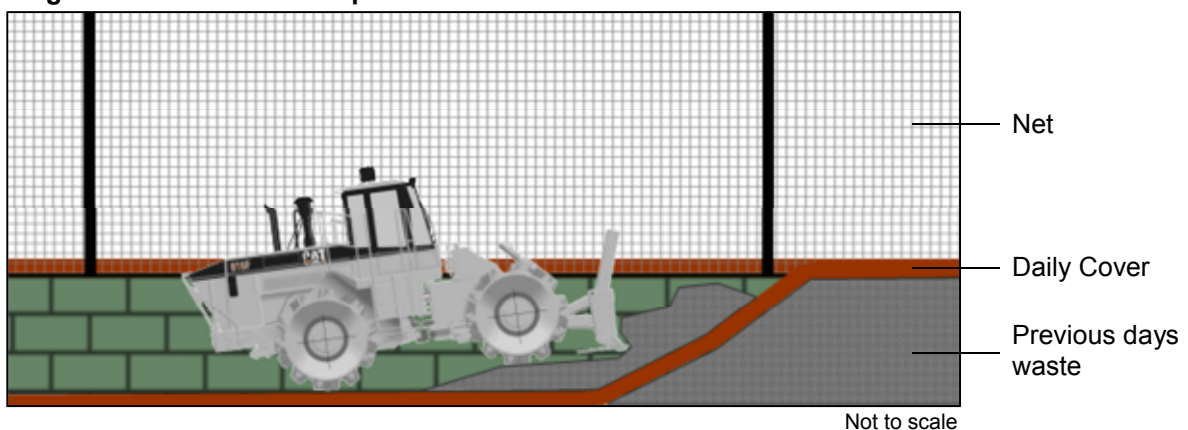
Unbaled green waste or unbaled construction or demolition waste of appropriate particle sizes may be placed and compacted:

- a) in any voids unavoidably occurring between bales and the inclined surface of the cells in which those bales are placed, or
- b) within a suitable netting system.

Disposal of unbaled waste (with the exclusion of filling unavoidable bale voids) must occur under the following operational controls:

- Unbaled waste must be tipped in close proximity to the existing working face, for ease of compaction and efficient lateral spreading/compaction. All transport vehicles must tip within the mobile netting system to eliminate the potential for windblown litter.
- Bales will be used to raise the netting system higher, to increase the capacity of the net structure between moves. Bale walls will be constructed in the form of a three sided pit or U shape, as illustrated in Appendix B1 and B2. Secondly this reduces wind impacts and hence mobility of litter.
- The entrance of the netting system is strictly to be erected to manage prolific wind directions. Winds coming from the west and north are most frequent with the greatest severity of windblown litter occurring from warm northerly winds. Consequently the netting entrance/exit must either face north, northwest, northeast or west.
- Waste handling within the net system will be spread and compacted into a working surface illustrated below.

Diagram 2.1: Loose fill compaction method



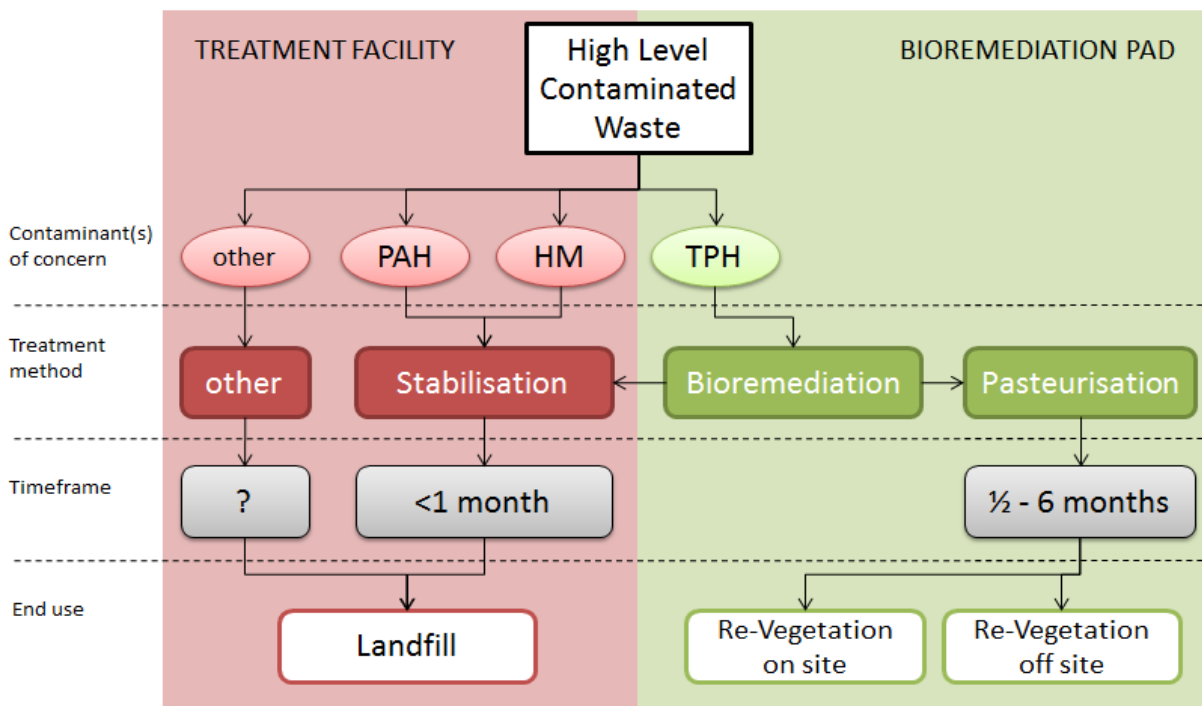
3 BIOREMEDIATION PAD

3.1 Background

The proposed construction of the Bioremediation Pad has been designed to enhance previously approved treatment activities at the Multi-purpose Waste Treatment Facility (MWTF). The objective is to manage significantly variable hazard management requirements between contamination types, methods and risk mitigators which can all vary in scale and cost effectiveness. Subsequently, IWS propose to construct additional processing areas that largely relate to bioremediation activities that are not as risk averse to surrounding land users or the environment and all contaminants for treatment in this proposed area will be biologically degradable. This also aligns IWS's facility with other EPA licensed facilities for bioremediation activities and is in accordance with the most relevant and current EPA guideline available - Compost guideline (Public consultation, October 2012).

Chart 3 below describes the determination of treatment method and location within the facility based on the contaminant type. Pink shows the increase in risk management required and therefore designates these processes for the enclosed facility. Green shows the reduced risk management required and therefore designates these processes for the Bioremediation Pad.

Chart 3: MWTF determination of treatment method and location



Contaminants of concern:

- Other includes all other contaminants that could potentially be treated at the MWTF.
- PAH Polycyclic Aromatic Hydrocarbon
- HM Heavy Metals
- TPH Total Petroleum Hydrocarbons

Treatment Method:

- Other Refers to numerous other possible scenarios including:
 - Treatment's requiring a combination of stabilisation and bioremediation
 - Thermal Desorption, Solvent Extraction etc. (refer MWTF EMP)
 - New treatment methods and technologies developed in the future (refer MWTF EMP)
- Stabilisation Refers chemical stabilisation / fixation or oxidation where contaminant is immobilised but not typically destroyed/removed
- Bioremediation refers to biological decomposition of contaminants promoted by organics and aerobic digestion
- Pasteurisation refers to the process whereby organic materials are treated to significantly reduce the number of plant and animal pathogens and weed propagules

3.2 Suggested Changes

3.2.1 Suggested Gazettal Changes

N/A – Existing conditions associated with the MWTF do not conflict with the proposed MWTF variation.

3.2.2 Suggested License Changes

3.2.2a **Application #3a – CHANGE IN PROCESS**

Change in process (waste) – according to Section 60. (400-347):

Section 6: (67-287) - The licensee must not receive the following categories of waste at the premises unless: ...

- x. *Organic liquids and sludge's that have been bulked prior to receipt for treatment processes at MWTF*
- y. *Organic liquids and sludge's are contained with an approved vessel at the premises for treatment processes at MWTF*

[REQUEST TO ADD TO LICENSE]

Section 7: (67-288) – Without limiting Condition 67-286, the Licensee must not receive the following types of waste: ...

- 1. *Liquid wastes and sludge's*
- 5. *Grease trap waste*

[REQUEST TO OMIT FROM LICENSE]

Removal required due to the conflict that exists between this historic condition and the addition of the MWTF development.

Application #3a is presented in Appendix C3.

3.2.2b **Application #3b – ALTERATION TO PLANT & EQUIPMENT**

Alterations to plant and equipment – according to Section 61. (400-348):

The main change will be the construction of a 'Bioremediation Pad' to accompany the existing approved enclosed facility (MWTF).

Alterations include the construction of a processing pad, storage pad, roads, swale and dam. Pad will be aerated by inset poly pipe. Refer to Appendix C1 and C2.

Application #3b is presented in Appendix C4.

3.3 Risk assessment – Outdoor Bioremediation

Risk	Enclosed Treatment Facility	Risk Rating	Control	Revised Rating	Bioremediation Pad	Risk Rating	Control	Revised Rating
Leachate	Potential for leachate generation from organic materials impacting groundwater	Medium	<p><i>Undesirable risk level</i></p> <ul style="list-style-type: none"> Perimeter concrete bund Additional dry organics use for bulking excess leachate 	Low	Potential for leachate generation from organic materials impacting groundwater	Medium	<p><i>Undesirable risk level</i></p> <ul style="list-style-type: none"> QA/QC clay liner and graded slope Continuous liner to dam for leachate collection and evaporation (capable of 1 in 25 year recurrence interval and 24 hr storm event) Excess leachate in dam to be pumped out and transported to the existing leachate evaporation pond onsite or to EPA approved liquid treatment plant 	Low
Odour	Potential for odour to occur from decomposing organics	High	<p><i>Unacceptable risk level</i></p> <ul style="list-style-type: none"> Organics enclosed in shed air exhausted from the facility is filtered through the Bio-filter Piles to be turned 3 times during pasteurisation to maintain aerobic digestion 	Low	Potential for odour to occur from decomposing organics	High	<p><i>Unacceptable risk level</i></p> <ul style="list-style-type: none"> All constructed windrows/piles to be covered with a 'bio layer' to deodorise air Active aeration keeps decomposition aerobic Aerated piles allows for only a single turn during pasteurisation phase 	Low
Dust	Potential for dust to occur from organic processing activities	High	<p><i>Unacceptable risk level</i></p> <ul style="list-style-type: none"> Organics enclosed in shed air exhausted from the facility is filtered through the Bio-filter 	Low	Potential for odour to occur from decomposing organics	High	<p><i>Unacceptable risk level</i></p> <ul style="list-style-type: none"> Moisture control by irrigation to maintain dust suppression All constructed windrows/piles to be covered with a 'bio layer' to deodorise air Aerated piles allows for only a single turn during pasteurisation phase 	Low
Fire	Potential for fire risk from organics due to high carbon content	Medium	<p><i>Undesirable risk level</i></p> <ul style="list-style-type: none"> Dedicated fire fighting tanks directly outside facility Windrow dimensions limited to 3m high and 2m wide Access and separation controls 	Low	Potential for fire risk from organics due to high carbon content	Medium	<p><i>Undesirable risk level</i></p> <ul style="list-style-type: none"> Moisture control by irrigation Water truck use to suppress any observed smoke/fire Windrow dimensions limited to 5m high and 4m wide Access and separation controls between windrows/piles 	Low



3.4 Design and Function

The bioremediation pad will be constructed according to the specification and design drawings attached (Appendix C1 and C2). The location of the pad will be north east of the existing treatment facility.

The design comprises a clay liner and calcrete/rubble working surface (>2% cross fall drainage gradient), and with inset aeration lines at the surface. All free liquid generated on the pad will be collected within the clay lined evaporation pond (sloped >1%). The evaporation pond and system will be capable of handling a 1 in 25 year recurrence interval and 24 hour storm event.

Windrows will be aerated as required using the 'in-ground' aeration lines. This will promote a high oxygen environment for the most effective and rapid pasteurization of organics. Secondly this will significantly mitigate odours associated with anaerobic digestion.

Odour from each windrow will also be managed and mitigated by the application of 300 mm or greater of composted organics capping over the entire windrow's exterior surface. This aligns with current remediation management used at the Treatment Facility (i.e. Bio-Filter).

Technical specifications including design drawings, a construction quality assurance plan and construction management plan will be submitted for assessment and approval by the EPA. Followed by an 'As constructed' report for assessment and approval prior to any operation use.

3.5 Methodology

Materials undergoing pasteurisation are to comply with Australian Standard AS4454-2012 Compost, soil conditioners and mulches for 'pasteurised product'. Pasteurisation occurs as a result of a time/temperature relationship and therefore temperatures will be monitored to determine if pasteurisation has occurred. The standard states "Appropriate turning of outer material to the inside of the windrow so the whole mass is subjected to minimum of three turns with the internal temperature reaching a minimum of 55°C for three consecutive days before each turn". This standard process will be adopted for pasteurisation within the enclosed facility.

Where adequate aeration is occurring, (i.e. at the bioremediation pad), material is only subject to a single turn, however to ensure appropriate temperatures are maintained throughout the pile, a minimum 300 mm composted organics layer will be used to insulate the pile at windrow construction.

Table 3.5: Methodology differentiation summary

Method	Enclosed Treatment Facility	Bioremediation Pad
<i>Batching</i>	3m high x 2m wide Maximum size not to exceed 1000 m ³	5m high x 4m wide Maximum size not to exceed 1000 m ³
<i>Temperature monitoring</i>	Must exceed 55°C for three consecutive days before each turn	Must exceed 55°C before and after turn
<i>Aeration & Turning</i> <i>Organics will be subject to aerobic digestion and turned according to treatment location</i>	Mechanical turning only 3 turns during 15 day pasteurisation phase	Aerated pad reduces turning and maintains aerobic environment 1 turn during 15 day pasteurisation phase
<i>Testing (QA/QC)</i>	TPH concentrations (inc. Silica Gel Clean up) to be analysed for compliance with existing disposal / reuse options as per current license conditions. Then if material is to be reused: Representative sample from each batch is to be tested in accordance with AS4454-2012 to qualify as 'pasteurised product' before it is transported away from the MWTF Compliance with criteria listed in Table 2 (Compost Guidelines, EPA, Oct 2012)	



4 CAPPING DESIGN

4.1 Background

Recent discussions with the EPA and developments in local industry best practice, has shown the wide acceptance of the Phytocap. The guidelines produced by the Waste Management Association of Australia (WMAA), as part of the Australian Alternative Cover Assessment Program (A-ACAP): *Guidelines for the Assessment, Design, Construction and Maintenance of Phytocaps as Final Covers for Landfills (October 2011)* provides guidance for landfill stakeholders on the applicability, design, construction and maintenance of Phytocaps in Australia based on research findings and field data from five Australian A-CAP sites.

IWS intend to use this guideline in designing the appropriate Phytocap for application at the Northern Balefill. Cap design will be in accordance with the 2011 Guidelines and trials will commence most likely in mid-2013.

Preliminary assessment of the required parameters for Phytocap design has been positive and show direct application potential for the site. Water balance assessment, presented in Appendix D1, shows the minor level of management required for excess rainfall. Only two months in the year rainfall exceeds evapotranspiration. Appendix D2 shows the preliminary tests for Water Holding Capacity, Air Filled Porosity and bulk density on a variety of different potential soil blends using readily available materials.

Soils types needed for Phytocap covers require high organic content and high porosity, both of which are unattainable from existing natural soils accessible from existing operations on site. Therefore materials must be obtained from off-site sources including raw recycled materials in soil and organic forms.

The establishment of the resource pad will allow the production of suitable and consistent soil matrixes on site and in turn will ensure the fastest introduction of this new methodology in cap design and construction.

4.2 Suggested Changes

4.2.1 Suggested gazettal changes

No reference to capping design was able to found.

4.2.2 Suggested License Changes

Pending design of a Phytocap, license changes are currently not necessary. Design and EPA submission is expected to occur by December 2012.



5 CONCLUSION

In summary, IWS have completed submission to aid the Planning Department in understanding the sites future objectives for the IWS Northern Balefill.

If you have any further queries regarding this master plan, please contact either of the undersigned.

Yours sincerely

A handwritten signature in black ink, appearing to read 'Simon Spencer'.

Simon Spencer BSc.EnvSc
Site Manager – Dublin
Integrated Waste Services

0400 113 870
simon.spencer@iwsgroup.com.au

A handwritten signature in black ink, appearing to read 'Paul Bowden'.

Paul Bowden B.E Civil & Env (Hons), MPM
General Manager
Integrated Waste Services

0400 366 031
paul.bowden@iwsgroup.com.au

Appendix A

Resource Pad

10. Vegetation Management and Revegetation Plan

10.1 Standards/Codes/Conditions

- Assessment Report – November 1997
- Country Fires Act 1989
- Development Act 1993
- Development Authorisation 29 January 1998 – Conditions 1, 2, 3, 4 and 9, Notes 1, 4, 5 and 16
- Lower North District Plan – Greening Australia Code of Practice for Seed Collecting
- Native Vegetation Act 1991

10.2 Objectives

- Minimise visual impacts of landfill by planting vegetation.
- Maintain and enhance existing on-site vegetation.
- Rehabilitate site to minimise erosion, pest plant and animal invasion.
- Commitment to an Environmental Strategy.

10.3 Site Overview

The area encompassing the IWS Northern Balefill site could be classified as an industrial agricultural area. Many operations utilised the low productivity of the land to set up intensive operations that did not rely on the surrounding land for production, eg feed lots, piggeries, poultry sheds. This observation clearly denotes the type of land surrounding the site when looking from an agricultural or rural living perspective.

From a conservation perspective the region has been degraded for many years by agricultural and grazing pressures and the extraction of road construction materials. The biodiversity of the region is still in decline with poor representation of tender plant and animal species.



Dublin Site

The climate of the area is naturally arid Australian Mallee. Extreme evaporation, unreliable seasons and low rainfall contribute to making the area unique in proximity to Adelaide.

In the next years IWS envisage changing the site from overgrazed farm and mining land into a property with valuable remnant native vegetation and a diverse ecology of created indigenous vegetation.

The site is situated North West of Adelaide on an arid calcareous plain. Sheet limestone is overlaid by grey calcareous loam with small areas of light soil rises. The South Western corner of the site has a remnant saline marsh complex surrounded by mallee rises. Much of the site has been run as grazing property with severe overgrazing in the past. The remaining area of remnant mallee has recovered since IWS purchased the site and excluded stock.

The mallee vegetation comprises of well established eucalypti of five species. The undergrowth is now healthy with *Rhagodia*, *Maireana* and *Dianella* species present. The remnant mallee adjoins other properties with remnant mallee although overgrazed it is still established and stable.

Figure 10-1 – List of Species

Trees and Shrubs:

- *Acacia hakeoides*
- *Acacia ligulata*
- *Acacia sclerophylla*
- *Eucalyptus dumosa*
- *Eucalyptus gracillis*
- *Eucalyptus oleosa*
- *Eucalyptus socialis*
- *Melaleuca acuminata*
- *Myoporum insulare*
- *Myoporum platycarpum*
- *Rhagodia candolleana*

Saltmarsh Species

- *Halosarcia halocnemoides* (Grey Samphire) - Principal species
- *Halosarcia* sp
- *Threlkeldia diffusa* (Coast Bonefruit)

Groundcovers and Grasses

- *Disphyma crassifolium* (Round Leaf Pigface) - stressed, near dead
- *Enchylaena tomentosa* (Ruby Saltbush) - common
- Unidentified sp - annual, slightly succulent
- *Stipa* sp

Note:

Seed will be sourced on-site and put into a bank for direct seeding and tubestock development. Natural regeneration is presently occurring in the vegetated areas and will be encouraged.

10.4 Management Plan

Infrastructure/Development Commitment	1998	1999	2000	2001	2002
Limit disturbance to vegetated area by protective (rabbit proof) fencing.	✓	✓	✓	✓	
Plant Buffer Zone using indigenous species from tubestock and direct seeding from on-site sources. (Refer figures 10-2, 10-3 & 10-4.)	✓	✓	✓	✓	
To minimise visual impact, develop a planted earth mound where necessary. (Refer figure 10-2.)	✓	✓	✓	Completed	
Establish and maintain seed bank of indigenous species to enable efficient and effective ongoing planting.	✓	✓	✓	✓	
Stockpile all excavated topsoil for use in capping to enhance revegetation by using natural topsoil.				✓	
Maintain firebreaks and maintenance track around the site. The District Council of Mallala specifies 2.0 metres ploughed or 4.0 metres slashed to enable access for fire fighting purposes.	✓	✓	✓	Sept /Oct	
Commence vegetation planting in designated areas prior to operation of the IWS Northern Balefill to establish a visual barrier.	✓	✓	✓	✓	
Cap and vegetate all cells using appropriate species according to the end use of the site to minimise erosion and improve the site.				Not commenced	
Prepare description of existing vegetation communities including species list and distribution map to create baseline data.	✓	✓	✓		



Tree in guard

Maintenance Commitment	1998	1999	2000	2001	2002
Ongoing implementation of pest plant and animal eradication program for Undisturbed Area.	✓	✓	✓	✓	
Repair and maintain fencing to prevent incursion of stock, pests or vehicles including an annual security and eradication program.	✓	✓	✓	✓	
Annually review operational procedures and control measures to prevent invasion of pest plants, animals and exotic vegetation in New Planting.	✓	✓	✓	✓	
Ongoing implementation of pest plant and animal eradication program for Disturbed Areas.	✓	✓	✓	✓	

Ford New Holland L85 Farm Tractor for use in vegetation management and pest plant eradication program



Monitoring Commitment	1998	1999	2000	2001	2002
Annual Native Vegetation Report to be prepared to identify any problems and what action to be taken to rectify them. This report to include photographic and survey record of vegetation.	✓	✓	✓		
Regular inspections to ensure control and eradication of pest plants and animals.	✓	✓	✓	✓	
Regular inspections to ensure successful establishment of vegetation and regeneration.	✓	✓	✓	✓	
Control of grass to maintain a safe environment. Grazing and slashing as required.	✓	✓	✓	✓	



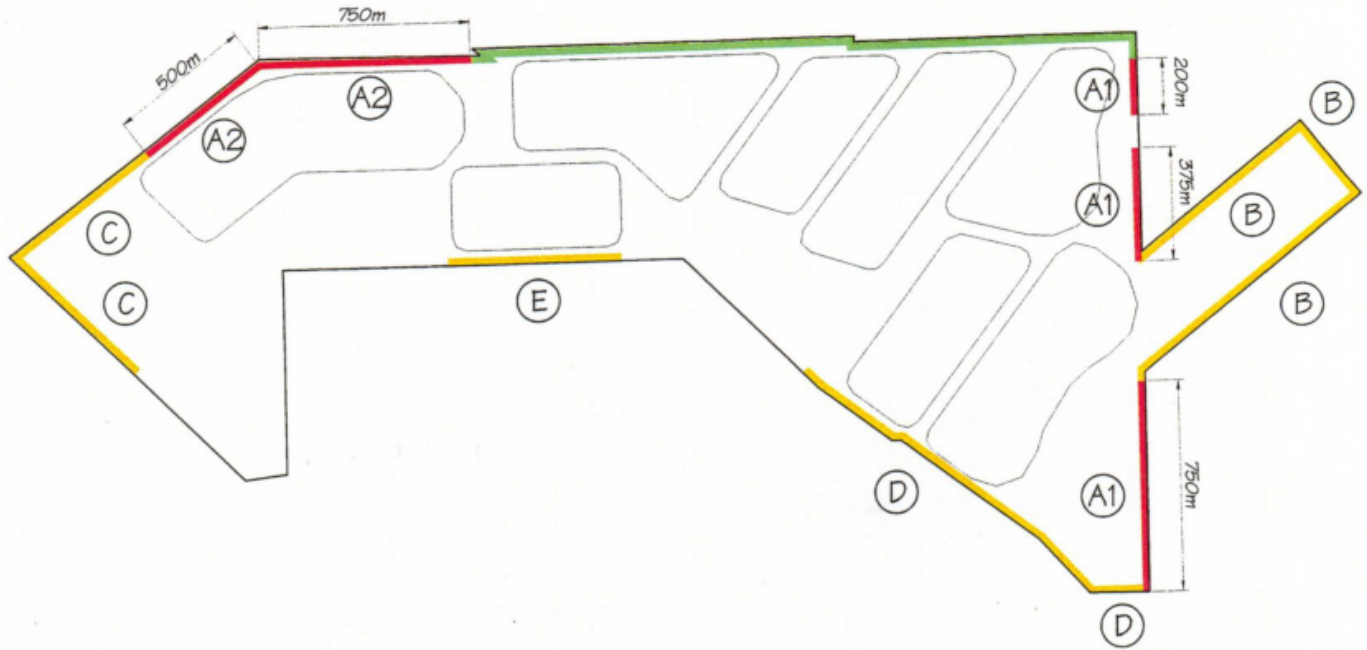
Note:
Trees only successfully growing, pest plants kept to a bare minimum

Earthmound on Eastern Boundary Refer A1 on 10-2

10.5 Further information

1. IWS Environmental Impact Statement, February 1996 Item 3.15, pages 30 to 33.
- 2.
3. IWS Northern Balefill – Clarification of Issues August 1997, Item 3, pages 18 to 22.
4. Establishment of Photo Points Report prepared by WE Matheson, Landcare Consultant – December 1999.
5. Rehabilitation Program for 2000 prepared by YP Windbreaks
6. Annual Native Vegetation Report – 2000 prepared by Benjamin Pavy – May 2001.

Figure 10-2 – Vegetation Development



PRIORITY

- A1 1999 - Completed 1999
- A2 2000
- B 2000
- C 2001
- D 2002
- E 2003

PLANTINGS

- MOUNDED
- UNMOUNDED
- NATURAL REVEGETATION

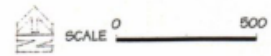


Figure 10-3 – Boundary Planting

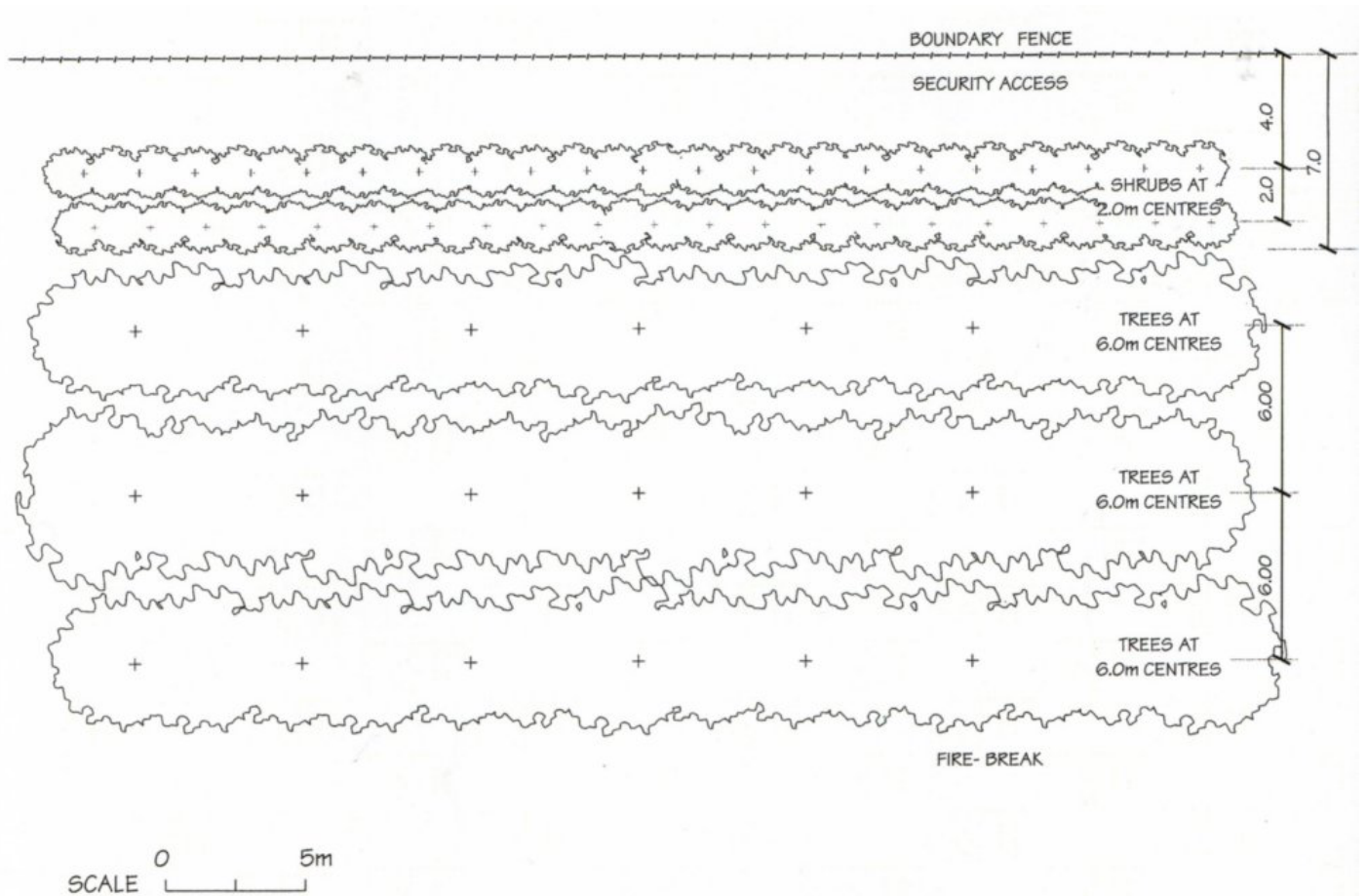
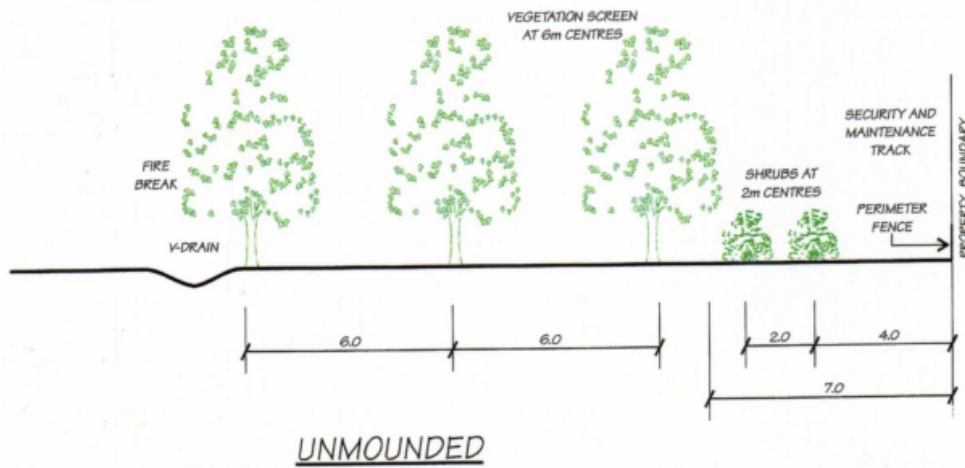
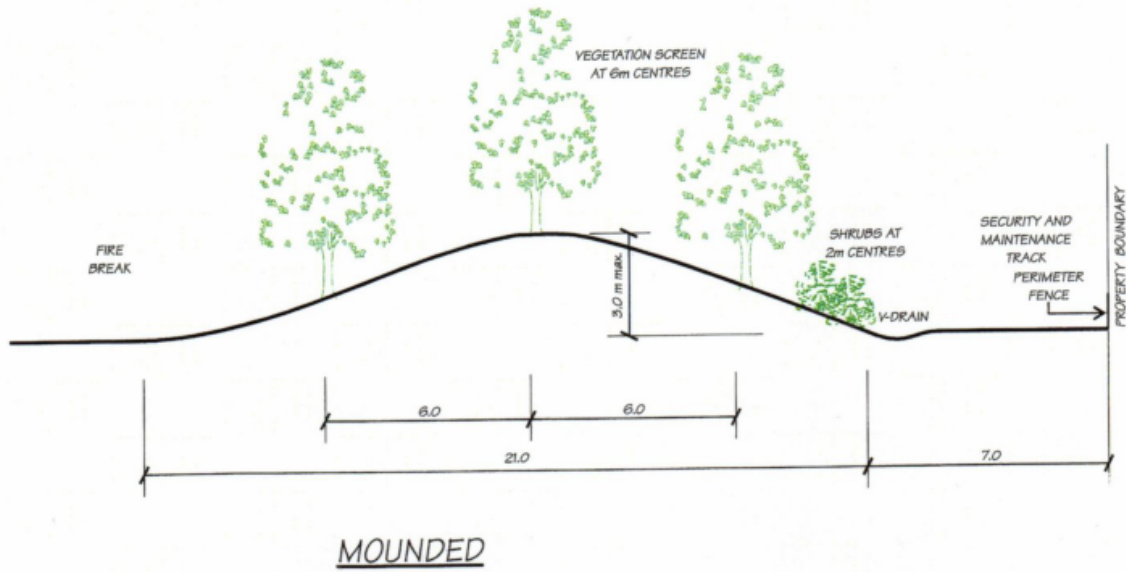


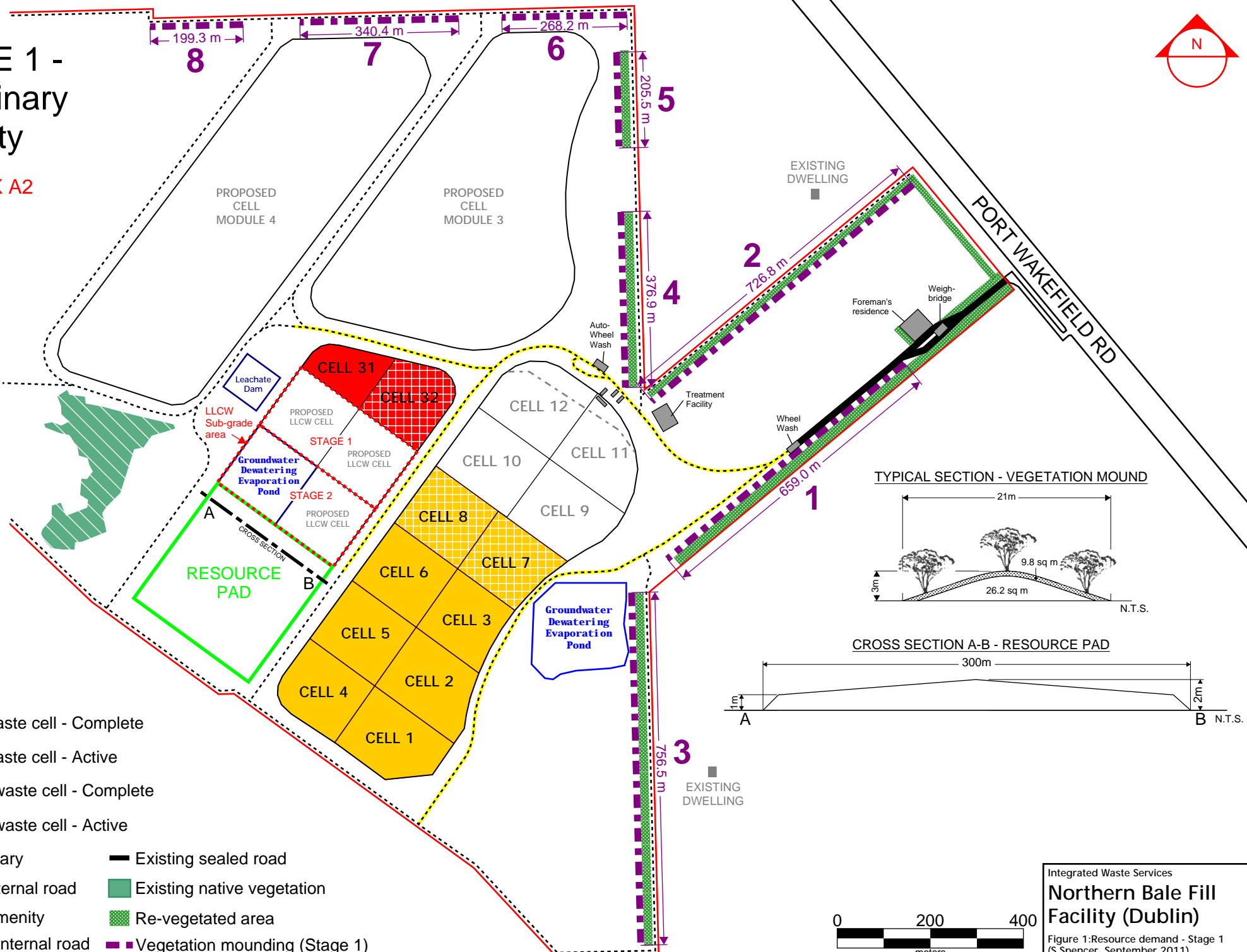
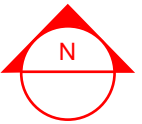
Figure 10-4 – Landscape Buffer



SCALE 0 2.5m

PHASE 1 - Preliminary capacity

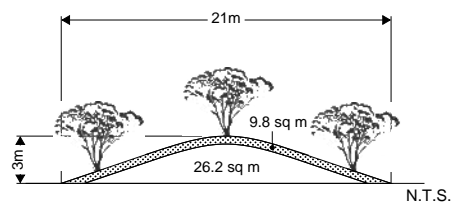
APPENDIX A2



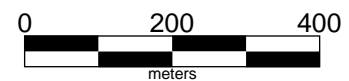
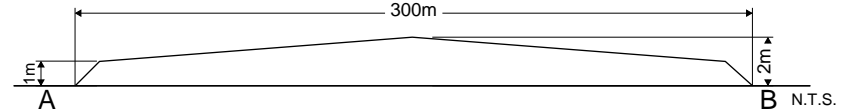
- General waste cell - Complete
- General waste cell - Active
- Low level waste cell - Complete
- Low level waste cell - Active

- Site boundary
- Existing internal road
- Facility / amenity
- Proposed internal road
- Existing native vegetation
- Re-vegetated area
- Vegetation mounding (Stage 1)
- Existing sealed road

TYPICAL SECTION - VEGETATION MOUND



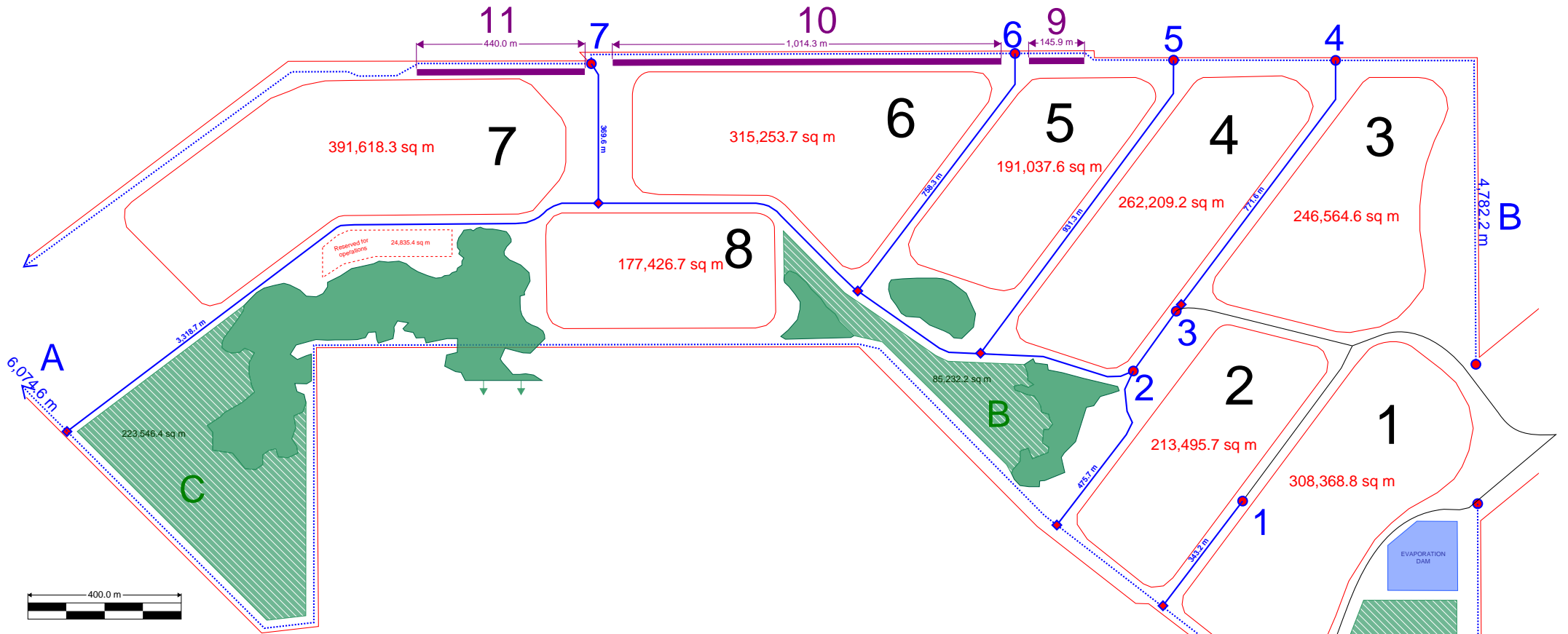
CROSS SECTION A-B - RESOURCE PAD



Integrated Waste Services
Northern Bale Fill Facility (Dublin)
 Figure 1: Resource demand - Stage 1
 (S.Spencer, September 2011)

PHASE 2 - Full site capacity analysis

APPENDIX A3



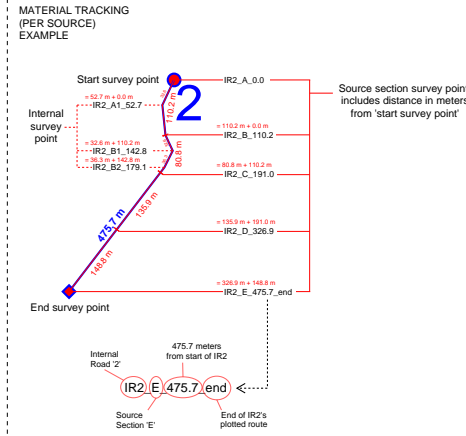
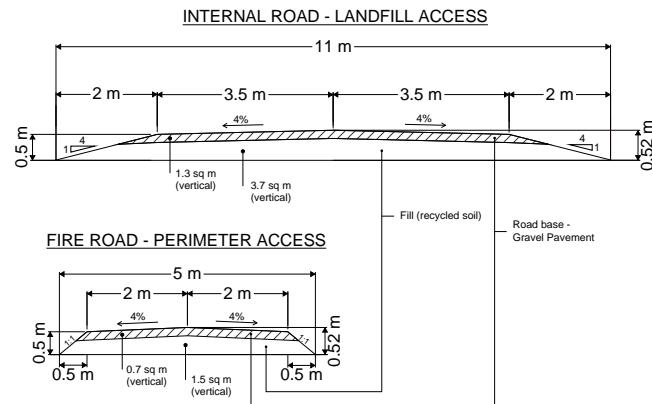
- 1 — Internal Road (11m wide)
- A — Fire Road (4m wide)
- 2 — Module number
- B — Re-vegetation zones
- 3 — Vegetation Mounding (Stage 2)
- Existing Roads
- Existing native vegetation

Refer to measurements for Road lengths (blue) and Module areas (red).

Note: Calculations are estimates only, additional space is available for roads (not shown) and additional surface area will be available in each module if measured 3-dimensionally to include slope angles.

Roads are assumed to be 0.5m thick, however thickness will vary when spanning across site contours, and may increase to >1m in areas.

Module surface capping requires compacted clay cap (as per License specification) and 450mm of other soil (as per LEMP), no specification on particle size or compaction standards for this layer.



APPENDIX A4

Resource demand calculations - TABLES A, B, C, D, E, F

TABLE A: ROAD BASE DEMAND								
	Length (m)	Width (m)	Area (m ²) H	Area (m ²) V	Thickness (m)	Volume (m ³)	Density (t/m ³)	Mass (t)
Fire Roads (FR) - Road Surface								
FR-A	4,782.2	5	23,911.0	0.7	V	3,347.5	2	6,695.1
FR-B	6,074.6	5	30,373.0	0.7	V	4,252.2	2	8,504.4
Sub-total	10,857	-	54,284	-	-	7,600	2	15,200
Internal Roads (IR) - Road Surface								
IR1	343.2	11	3,775.2	1.3	V	446.2	2	892.3
IR2	475.7	11	5,232.7	1.3	V	618.4	2	1,236.8
IR3	3,318.7	11	36,505.7	1.3	V	4,314.3	2	8,628.6
IR4	771.6	11	8,487.6	1.3	V	1,003.1	2	2,006.2
IR5	931.3	11	10,244.3	1.3	V	1,210.7	2	2,421.4
IR6	758.3	11	8,341.3	1.3	V	985.8	2	1,971.6
IR7	369.6	11	4,065.6	1.3	V	480.5	2	961.0
Sub-total	6,968	-	76,652	-	-	9,059	2	18,118
TOTAL						16,659	2	33,317

TABLE B: FILL DEMAND								
	Length (m)	Width (m)	Area (m ²) H	Area (m ²) V	Thickness (m)	Volume (m ³)	Density (t/m ³)	Mass (t)
Fire Roads (FR) - Road Fill								
FR-A	4,782.2	5	23,911.0	1.5	V	7,173.3	1.5	10,760.0
FR-B	6,074.6	5	30,373.0	1.5	V	9,111.9	1.5	13,667.9
Sub-total	10,857	-	54,284	-	-	16,285	1.5	24,428
Internal Roads (IR) - Road Fill								
IR1	343.2	11	3,775.2	3.7	V	1,269.8	1.5	1,904.8
IR2	475.7	11	5,232.7	3.7	V	1,760.1	1.5	2,640.1
IR3	3,318.7	11	36,505.7	3.7	V	12,279.2	1.5	18,418.8
IR4	771.6	11	8,487.6	3.7	V	2,854.9	1.5	4,282.4
IR5	931.3	11	10,244.3	3.7	V	3,445.8	1.5	5,168.7
IR6	758.3	11	8,341.3	3.7	V	2,805.7	1.5	4,208.6
IR7	369.6	11	4,065.6	3.7	V	1,367.5	1.5	2,051.3
Sub-total	6,968	-	76,652	-	-	25,783	1.5	38,675
LLCW cell Sub-Grade (SG)								
SG1	300	150	45,000	n/a	5	225,000	1.5	337,500.0
SG2*	300	150	45,000	n/a	5	225,000	1.5	337,500.0
Sub-total	-	-	90,000	-	-	450,000	1.5	675,000
Cell module (M) capping - 450mm protective layer								
M1	V	V	308,368.8	n/a	0.45	138,766.0	1.5	208,148.9
M2	V	V	213,495.7	n/a	0.45	96,073.1	1.5	144,109.6
M3	V	V	246,564.6	n/a	0.45	110,954.1	1.5	166,431.1
M4	V	V	262,209.2	n/a	0.45	117,994.1	1.5	176,991.2
M5	V	V	191,037.0	n/a	0.45	85,966.7	1.5	128,950.0
M6	V	V	315,253.7	n/a	0.45	141,864.2	1.5	212,796.2
M7	V	V	391,618.3	n/a	0.45	176,228.2	1.5	264,342.4
M8	V	V	177,426.7	n/a	0.45	79,842.0	1.5	119,763.0
Sub-total	-	-	2,105,974	-	-	947,688	1.5	1,421,532
TOTAL						1,439,757	1.5	2,159,635

TABLE C: SOIL DEMAND								
	Length (m)	Width (m)	Area (m ²) H	Area (m ²) V	Thickness (m)	Volume (m ³)	Density (t/m ³)	Mass (t)
Vegetation mounds (VM) - Mound Core								
VM1	659	21	13839	26.2	n/a	17,265.8	1.5	25,898.7
VM2	726.8	21	15262.8	26.2	n/a	19,042.2	1.5	28,563.2
VM3	756.5	21	15886.5	26.2	n/a	19,820.3	1.5	29,730.5
VM4	376.9	21	7914.9	26.2	n/a	9,874.8	1.5	14,812.2
VM5	205.5	21	4315.5	26.2	n/a	5,384.1	1.5	8,076.2
VM6	268.2	21	5632.2	26.2	n/a	7,026.8	1.5	10,540.3
VM7	340.4	21	7148.4	26.2	n/a	8,918.5	1.5	13,377.7
VM8	199.3	21	4185.3	26.2	n/a	5,221.7	1.5	7,832.5
VM9*	145.9	21	3063.9	26.2	n/a	3,822.6	1.5	5,733.9
VM10*	1014.3	21	21300.3	26.2	n/a	26,574.7	1.5	39,862.0
VM11*	440	21	9240	26.2	n/a	11,528.0	1.5	17,292.0
Sub-total	5,133	-	107,788.8	-	-	134,479	1.5	201,719

APPENDIX A4

TABLE D: TOP SOIL DEMAND								
	Length (m)	Width (m)	Area (m ²) H	Area (m ²) V	Thickness (m)	Volume (m ³)	Density (t/m ³)	Mass (t)
Vegetation mounds (VM) - Top Soil								
VM1	659	21	13839	9.8	n/a	6,458.2	1.5	9,687.3
VM2	726.8	21	15262.8	9.8	n/a	7,122.6	1.5	10,684.0
VM3	756.5	21	15886.5	9.8	n/a	7,413.7	1.5	11,120.6
VM4	376.9	21	7914.9	9.8	n/a	3,693.6	1.5	5,540.4
VM5	205.5	21	4315.5	9.8	n/a	2,013.9	1.5	3,020.9
VM6	268.2	21	5632.2	9.8	n/a	2,628.4	1.5	3,942.5
VM7	340.4	21	7148.4	9.8	n/a	3,335.9	1.5	5,003.9
VM8	199.3	21	4185.3	9.8	n/a	1,953.1	1.5	2,929.7
VM9*	145.9	21	3063.9	9.8	n/a	1,429.8	1.5	2,144.7
VM10*	1014.3	21	21300.3	9.8	n/a	9,940.1	1.5	14,910.2
VM11*	440	21	9240	9.8	n/a	4,312.0	1.5	6,468.0
Sub-total	5,133	-	107,788.8	-	-	50,301	1.5	75,452
Cell module (M) capping - 150mm Top Soil Layer								
M1	V	V	308,368.8	n/a	0.15	46,255.3	1.5	69,383.0
M2	V	V	213,495.7	n/a	0.15	32,024.4	1.5	48,036.5
M3	V	V	246,564.6	n/a	0.15	36,984.7	1.5	55,477.0
M4	V	V	262,209.2	n/a	0.15	39,331.4	1.5	58,997.1
M5	V	V	191,037.0	n/a	0.15	28,655.6	1.5	42,983.3
M6	V	V	315,253.7	n/a	0.15	47,288.1	1.5	70,932.1
M7	V	V	391,618.3	n/a	0.15	58,742.7	1.5	88,114.1
M8	V	V	177,426.7	n/a	0.15	26,614.0	1.5	39,921.0
Sub-total	-	-	2,105,974	-	-	315,896	1.5	473,844
TOTAL						366,198		549,296

TABLE E: LANDSCAPE MULCH DEMAND								
	Length (m)	Width (m)	Area (m ²) H	Area (m ²) V	Thickness (m)	Volume (m ³)	Density (t/m ³)	Mass (t)
Vegetation mounds (VM) - Surface Mulch								
VM1	659	21	13839	n/a	0.3	4,151.7	0.7	2,906.2
VM2	726.8	21	15262.8	n/a	0.3	4,578.8	0.7	3,205.2
VM3	756.5	21	15886.5	n/a	0.3	4,766.0	0.7	3,336.2
VM4	376.9	21	7914.9	n/a	0.3	2,374.5	0.7	1,662.1
VM5	205.5	21	4315.5	n/a	0.3	1,294.7	0.7	906.3
VM6	268.2	21	5632.2	n/a	0.3	1,689.7	0.7	1,182.8
VM7	340.4	21	7148.4	n/a	0.3	2,144.5	0.7	1,501.2
VM8	199.3	21	4185.3	n/a	0.3	1,255.6	0.7	878.9
VM9*	145.9	21	3063.9	n/a	0.3	919.2	0.7	643.4
VM10*	1014.3	21	21300.3	n/a	0.3	6,390.1	0.7	4,473.1
VM11*	440	21	9240	n/a	0.3	2,772.0	0.7	1,940.4
Sub-total	5,133	-	107,788.8	-	-	32,337	0.7	22,636
Revegetation Zones (RZ) - Surface Mulch								
RZ-A	V	V	152,696.6	n/a	0.3	45,809.0	0.7	32,066.3
RZ-B	V	V	85,232.2	n/a	0.3	25,569.7	0.7	17,898.8
RZ-C	V	V	223,546.4	n/a	0.3	67,063.9	0.7	46,944.7
Sub-total			461,475			138,443	0.7	96,910
TOTAL			569,264			170,779		119,545

TABLE F: COMMERCIAL MULCH DEMAND								
	Length (m)	Width (m)	Area (m ²) H	Area (m ²) V	Thickness (m)	Volume (m ³)	Density (t/m ³)	Mass (t)
Cell module (M) capping - Surface Mulch								
M1	V	V	308,368.8	n/a	0.3	92,510.6	0.7	64,757.4
M2	V	V	213,495.7	n/a	0.3	64,048.7	0.7	44,834.1
M3	V	V	246,564.6	n/a	0.3	73,969.4	0.7	51,778.6
M4	V	V	262,209.2	n/a	0.3	78,662.8	0.7	55,063.9
M5	V	V	191,037.0	n/a	0.3	57,311.1	0.7	40,117.8
M6	V	V	315,253.7	n/a	0.3	94,576.1	0.7	66,203.3
M7	V	V	391,618.3	n/a	0.3	117,485.5	0.7	82,239.8
M8	V	V	177,426.7	n/a	0.3	53,228.0	0.7	37,259.6
Sub-total	-	-	2,105,974	-	-	631,792	0.7	442,255
TOTAL						631,792		442,255

Area (m²) H Area calculated horizontally (length by width)

Area (m²) V Area calculated vertically (height by width)

V Varied dimensions, refer to figures

n/a Not applicable

0.7 Density multiplier to estimate mass required to fill volume

* Stage 2



Application for CHANGE to PROCESS EMISSION or WASTE
Environment Protection Act 1993 – Section 54 C

This application is to be used in accordance with the criteria of the condition of your Authorisation. Prior to completing this Application, contact your EPA coordinator (whose name appears at the bottom of the EPA Authorisation) to discuss the proposed changes to Process/Waste emissions and determine relevant details/documentation to be included.

(Use **BLOCK LETTERS** throughout and all section must be completed)

Send completed application to:
 Licensing & Operations Services – Regulation and Compliance Division
 Environment Protection Authority
 email: licensing.epa@epa.sa.gov.au or
 Fax: 8124 4672 or Postal: GPO Box 2607 Adelaide SA 5001
 ABN: 85 393 411 003

OWNERSHIP/PROPERTY DETAILS

Current EPA Licence Number	
Name of EPA Licence Holder <i>(as it appears on Authorisation)</i>
Location of premises to which application relates <i>(as it appears on Authorisation)</i> Post Code..... Title Reference/s
Postal Address of Authorisation Holder Post Code..... Telephone..... Email.....
Details of Contact Person – <i>Authorised to act on behalf of Authorisation Holder</i>	Name..... Telephone..... Mobile Phone..... E-mail.....

PROCESS/WASTE CHANGE DETAILS

Nature of Process and/or Waste change *(include details of projected emission increases, changes to waste emissions or relocation of emission points, etc – attach extra details if necessary)*

.....

.....

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.....


.....

APPENDIX A5

DECLARATION

Declaration and Consent of current licence holder

(Names(s) of person authorised to act on behalf of current Authorisation Holder)

Name		Position	
Telephone		Email	
Signature		Date	

GENERAL FEE INFORMATION

Enclosed Fee – based on estimated cost: \$.....

This is the costs involved in the change of process (eg. – materials, chemicals or fuels) relating to the prescribed activity – refer to Fee Schedule below.

FEE SCHEDULE

Environment Protection Regulations 2009—refer to regulation 41

Estimated cost of proposed works	Fee Units	Fee
Up to and including \$10,000	10	\$179
More than \$10, 000 but not more than \$50,000	20	\$358
More than \$50 000 but not more than \$500,000	40	\$716
More than \$500,000 but not more than \$5 million	60	\$1,074
More than \$5 million but not more than \$50 million	100	\$1,790
More than \$50 million	200	\$3,580

These fees are correct until 30 June 2013.

An invoice receipt will be sent to you on review of this application form.

PAYMENT OPTIONS

Payment by mail: make cheques or money orders payable to the 'Environment Protection Authority' and crossed 'Not Negotiable'. Do not include bank notes or coins.

Mail your payment with this application to:
 Environment Protection Authority
 GPO Box 2607
 ADELAIDE SA 5001

EPA also accepts credit card payments. Complete the details below:

- Visa Mastercard

Cardholder's name

Signature

Card number CVV (last 3 digits)

Expire date

Your telephone number (if we need to contact you)

Amount of credit card payment \$.....

(Credit card payment only accepted within agreed trading terms)



Application for ALTERATIONS to PLANT & EQUIPMENT
Environment Protection Act 1993 – Section 54 C

This application is to be used in accordance with the criteria of the condition of your Authorisation. Prior to completing this Application, contact your EPA coordinator (whose name appears at the bottom of the EPA Authorisation) to discuss the proposed changes to Process/Waste emissions and determine relevant details/documentation to be included.

(Use BLOCK LETTERS throughout and all section must be completed)

Send completed application to:
Licensing & Operations Services – Regulation and Compliance Division
Environment Protection Authority
email: licensing.epa@epa.sa.gov.au or
Fax: 8124 4672 or Postal: GPO Box 2607 Adelaide SA 5001
ABN: 85 393 411 003

OWNERSHIP/PROPERTY DETAILS

Table with 2 columns: Field Name and Input Area. Fields include Current EPA Licence Number, Name of EPA Licence Holder, Location of premises to which application relates, Postal Address of Authorisation Holder, and Details of Contact Person.

PLANT & EQUIPMENT DETAILS

Details and purpose of plant & equipment alterations (include site location of installation and construction works – attach extra details if necessary)


Four horizontal dotted lines for providing details of plant and equipment alterations.

APPENDIX A6

DECLARATION

Declaration and Consent of current licence holder

(Names(s) of person authorised to act on behalf of current Authorisation Holder)

Name		Position	
Telephone		Email	
Signature		Date	

GENERAL FEE INFORMATION

Enclosed Fee – based on estimated capital cost of works: \$.....

This is the cost of installed plant & equipment relating to the prescribed activity – NOT the cost of land purchase or infrastructure that does not contribute to the prescribed activity (refer to Fee Schedule below).

FEE SCHEDULE

Environment Protection Regulations 2009—refer to regulation 41

Estimated cost of proposed works	Fee Units	Fee
Up to and including \$10,000	10	\$179
More than \$10, 000 but not more than \$50,000	20	\$358
More than \$50 000 but not more than \$500,000	40	\$716
More than \$500,000 but not more than \$5 million	60	\$1,074
More than \$5 million but not more than \$50 million	100	\$1,790
More than \$50 million	200	\$3,580

These fees are correct until 30 June 2013.

An invoice receipt will be sent to you on review of this application form.

PAYMENT OPTIONS

Payment by mail: make cheques or money orders payable to the 'Environment Protection Authority' and crossed 'Not Negotiable'. Do not include bank notes or coins.

Mail your payment with this application to:
Environment Protection Authority
GPO Box 2607
ADELAIDE SA 5001

EPA also accepts credit card payments. Complete the details below:

- Visa
- Mastercard

Cardholder's name

Signature

Card number CVV (last 3 digits)

Expire date

Your telephone number (if we need to contact you)

Amount of credit card payment \$.....

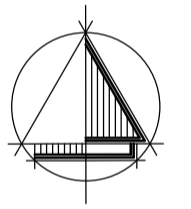
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APPENDIX A7




OVERALL SITE PLAN
SCALE 1:5000

SECTION		PLAN
	RESOURCE PAD 200MM GRIT OR RUBBLE 95% COMPACTION SUBGRADE OR FILL	
	MAIN ROAD PAVEMENT 300MM RUBBLE SUBGRADE OR FILL	
	MINOR ROAD PAVEMENT 300MM RUBBLE SUBGRADE OR FILL	
	TOPSOIL LAYER/CLAY LINER (DAM) 200MM TOPSOIL 300MM CLAY LINER SUBGRADE OR FILL	
	VEGETATION MOUND SUBGRADE OR FILL	



REVISIONS			
DATE	REV	DESCRIPTION	BY

residential design
commercial design
industrial design
project managers



81 KING WILLIAM STREET
KENT TOWN SA 5067
P: 08 8130 3700 F: 08 8312 1109
E: admin@aspexdesigners.com.au
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PROJECT:
PROPOSED RESOURCE PAD

SITE ADDRESS:
IWS NORTHERN BALEFILL
PT WAKEFIELD RD. DUBLIN S.A.

CLIENT:
INTEGRATED WASTE SERVICES

DRAWING TITLE:
OVERALL SITE PLAN

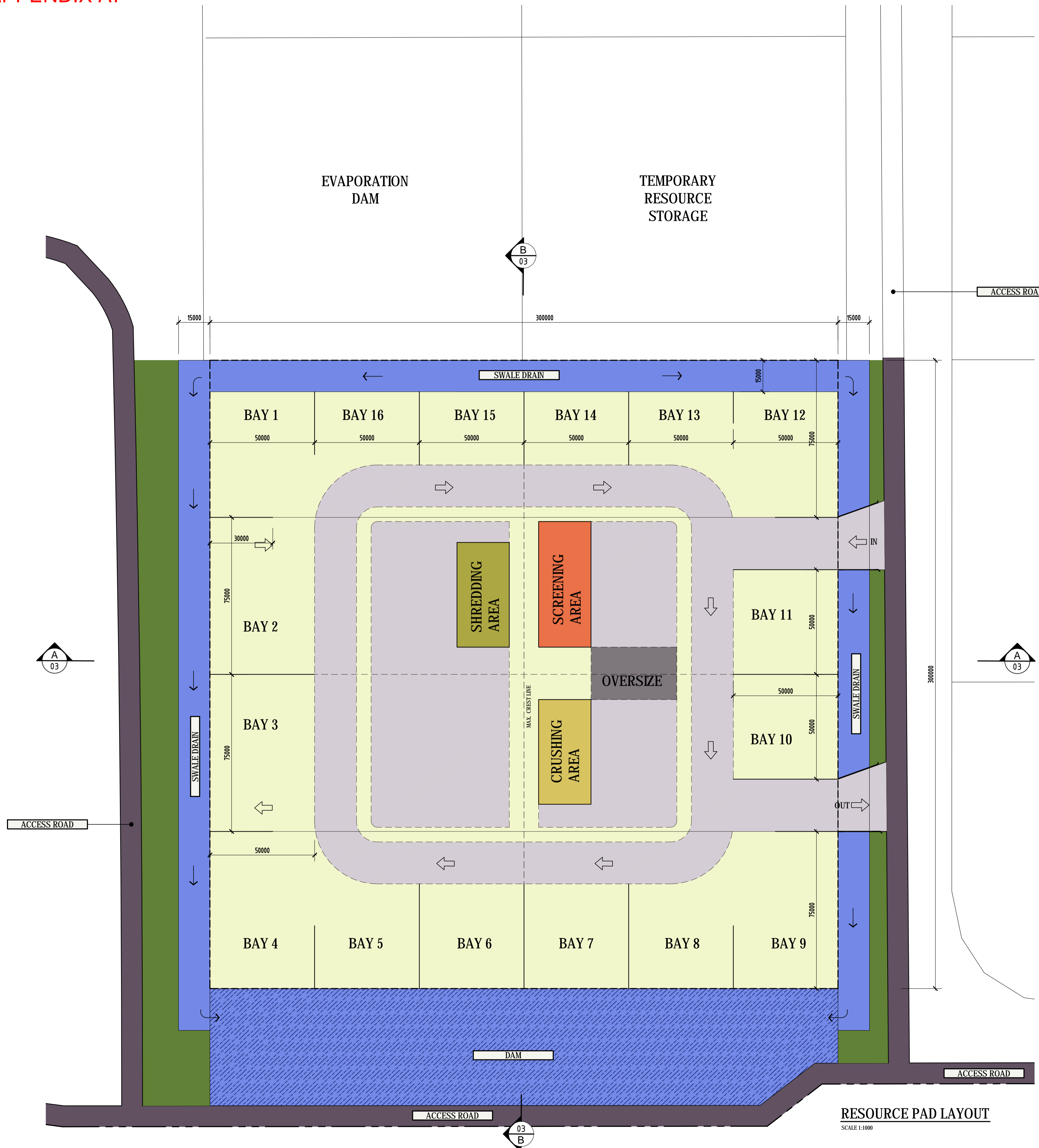
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DRAWN: GZ **DATE:** 09.2012

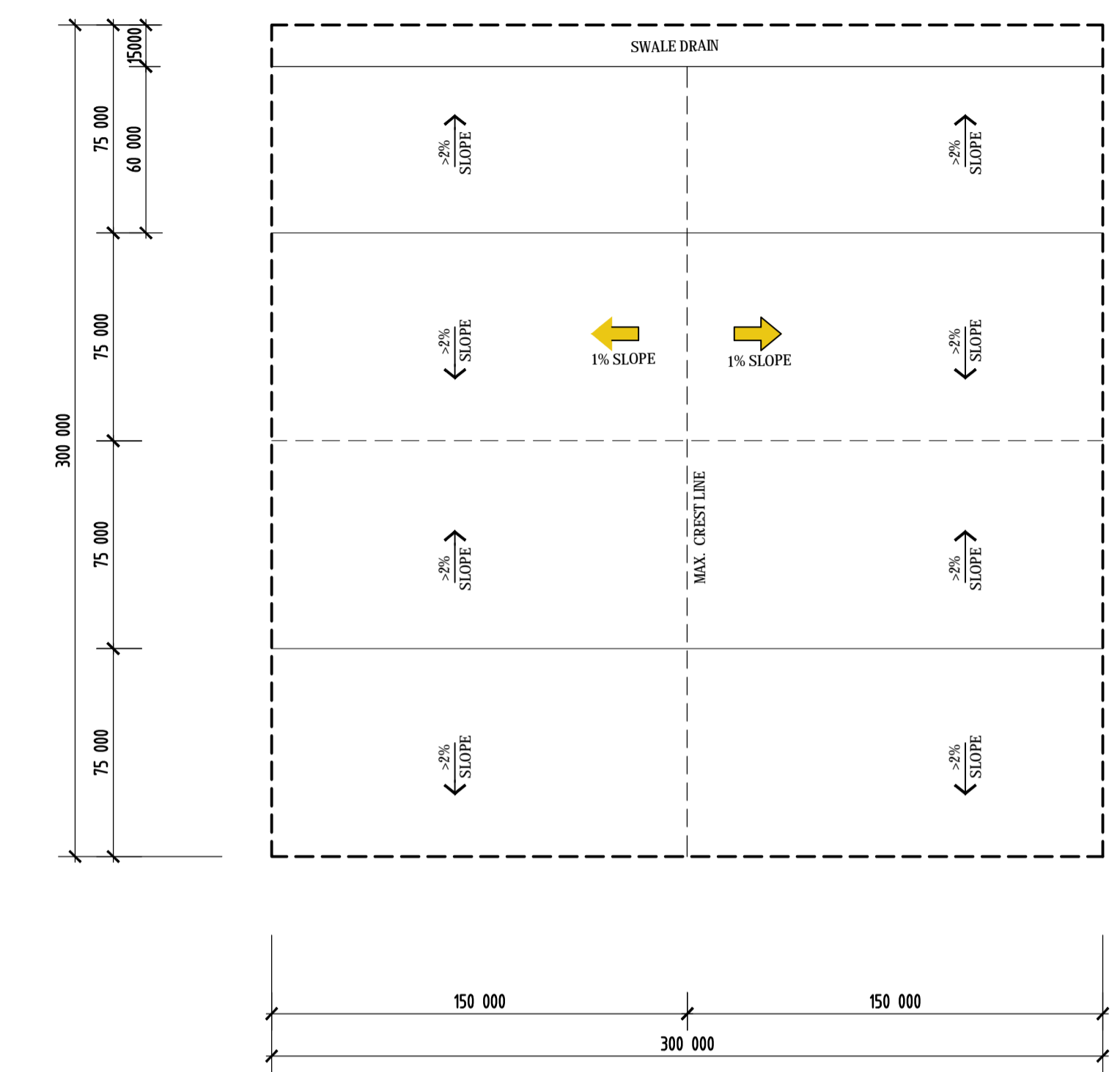
SCALE: 1:5000 **JOB NO:** IWS 2671

CONTRACTORS NOTE:
CONTRACTORS ARE TO VERIFY ALL DIMENSIONS ON-SITE BEFORE COMMENCING ANY WORK. FIGURED DIMENSIONS SHALL TAKE PREFERENCE OVER SCALED DIMENSIONS, AND ANY DISCREPANCY SHALL BE REPORTED TO THE DESIGNER IMMEDIATELY.

SHEET SIZE
A1



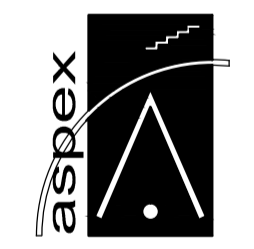
RESOURCE PAD LAYOUT
SCALE 1:1000



RESOURCE PAD
SCALE 1:2000

REVISIONS			
DATE	REV	DESCRIPTION	BY

residential design
commercial design
industrial design
project managers



81 KING WILLIAM STREET
KENT TOWN SA 5067
P: 08 8130 3700 F: 08 8312 1109
E: admin@aspexdesigners.com.au
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PROJECT:
PROPOSED RESOURCE PAD

SITE ADDRESS:
IWS NORTHERN BALEFILL
PT WAKEFIELD RD. DUBLIN S.A.

CLIENT:
INTEGRATED WASTE SERVICES

DRAWING TITLE:
RESOURCE PAD LAYOUT

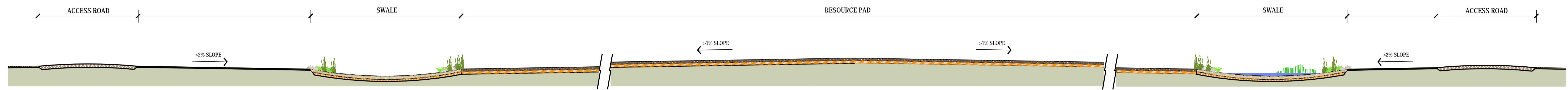
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DRAWN: GZ DATE: 09.2012

SCALE: 1:1000 JOB NO: IWS 2671

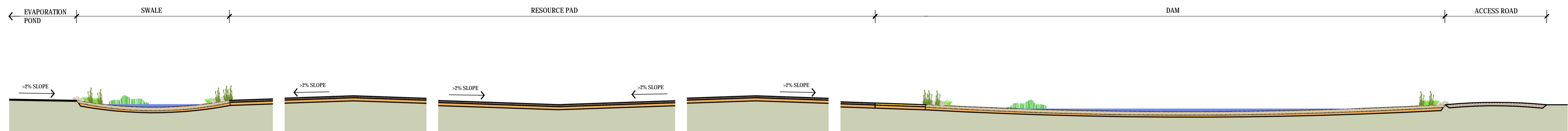
CONTRACTORS NOTE:
CONTRACTORS ARE TO VERIFY ALL DIMENSIONS
ON-SITE BEFORE COMMENCING ANY WORK. FIGURED
DIMENSIONS SHALL TAKE PREFERENCE OVER
SCALED DIMENSIONS, AND ANY DISCREPANCY
SHALL BE REPORTED TO THE DESIGNER
IMMEDIATELY.

APPENDIX A7



CROSS SECTION A-A

SCALE 1:200




CROSS SECTION B-B

SCALE 1:200

KEY LEGEND	
SECTION	PLAN
<p>RESOURCE PAD 200MM GRIT OR RUBBLE 95% COMPACTION SUBGRADE OR FILL</p>	
<p>MAIN ROAD PAVEMENT 300MM RUBBLE SUBGRADE OR FILL</p>	
<p>MINOR ROAD PAVEMENT 300MM RUBBLE SUBGRADE OR FILL</p>	
<p>TOPSOIL LAYER/CLAY LINER (DAM) 200MM TOPSOIL 300MM CLAY LINER SUBGRADE OR FILL</p>	
<p>VEGETATION MOUND SUBGRADE OR FILL</p>	

REVISIONS			
DATE	REV	DESCRIPTION	BY

residential design
commercial design
industrial design
project managers



81 KING WILLIAM STREET
KENT TOWN SA 5067
P: 08 8130 3700 F: 08 8312 1109
E: admin@aspexdesigners.com.au
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PROJECT:
PROPOSED RESOURCE PAD

SITE ADDRESS:
IWS NORTHERN BALEFILL
PT WAKEFIELD RD. DUBLIN S.A.

CLIENT:
INTEGRATED WASTE SERVICES

DRAWING TITLE:
RESOURCE PAD SECTIONS

DRAWING NUMBER: CD03 B

DRAWN: GZ **DATE:** 09.2012

SCALE: 1:200 **JOB NO:** IWS 2671

CONTRACTORS NOTE:
CONTRACTORS ARE TO VERIFY ALL DIMENSIONS ON-SITE BEFORE COMMENCING ANY WORK. FIGURED DIMENSIONS SHALL TAKE PREFERENCE OVER SCALED DIMENSIONS, AND ANY DISCREPANCY SHALL BE REPORTED TO THE DESIGNER IMMEDIATELY.

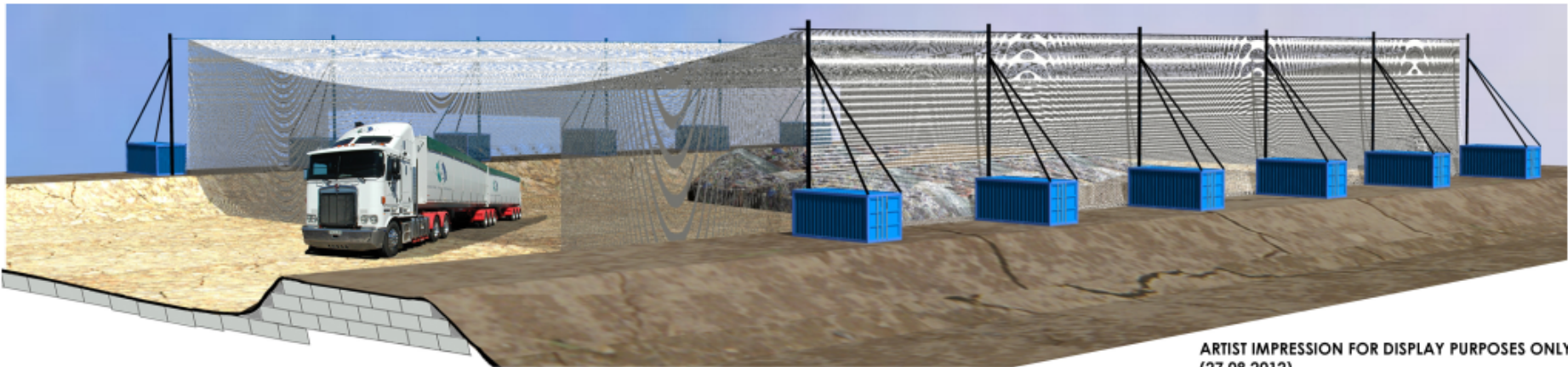
SHEET SIZE
A1

Appendix B

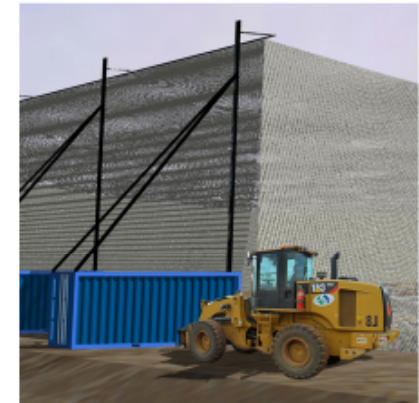
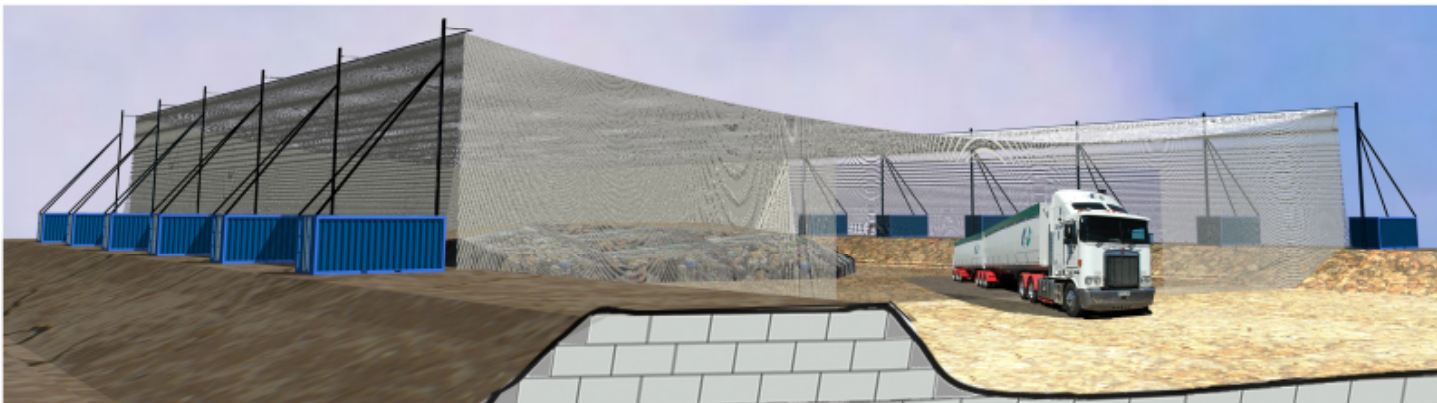
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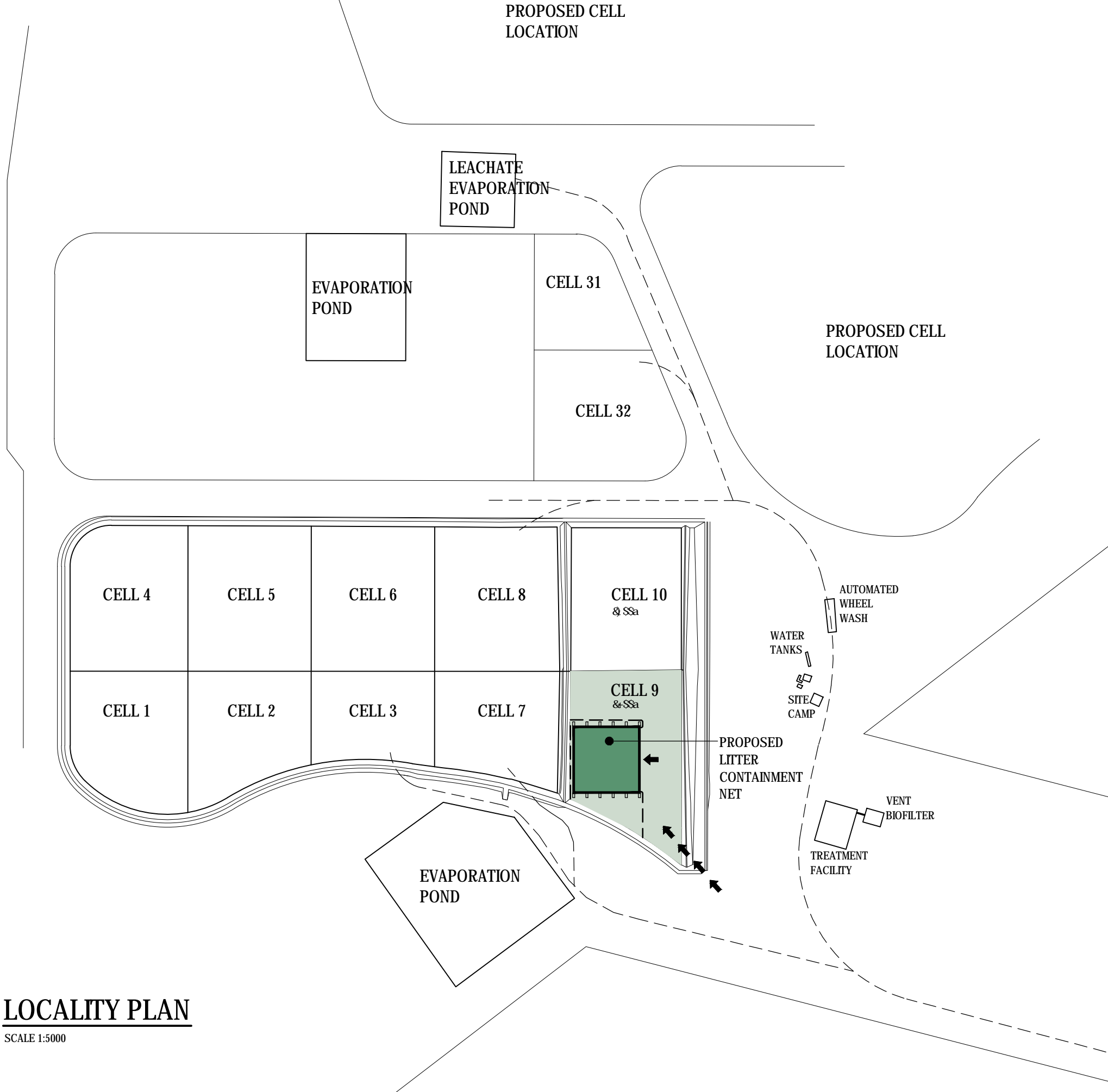
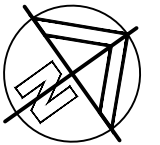
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Port Wakefield Road
Dublin SA



ARTIST IMPRESSION FOR DISPLAY PURPOSES ONLY.
(27.08.2012)
DRAWING NUMBER CD04 A

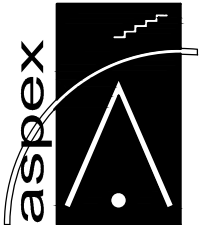




REVISIONS

DATE	REV	DESCRIPTION	BY
29.08.2012	A	ISSUED AS FINAL	GZ

- residential design
- commercial design
- industrial design
- project managers



81 KING WILLIAM STREET
 KENT TOWN SA 5067
 P: 08 8130 3700 F: 08 8132 1109
 E: admin@aspexdesigners.com.au
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PROJECT:
 LITTER CONTAINMENT NET

SITE ADDRESS:
 PORT WAKEFIELD ROAD
 DUBLIN S.A

CLIENT:
 INTEGRATED WASTE SERVICES

DRAWING TITLE:
 LOCALITY PLAN

DRAWING NUMBER: CD01 A

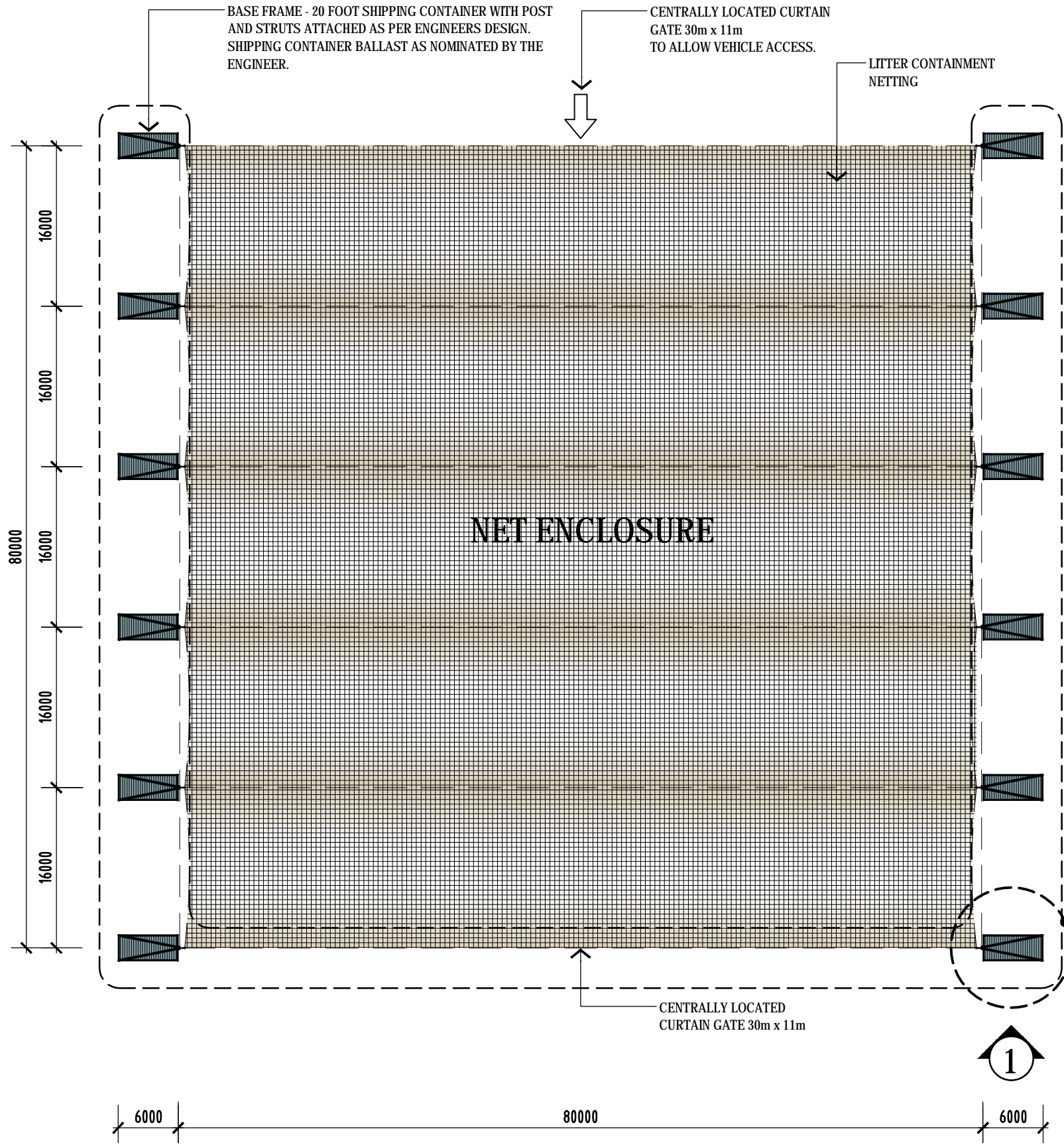
DRAWN: GZ DATE: 08.2012

SCALE: 1:5000 JOB NO: IWS 2654

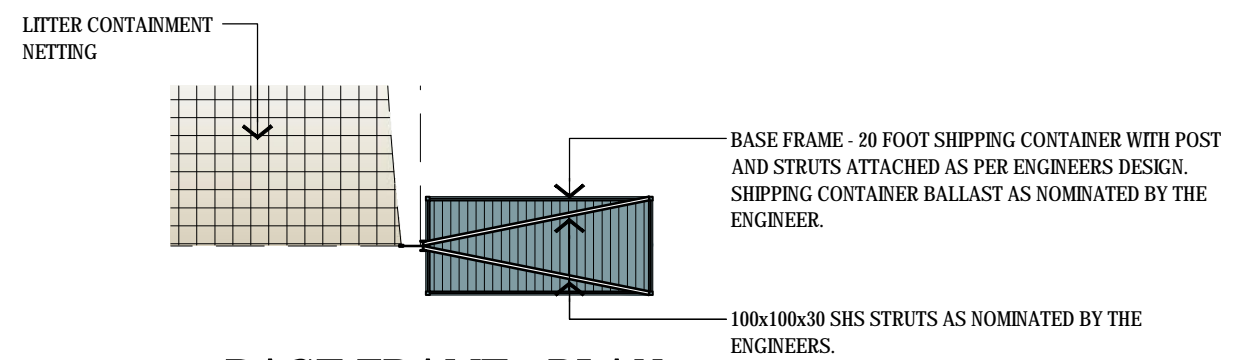
CONTRACTORS NOTE:
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LOCALITY PLAN
 SCALE 1:5000

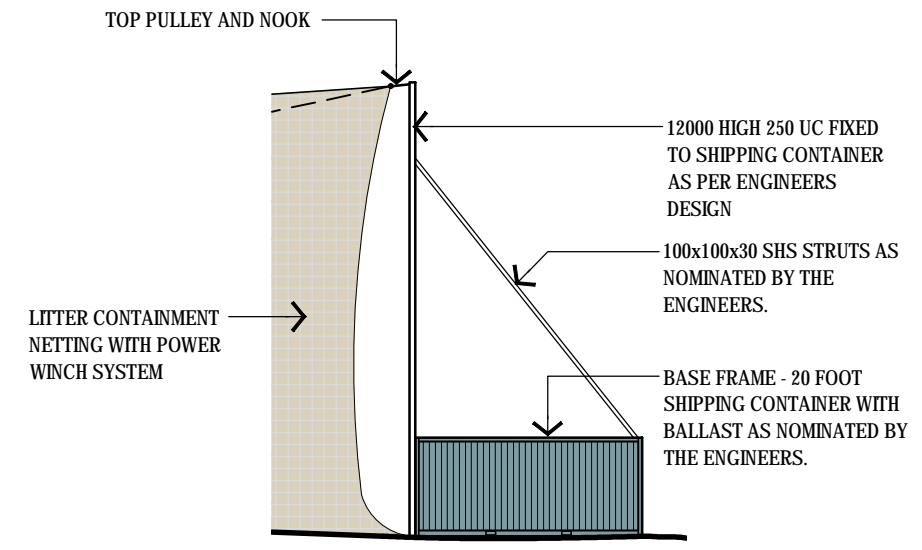
LITTER CONTAINMENT NETTING SYSTEM, ASSOCIATED POWER WINCH & ROPES AS SPECIFIED BY ENGINEER.



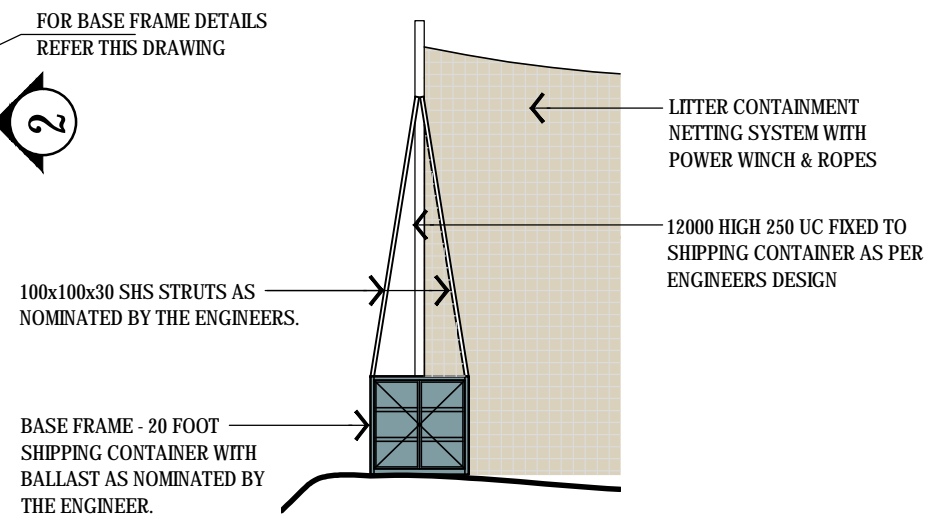
NET ENCLOSURE - PROPOSED PLAN
SCALE 1:500



BASE FRAME - PLAN
SCALE 1:200



BASE FRAME - VIEW 1
SCALE 1:200

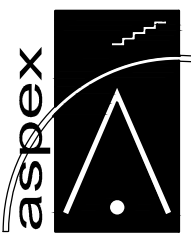


BASE FRAME - VIEW 2
SCALE 1:200

REVISIONS

DATE	REV	DESCRIPTION	BY
29.08.2012	A	ISSUED AS FINAL	GZ

residential design
commercial design
industrial design
project managers



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PROJECT:
LITTER CONTAINMENT NET

SITE ADDRESS:
PORT WAKEFIELD ROAD
DUBLIN S.A

CLIENT:
INTEGRATED WASTE SERVICES

DRAWING TITLE:
PLAN & ELEVATIONS

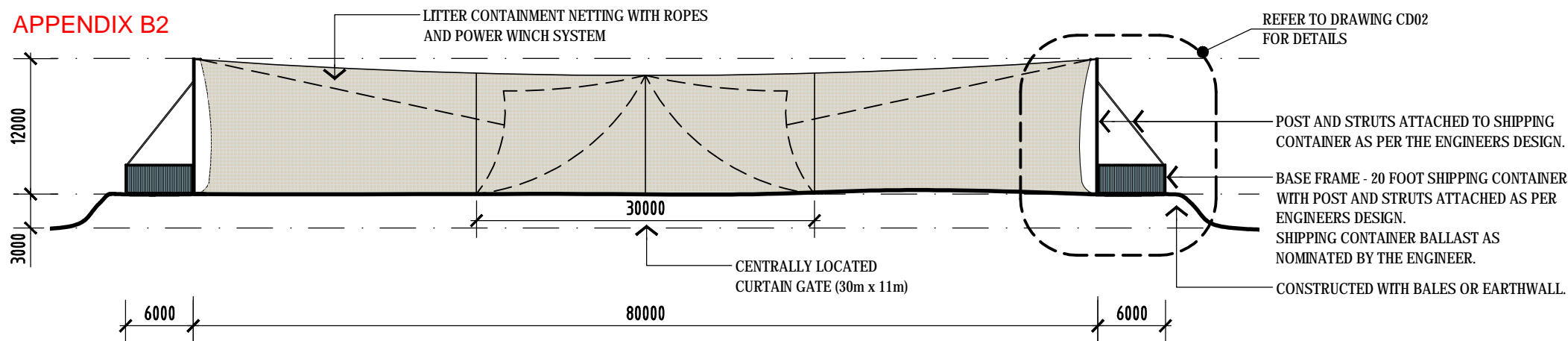
DRAWING NUMBER: CD02 A

DRAWN: GZ DATE: 08.2012

SCALE: 1:500, 1:200 JOB NO: IWS 2654

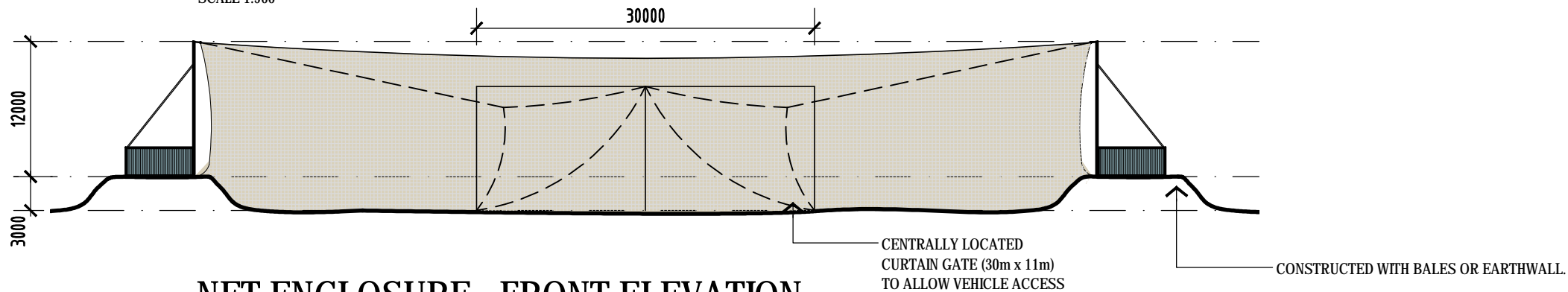
CONTRACTORS NOTE:
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APPENDIX B2



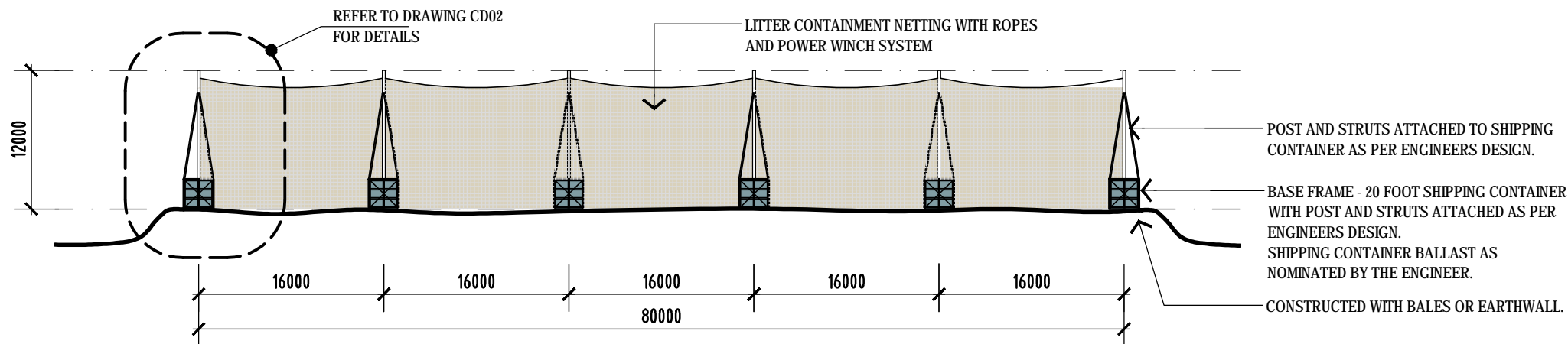
NET ENCLOSURE - REAR ELEVATION

SCALE 1:500



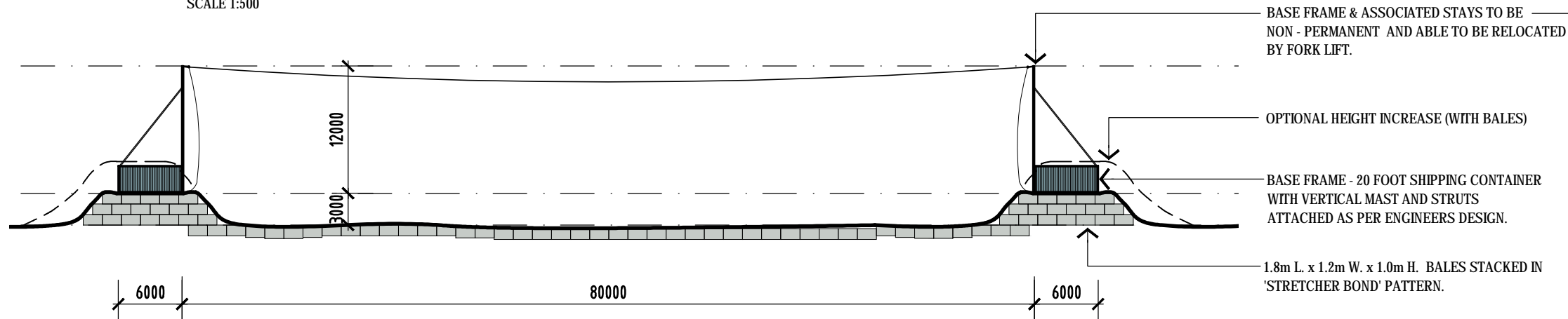
NET ENCLOSURE - FRONT ELEVATION

SCALE 1:500



NET ENCLOSURE - SIDE ELEVATIONS

SCALE 1:500



TYPICAL SECTION

SCALE 1:500

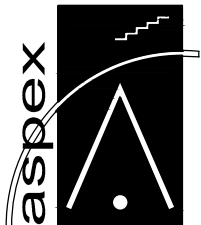
LITTER CONTAINMENT NETTING SYSTEM, ASSOCIATED POWER WINCH & ROPES AS SPECIFIED BY ENGINEER.



REVISIONS

DATE	REV	DESCRIPTION	BY
29.08.2012	A	ISSUED AS FINAL	GZ

- residential design
- commercial design
- industrial design
- project managers



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 E: admin@aspexdesigners.com.au

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PROJECT:
 LITTER CONTAINMENT NET

SITE ADDRESS:
 PORT WAKEFIELD ROAD
 DUBLIN S.A

CLIENT:
 INTEGRATED WASTE SERVICES

DRAWING TITLE:
 ELEVATIONS & SECTION

DRAWING NUMBER: CD03 A

DRAWN: GZ **DATE:** 08.2012

SCALE: 1:500 **JOB NO:** IWS 2654

CONTRACTORS NOTE:
 CONTRACTORS ARE TO VERIFY ALL DIMENSIONS ON-SITE BEFORE COMMENCING ANY WORK. FIGURED DIMENSIONS SHALL TAKE PREFERENCE OVER SCALED DIMENSIONS, AND ANY DISCREPANCY SHALL BE REPORTED TO THE DESIGNER IMMEDIATELY.



APPENDIX B3

Application for CHANGE to PROCESS EMISSION or WASTE

Environment Protection Act 1993 – Section 54 C

This application is to be used in accordance with the criteria of the condition of your Authorisation. Prior to completing this Application, contact your EPA coordinator (whose name appears at the bottom of the EPA Authorisation) to discuss the proposed changes to Process/Waste emissions and determine relevant details/documentation to be included.

(Use **BLOCK LETTERS** throughout and all section must be completed)

Send completed application to:
 Licensing & Operations Services – Regulation and Compliance Division
 Environment Protection Authority
 email: licensing.epa@epa.sa.gov.au or
 Fax: 8124 4672 or Postal: GPO Box 2607 Adelaide SA 5001
 ABN: 85 393 411 003

OWNERSHIP/PROPERTY DETAILS

Current EPA Licence Number	
Name of EPA Licence Holder <i>(as it appears on Authorisation)</i>
Location of premises to which application relates <i>(as it appears on Authorisation)</i> Post Code..... Title Reference/s
Postal Address of Authorisation Holder Post Code..... Telephone..... Email.....
Details of Contact Person – <i>Authorised to act on behalf of Authorisation Holder</i>	Name..... Telephone..... Mobile Phone..... E-mail.....

PROCESS/WASTE CHANGE DETAILS

Nature of Process and/or Waste change *(include details of projected emission increases, changes to waste emissions or relocation of emission points, etc – attach extra details if necessary)*

.....

.....

.....

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.....

APPENDIX B3

DECLARATION

Declaration and Consent of current licence holder

(Names(s) of person authorised to act on behalf of current Authorisation Holder)

Name		Position	
Telephone		Email	
Signature		Date	

GENERAL FEE INFORMATION

Enclosed Fee – based on estimated cost: \$.....

This is the costs involved in the change of process (eg. – materials, chemicals or fuels) relating to the prescribed activity – refer to Fee Schedule below.

FEE SCHEDULE

Environment Protection Regulations 2009—refer to regulation 41

Estimated cost of proposed works	Fee Units	Fee
Up to and including \$10,000	10	\$179
More than \$10, 000 but not more than \$50,000	20	\$358
More than \$50 000 but not more than \$500,000	40	\$716
More than \$500,000 but not more than \$5 million	60	\$1,074
More than \$5 million but not more than \$50 million	100	\$1,790
More than \$50 million	200	\$3,580

These fees are correct until 30 June 2013.

An invoice receipt will be sent to you on review of this application form.

PAYMENT OPTIONS

Payment by mail: make cheques or money orders payable to the 'Environment Protection Authority' and crossed 'Not Negotiable'. Do not include bank notes or coins.

Mail your payment with this application to:
 Environment Protection Authority
 GPO Box 2607
 ADELAIDE SA 5001

EPA also accepts credit card payments. Complete the details below:

- Visa Mastercard

Cardholder's name

Signature

Card number CVV (last 3 digits)

Expire date

Your telephone number (*if we need to contact you*)

Amount of credit card payment \$.....

(Credit card payment only accepted within agreed trading terms)



APPENDIX B4

Application for ALTERATIONS to PLANT & EQUIPMENT

Environment Protection Act 1993 – Section 54 C

This application is to be used in accordance with the criteria of the condition of your Authorisation. Prior to completing this Application, contact your EPA coordinator (whose name appears at the bottom of the EPA Authorisation) to discuss the proposed changes to Process/Waste emissions and determine relevant details/documentation to be included.

(Use BLOCK LETTERS throughout and all section must be completed)

Send completed application to:
Licensing & Operations Services – Regulation and Compliance Division
Environment Protection Authority
email: licensing.epa@epa.sa.gov.au or
Fax: 8124 4672 or Postal: GPO Box 2607 Adelaide SA 5001
ABN: 85 393 411 003

OWNERSHIP/PROPERTY DETAILS

Table with 2 columns: Field Name and Input Area. Fields include Current EPA Licence Number, Name of EPA Licence Holder, Location of premises to which application relates, Postal Address of Authorisation Holder, and Details of Contact Person.

PLANT & EQUIPMENT DETAILS

Details and purpose of plant & equipment alterations (include site location of installation and construction works – attach extra details if necessary)


Four horizontal dotted lines for providing details and purpose of plant & equipment alterations.

APPENDIX B4

DECLARATION

Declaration and Consent of current licence holder

(Names(s) of person authorised to act on behalf of current Authorisation Holder)

Name		Position	
Telephone		Email	
Signature		Date	

GENERAL FEE INFORMATION

Enclosed Fee – based on estimated capital cost of works: \$.....

This is the cost of installed plant & equipment relating to the prescribed activity – NOT the cost of land purchase or infrastructure that does not contribute to the prescribed activity (refer to Fee Schedule below).

FEE SCHEDULE

Environment Protection Regulations 2009—refer to regulation 41

Estimated cost of proposed works	Fee Units	Fee
Up to and including \$10,000	10	\$179
More than \$10, 000 but not more than \$50,000	20	\$358
More than \$50 000 but not more than \$500,000	40	\$716
More than \$500,000 but not more than \$5 million	60	\$1,074
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ADELAIDE SA 5001

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- Visa
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Cardholder's name

Signature

Card number CVV (last 3 digits)

Expire date

Your telephone number (if we need to contact you)

Amount of credit card payment \$.....

(credit card payment only accepted within agreed trading terms)

Appendix C

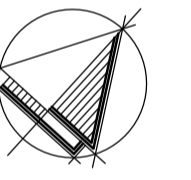
Bioremediation Pad



OVERALL SITE PLAN
SCALE 1:1000

KEY LEGEND

LEVEL 1 SUPERVISION PROCESSING AREA 200MM LIMESTONE/RUBBLE 300MM CLAY UNDER SUBGRADE OR FILL	
LEVEL 2 SUPERVISION STORAGE AREA 200MM GRIT OR RUBBLE 95% COMPACTION SUBGRADE OR FILL	
MAIN ROAD PAVEMENT 300MM RUBBLE SUBGRADE OR FILL	
MINOR ROAD PAVEMENT 300MM RUBBLE SUBGRADE OR FILL	
TOPSOIL LAYER/CLAY LINER (DAM) 200MM TOPSOIL 300MM CLAY LINER SUBGRADE OR FILL	
VEGETATION MOUND	
MULCHED SWALE/ GARDEN BED	
EXCLUSION ZONE	



REVISIONS

DATE	REV	DESCRIPTION	BY
19.09.12	B	BIOREMEDIATION PAD REVISED	GZ
29.08.12	A	ISSUED AS FINAL	JR

residential design
commercial design
industrial design
project managers

49 PORTRUSH ROAD
PAYNEHAM SA 5070
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E: admin@aspedesigners.com.au
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PROJECT:
PROPOSED BIOREMEDIATION PAD

SITE ADDRESS:
IWS NORTHERN BALEFILL
PT WAKEFIELD RD LOWER LIGHT

CLIENT:
INTEGRATED WASTE SERVICES

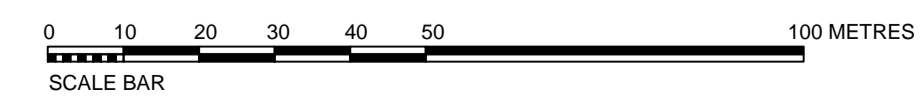
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DRAWING NUMBER: CD01 B


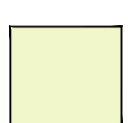
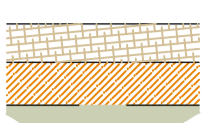
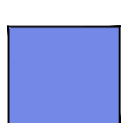
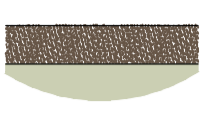
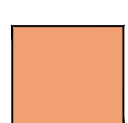

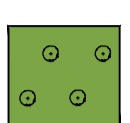
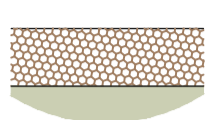

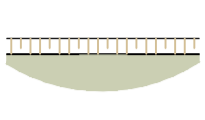
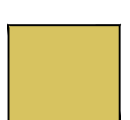
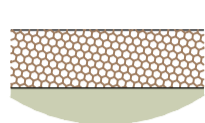
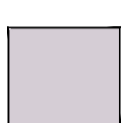
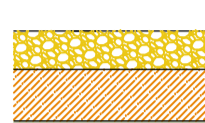
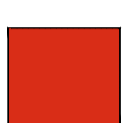
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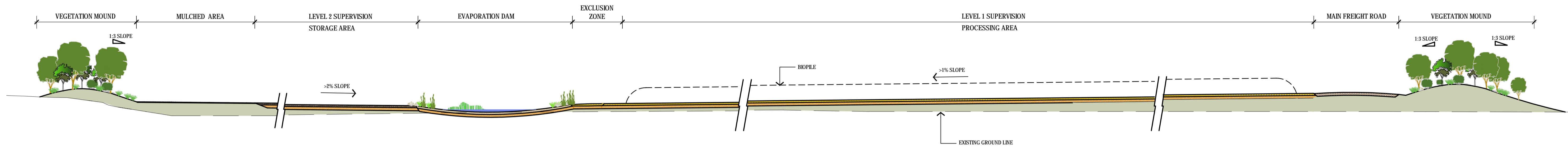
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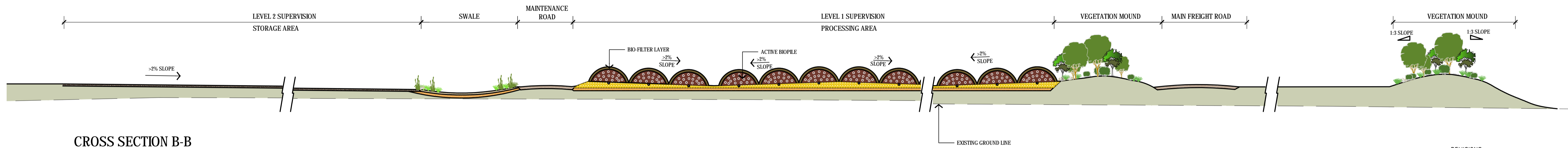
APPENDIX C2

SECTION	PLAN	SECTION	PLAN
 LEVEL 1 SUPERVISION PROCESSING AREA 200MM LIMESTONE/RUBBLE 300MM CLAY UNDER SUBGRADE OR FILL		 TOPSOIL LAYER/CLAY LINER 200MM TOPSOIL 300MM CLAY LINER SUBGRADE OR FILL	 (DAM)
 LEVEL 2 SUPERVISION STORAGE AREA 200MM GRIT OR RUBBLE 95% COMPACTION SUBGRADE OR FILL		 VEGETATION MOUND SUBGRADE OR FILL	
 MAIN ROAD PAVEMENT 300MM RUBBLE SUBGRADE OR FILL		 MULCHED SWALE/ GARDEN BED	
 MINOR ROAD PAVEMENT 300MM RUBBLE SUBGRADE OR FILL		 EXCLUSION ZONE 200MM LIMESTONE/RUBBLE 300MM CLAY UNDER SUBGRADE OR FILL	



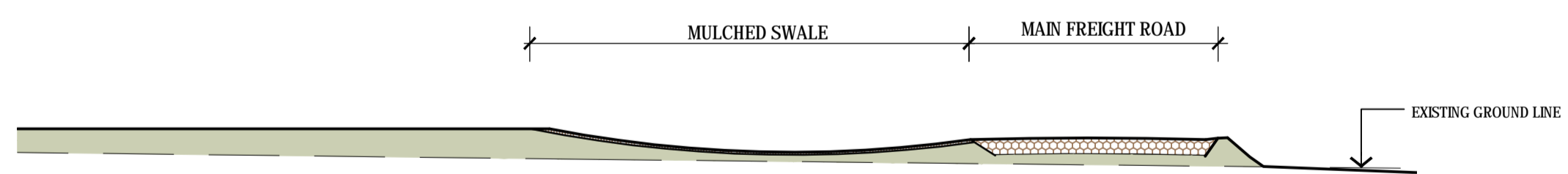
CROSS SECTION A-A

SCALE 1:200



CROSS SECTION B-B

SCALE 1:200




CROSS SECTION C-C

SCALE 1:200

REVISIONS			
DATE	REV	DESCRIPTION	BY
19.09.12	B	CROSS SECTION B-B REVISED	GZ
29.08.12	A	ISSUED AS FINAL	JR

residential design
commercial design
industrial design
project managers



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PROJECT:
PROPOSED BIOREMEDIATION PAD

SITE ADDRESS:
IWS NORTHERN BALEFILL
PT WAKEFIELD RD LOWER LIGHT

CLIENT:
INTEGRATED WASTE SERVICES

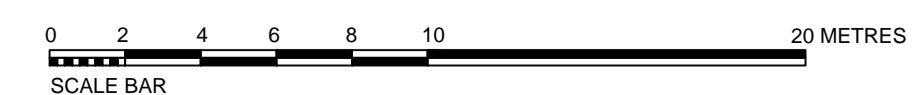
DRAWING TITLE:
SECTIONS

DRAWING NUMBER: CD02 B

DRAWN: JR DATE: AUG 2012

SCALE: 1:200 JOB NO: IWS 2653

CONTRACTORS NOTE:
CONTRACTORS ARE TO VERIFY ALL DIMENSIONS
ON-SITE BEFORE COMMENCING ANY WORK.
FIGURED DIMENSIONS SHALL TAKE PREFERENCE
OVER SCALED DIMENSIONS, AND ANY
DISCREPANCY SHALL BE REPORTED TO THE
DESIGNER IMMEDIATELY.



SHEET SIZE
A1



APPENDIX C3

Application for CHANGE to PROCESS EMISSION or WASTE

Environment Protection Act 1993 – Section 54 C

This application is to be used in accordance with the criteria of the condition of your Authorisation. Prior to completing this Application, contact your EPA coordinator (whose name appears at the bottom of the EPA Authorisation) to discuss the proposed changes to Process/Waste emissions and determine relevant details/documentation to be included.

(Use BLOCK LETTERS throughout and all section must be completed)

Send completed application to:
Licensing & Operations Services – Regulation and Compliance Division
Environment Protection Authority
email: licensing.epa@epa.sa.gov.au or
Fax: 8124 4672 or Postal: GPO Box 2607 Adelaide SA 5001
ABN: 85 393 411 003

OWNERSHIP/PROPERTY DETAILS

Table with 2 columns: Field Name and Input Area. Fields include Current EPA Licence Number, Name of EPA Licence Holder, Location of premises, Postal Address, and Contact Person details.

PROCESS/WASTE CHANGE DETAILS

Nature of Process and/or Waste change (include details of projected emission increases, changes to waste emissions or relocation of emission points, etc – attach extra details if necessary)


Dotted lines for providing details on process/waste change.

APPENDIX C3

DECLARATION

Declaration and Consent of current licence holder

(Names(s) of person authorised to act on behalf of current Authorisation Holder)

Name		Position	
Telephone		Email	
Signature		Date	

GENERAL FEE INFORMATION

Enclosed Fee – based on estimated cost: \$.....

This is the costs involved in the change of process (eg. – materials, chemicals or fuels) relating to the prescribed activity – refer to Fee Schedule below.

FEE SCHEDULE

Environment Protection Regulations 2009—refer to regulation 41

Estimated cost of proposed works	Fee Units	Fee
Up to and including \$10,000	10	\$179
More than \$10, 000 but not more than \$50,000	20	\$358
More than \$50 000 but not more than \$500,000	40	\$716
More than \$500,000 but not more than \$5 million	60	\$1,074
More than \$5 million but not more than \$50 million	100	\$1,790
More than \$50 million	200	\$3,580

These fees are correct until 30 June 2013.

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PAYMENT OPTIONS

Payment by mail: make cheques or money orders payable to the 'Environment Protection Authority' and crossed 'Not Negotiable'. Do not include bank notes or coins.

Mail your payment with this application to:
Environment Protection Authority
GPO Box 2607
ADELAIDE SA 5001

EPA also accepts credit card payments. Complete the details below:

- Visa
- Mastercard

Cardholder's name

Signature

Card number CVV (last 3 digits)

Expire date

Your telephone number (if we need to contact you)

Amount of credit card payment \$.....

(Credit card payment only accepted within agreed trading terms)



APPENDIX C4

Application for ALTERATIONS to PLANT & EQUIPMENT

Environment Protection Act 1993 – Section 54 C

This application is to be used in accordance with the criteria of the condition of your Authorisation. Prior to completing this Application, contact your EPA coordinator (whose name appears at the bottom of the EPA Authorisation) to discuss the proposed changes to Process/Waste emissions and determine relevant details/documentation to be included.

(Use **BLOCK LETTERS** throughout and all section must be completed)

Send completed application to:
 Licensing & Operations Services – Regulation and Compliance Division
 Environment Protection Authority
 email: licensing.epa@epa.sa.gov.au or
 Fax: 8124 4672 or Postal: GPO Box 2607 Adelaide SA 5001
 ABN: 85 393 411 003

OWNERSHIP/PROPERTY DETAILS

Current EPA Licence Number	
Name of EPA Licence Holder <i>(as it appears on Authorisation)</i>	
Location of premises to which application relates <i>(as it appears on Authorisation)</i> Post code..... Title Reference/s
Postal Address of Authorisation Holder Post code Telephone..... Email.....
Details of Contact Person – <i>Authorised to act on behalf of Authorisation Holder</i>	Name..... Telephone..... Mobile Phone..... E-mail.....

PLANT & EQUIPMENT DETAILS

Details and purpose of plant & equipment alterations (include site location of installation and construction works – attach extra details if necessary)


.....

APPENDIX C4

DECLARATION

Declaration and Consent of current licence holder

(Names(s) of person authorised to act on behalf of current Authorisation Holder)

Name		Position	
Telephone		Email	
Signature		Date	

GENERAL FEE INFORMATION

Enclosed Fee – based on estimated capital cost of works: \$.....

This is the cost of installed plant & equipment relating to the prescribed activity – NOT the cost of land purchase or infrastructure that does not contribute to the prescribed activity (refer to Fee Schedule below).

FEE SCHEDULE

Environment Protection Regulations 2009—refer to regulation 41

Estimated cost of proposed works	Fee Units	Fee
Up to and including \$10,000	10	\$179
More than \$10, 000 but not more than \$50,000	20	\$358
More than \$50 000 but not more than \$500,000	40	\$716
More than \$500,000 but not more than \$5 million	60	\$1,074
More than \$5 million but not more than \$50 million	100	\$1,790
More than \$50 million	200	\$3,580

These fees are correct until 30 June 2013.

An invoice receipt will be sent to you on review of this application form.

PAYMENT OPTIONS

Payment by mail: make cheques or money orders payable to the 'Environment Protection Authority' and crossed 'Not Negotiable'. Do not include bank notes or coins.

Mail your payment with this application to:
Environment Protection Authority
GPO Box 2607
ADELAIDE SA 5001

EPA also accepts credit card payments. Complete the details below:

- Visa
- Mastercard

Cardholder's name

Signature

Card number CVV (last 3 digits)

Expire date

Your telephone number (if we need to contact you)

Amount of credit card payment \$.....

(credit card payment only accepted within agreed trading terms)

Appendix D

Capping Design



Australian Government
Bureau of Meteorology

Gridded Average Rainfall Metadata

Dataset	
Title	Mean monthly and mean annual rainfall data (base climatological data sets)
Custodian	
Custodian	Bureau of Meteorology
Jurisdiction	Australia
Description	
Abstract	Mean monthly and mean annual rainfall grids. The grids show the rainfall values across Australia in the form of two-dimensional array data. The mean data are based on the standard 30-year period 1961-1990. See LINEAGE below for more information.
Search Word(s)	Gridded, spline, analyses, climatology, rainfall, meteorology
Geographic Extent Names(s)	Australia
General Category	Gridded climatological data
General Custodian Jurisdiction	Australian Government Australia
Geographic Extent Polygon	Not applicable
Geographic Bounding Box	See below
North Bounding Latitude	-9.975
South Bounding Latitude	-44.00
East Bounding Longitude	154.025
West Bounding Longitude	112.00
Data Currency	
Beginning Date	1961
Ending Date	1990
Dataset Status	
Progress	Completed
Maintenance and Update frequency	Ongoing
Access	
Stored Data Format	Arc/Info grids – all Australia

APPENDIX D1

Available Format Type	ASCII row major, Arc/Info grid Interchange (.e00), Shapefiles.
Access Constraint	Please note that the copyright for any data supplied by the Bureau of Meteorology is held in the Commonwealth of Australia and the purchaser shall give acknowledgement of the source in reference to the data. Apart from dealings under the Copyright Act 1968, the purchaser shall not reproduce (electronically or otherwise), modify or supply (by sale or otherwise) these data without written permission from the supplier. Please contact us (see details below) for more information.
Data Quality	
Lineage	Gridded data were generated using the ANU (Australian National University) 3-D Spline (surface fitting algorithm). The resolution of the data is 0.025 degrees (approximately 2.5km) - as part of the 3-D analysis process a 0.025 degree resolution digital elevation model (DEM) was used. Approximately 6000 stations were used in the analysis over Australia. All input station data underwent a high degree of quality control before analysis, and conform to WMO (World Meteorological Organisation) standards for data quality.
Positional Accuracy	The observational (station) data on which the analyses were based have an associated accuracy of the order of 0.01 degrees (approximately 1km) or better.
Attribute Accuracy	Grid point data are post –processed. For more information (metadata) on observing stations please contact us.
Logical Consistency	Not applicable
Completeness	No missing data
Contact Information	
Contact Organisation	Bureau of Meteorology
Contact Position	NCC Information officer
Mail Address	PO BOX 1289, Melbourne 3001, Australia
Locality	
State	Victoria
Country	Australia
Postcode	3001
Telephone	(03) 9669 4082
Facsimile	(03) 9669 4515
Electronic Mail	webclim@bom.gov.au
Metadata date	
Metadata date	2003
Additional Metadata	Additional information available on request (see contact above)



Australian Government
Bureau of Meteorology

Gridded Average Evapotranspiration Metadata

Dataset	
Title	Mean monthly and mean annual evapotranspiration (base climatological data sets)
Custodian	
Custodian	Bureau of Meteorology
Jurisdiction	Australia
Description	
Abstract	Mean monthly and mean annual areal actual, areal potential and point potential evapotranspiration grids. The grids show evapotranspiration values across Australia in the form of two-dimensional array data. The mean data are based on the standard 30-year period 1961-1990. See LINEAGE below for more information.
Search Word(s)	Gridded, spline, analyses, climatology, evapotranspiration, hydrology, meteorology
Geographic Extent Names(s)	Australia
General Category	Gridded climatological data
General Custodian Jurisdiction	Australian Government Australia
Geographic Extent Polygon	Not applicable
Geographic Bounding Box	See below
North Bounding Latitude	-10.1
South Bounding Latitude	-43.8
East Bounding Longitude	153.85
West Bounding Longitude	112.15
Data Currency	
Beginning Date	1961
Ending Date	1990
Dataset Status	
Progress	Completed
Maintenance and Update frequency	Ongoing

APPENDIX D1

Access	
Stored Data Format	Arc/Info grids – all Australia
Available Format Type	ASCII row major, Arc/Info grid Interchange (.e00), Shapefiles.
Access Constraint	Please note that the copyright for any data supplied by the Bureau of Meteorology is held in the Commonwealth of Australia and the purchaser shall give acknowledgement of the source in reference to the data. Apart from dealings under the Copyright Act 1968, the purchaser shall not reproduce (electronically or otherwise), modify or supply (by sale or otherwise) these data without written permission from the supplier. Please contact us (see details below) for more information.
Data Quality	
Lineage	<p>Gridded data were generated using the ANU (Australian National University) 3-D Spline (surface fitting algorithm). The grid point resolution of the data is 0.1 degrees (approximately 10km).</p> <p>As part of the 3-D analysis process a 0.1 degree resolution digital elevation model (DEM) was used. Approximately 700 stations were used in the analysis, and all input station data underwent a high degree of quality control before analysis, and conform to WMO (World Meteorological Organisation) standards for data quality.</p> <p>Areal Actual ET is the ET that actually takes place, under the condition of existing water supply, from an area so large that the effects of any upwind boundary transitions are negligible and local variations are integrated to an areal average.</p> <p>Areal Potential ET is the ET that would take place, under the condition of unlimited water supply, from an area so large that the effects of any upwind boundary transitions are negligible and local variations are integrated to an areal average.</p> <p>Point Potential ET is the ET that would take place, under the condition of unlimited water supply, from an area so small that the local ET effects do not alter local airmass properties. It is assumed that latent and sensible heat transfers within the height of measurement are through convection only.</p> <p>The above definitions are based on those given by Morton (1983), but we have used the term areal potential ET for Morton's wet-environment ET and the term point potential ET for Morton's potential ET. Morton, F.I. (1983). Operational estimates of areal evapotranspiration and their significance to the science and practice of hydrology. <i>Journal of Hydrology</i>, 66: 1-76.</p>
Positional Accuracy	The observational (station) data on which the analyses were based have an associated accuracy of the order of 0.01 degrees (approximately 1km) or better.

APPENDIX D1

Attribute Accuracy	Grid point data are post processed. For more information please contact us.
Logical Consistency	Not applicable
Completeness	No missing data
Contact Information	
Contact Organisation	Bureau of Meteorology
Contact Position	NCC Information officer
Mail Address	PO BOX 1289K, Melbourne 3001, Australia
Locality	
State	Victoria
Country	Australia
Postcode	3001
Telephone	(03) 9669 4082
Facsimile	(03) 9669 4515
Electronic Mail	webclim@bom.gov.au
Metadata date	
Metadata date	2003
Additional Metadata	Additional information available on request (see contact above).

APPENDIX D1

BUREAU OF METEOROLOGY

This locational data was extracted from the Bureau of Meteorology's climatological gridded datasets. These gridded datasets were generated from the Bureau's observational (station) data. Maps derived from these gridded data are available at <http://www.bom.gov.au/climate/averages/>. The metadata provided with this data file describes the gridded datasets in more detail.

Copyright for any data supplied by the Bureau of Meteorology is held in the Commonwealth of Australia and the purchaser shall give acknowledgement of the source in reference to the data. Apart from dealings under the Copyright Act 1968, the purchaser shall not reproduce (electronically or otherwise), modify or supply (by sale or otherwise) these data without written permission from the supplier. Enquiries should be made in the first instance to webclim@bom.gov.au or call (03) 9669 4082.

Longitude Latitude
138.3844 -34.4958

	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Rainfall	18	17	18	33	44	39	49	44	37	35	23	21	374
ET (AP)	174	141	114	69	44	30	36	52	79	117	145	156	1158
ET (PP)	264	222	192	119	67	39	48	70	106	164	210	238	1740
ET (AA)	23	23	22	28	39	28	34	44	44	42	29	25	380

The data provided here is the grid-point average data for ...

Rainfall = rainfall (millimetres)

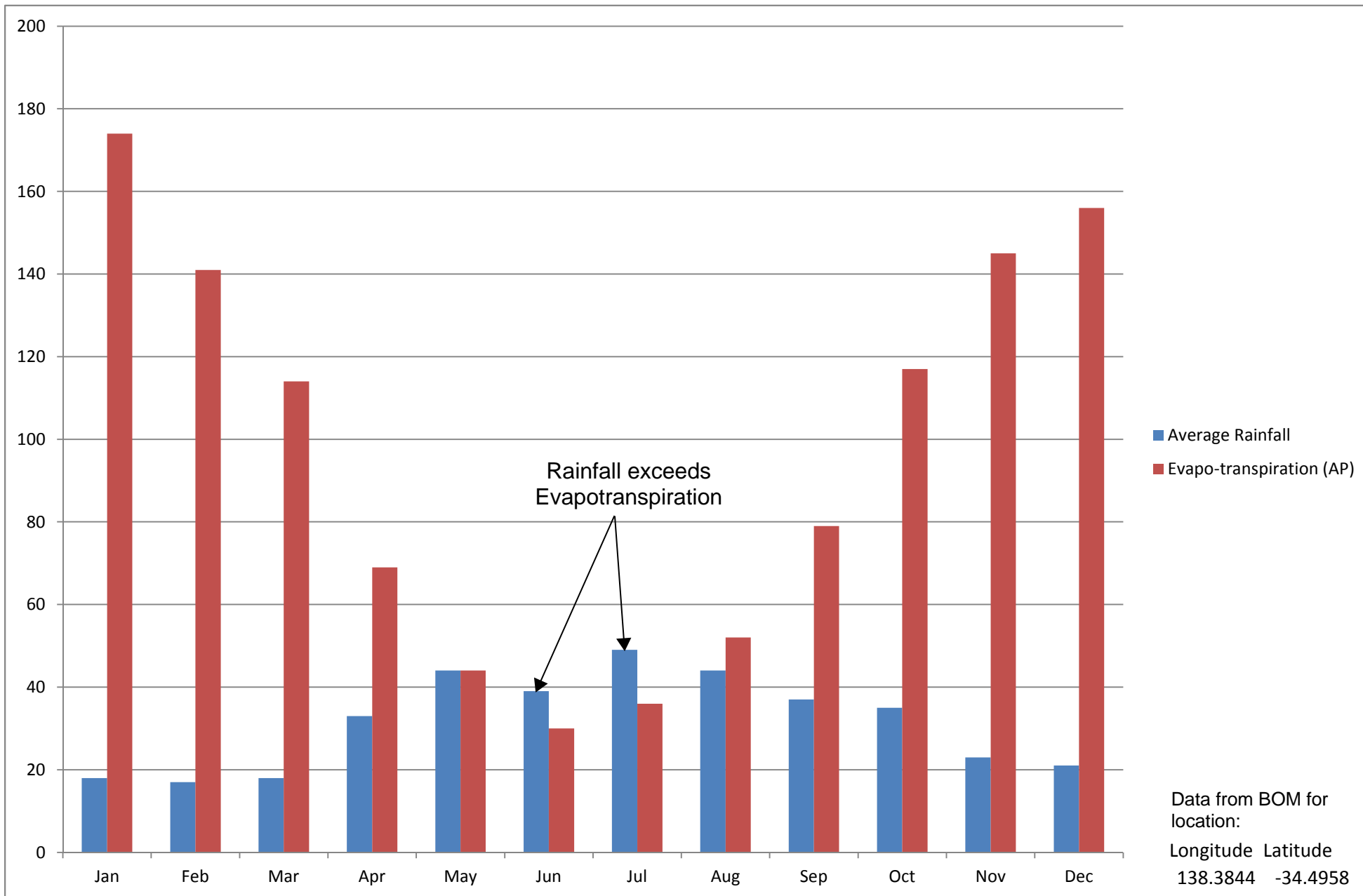
ET (AP) = evapotranspiration - areal potential (millimetres)

ET (PP) = evapotranspiration - point potential (millimetres)

ET (AA) = evapotranspiration - areal actual (millimetres)

APPENDIX D1

Rainfall compared with Evapo-transpiration





LABORATORIES
SOUTH AUSTRALIA

Simon Spencer
Wingfield Rd (cnr Hines Rd)
WINGFIELD SA 5013

Fax Number (08) 8243 1299
Date received Wednesday, 15 February 2012
Date reported Wednesday, 18 April 2012
Analytical Uncertainty ± 5% @ 95% Confidence Level

Test Report

12E/31989

Special Note

Page 1 of 2

Sample No	Sample Description	Air Filled Porosity	Total Water Holding	Bulk Density									
		%	%	kg/L									
31989.01	100% Red Brown Clay	2.5	49.0	1.15									
31989.02	100% Calcrete	4.5	33.5	1.56									
31989.03	100% Gyprock	44.5	25.5	0.55									
31989.04	100% Sweepings	26.5	34.5	0.88									
31989.05	80% Red-Brown Clay 20% Sweepings	4.0	47.0	1.20									
31989.06	80% Red-Brown Clay 10% Gyprock 10% Sweepings	4.5	49.5	1.09									

Limit of Determination 0.10
Method of Analysis AS 3743 - 2003 AS 3743 - 2003 AS 4419-2003, App.B

Signed :

Nick Kopsaftis

Laboratory Manager

PO Box 105, Endfield Plaza, SA 5085 tel: (018) 8260 2122 fax: (018) 8260 1000

Methods of analysis: Procedure by which analyte was determined.

Limit of Determination (LOD): The lowest concentration which will be reported using the cited method in an undiluted sample.

Collex Pty Ltd shall not be liable for any loss or otherwise incurred by the client in the use or interpretation of the results contained in this report. This report shall not be reproduced unless in full. Sample(s) analysed under a quality system certified as complying with QEC AS/NZS ISO 9001:2000 by an accredited certification body. Sample(s) as received. Sample(s) taken and supplied by Client. Samples shall be retained for three months (if possible). Test results relate to the sample(s) only.



LABORATORIES
SOUTH AUSTRALIA

Simon Spencer
Wingfield Rd (cnr Hines Rd)
WINGFIELD SA 5013
Fax Number (08) 8243 1299
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Special Note

Test Report

12E/31989

Page 2 of 2

Sample No	Sample Description	Air Filled Porosity	Total Water Holding	Bulk Density								
		%	%	kg/L								
31989.07	80% Red-Brown Clay 20% Gyprock	4.5	50.5	1.10								
31989.08	40% Red-Brown Clay 40% Calcrete 20% Sweepings	6.0	38.5	1.25								
31989.09	80% Calcrete 20% Sweepings	4.5	35.5	1.53								
31989.10	70% Red-Brown Clay 30% Sweepings	4.5	47.5	1.18								

Limit of Determination 0.10
Method of Analysis AS 3743 - 2003 AS 3743 - 2003 AS 4419-2003, App.B

Signed :

Nick Kopsaftis

Laboratory Manager

PO Box 105, Endfield Plaza, SA 5085 Tel: 081 (0)8 8260 2122 Fax: 081 (0)8 8260 1000

www.veolia.com.au Methods of analysis: Procedure by which analyte was determined.

Limit of Determination (LOD): The lowest concentration which will be reported using the cited method in an undiluted sample.

Collex Pty Ltd shall not be liable for any loss or otherwise incurred by the client in the use or interpretation of the results contained in this report. This report shall not be reproduced unless in full. Sample(s) analysed under a quality system certified as complying with QEC AS/NZS ISO 9001:2000 by an accredited certification body. Sample(s) as received. Sample(s) taken and supplied by Client. Samples shall be retained for three months(if possible). Test results relate to the sample(s) only.