Whitehead & Associates
Environmental Consultants

Ashlee Rutherford
Perception Planning P/L
Re: Gresford Showground

Ref: 2971_WMR_Final

3rd November 2021

On-Site Wastewater Management Report (WMR) for proposed Site improvements at Gresford Showground, East Gresford, NSW

Whitehead & Associates Environmental Consultants Pty Ltd ("W&A") were engaged by Perception Planning P/L (the "Client") to prepare an On-Site Wastewater Management Report (WMR) for proposed site improvements at Gresford Showground; 29 Park Street, East Gresford, NSW (the "Site"). The Site, identified as Lot 7002 DP 96464 & Lot 1 DP11562, is approximately 11.35ha in area and is zoned RE1 (Public Recreation) under the Dungog Local Environmental Plan (LEP, 2014).

The Site is bound by private rural properties to the north & south, Allyn River to the east and Park Street to the west. Existing Site improvements include 15 buildings used for various purposes, including four (4) separate amenity blocks. Other improvements include two (2) lawn bowling greens, two (2) tennis courts, a skate park, animal yards and a rodeo arena. The remainder of the Site comprises general public space & parkland. A dam is located approximately 20m north of the Site on an adjacent property.

Comprising of two separate parcels, the Site operates as a regional agricultural show facility. The Site is owned by the NSW Government (Crown Land) and leased to the Gresford Park management trust (the "Trust") for public recreation purposes, including a range of community and (not-for-profit) commercial events. Potable water for the Site is sourced from roof (tank) water supply, with no reticulated sewer service available. The Site is identified as marginally flood-prone, per Council mapping, but no other major restrictions are noted.

W&A understand Perception Planning P/L is assisting the Trust to prepare a Development Application (DA) to Dungog Shire Council ("Council" or "DSC") for the construction of upgraded services and facilities at the Site including: an additional amenity block near the pavilion; a visitor carpark near the existing camp area; a disabled shower & toilet facility; formalisation of powered & unpowered campsites, and a caravan dump point. This report will also consider the future development of a proposed laundry, to be submitted under a separate DA. W&A understand the Trust has obtained external funding for wastewater servicing upgrades at the Site to facilitate these developments.

Council has adopted a comprehensive Development Assessment Framework (DAF) for on-site sewage management (OSSM), which sets out required standards for investigation, acceptable solutions and minimum standards for sewage management in unsewered areas of the Local Government Area (LGA). The DSC DAF (2015) identifies each allotment within the LGA as having Low, Medium, High or Very High hazard for on-site wastewater management. The Site is considered a 'High' hazard for non-domestic (commercial) OSSM.

The following table presents the minimum standards required by the DSC DAF (2015) for a 'high' hazard non-domestic development WMR.

DAF Minimum Standards for WMR (High Hazard – Non-Domestic)		
Report Element	**Minimum Standard**	**Completed**
Introduction and Background	• Name, contact details and qualifications of author(s). • Site location and owner. • Allotment size (m^2 or ha). • Proposed / existing water supply. • Description of proposed facility (including equivalent persons). • Availability of sewer.	✓ ✓ ✓ ✓ ✓ ✓
Site and Soil Assessment	• Broad overview of locality and landscape characteristics. • Details of the date and time of assessment in addition to statements confirming the methods used to complete the assessment. • Site assessment that considers all parameters listed in Table 6-1 of the DAF in accordance with AS/NZS 1547:2012. • Detailed review of available published soils information for the site. • Soil assessment that considers all parameters listed in Table 6-1 of the DAF in accordance with AS/NZS 1547:2012. • Where multiple soil facets are present the site plan should show the approximate boundary between facets. • Detailed explanation of the implications of observed site and soil features for system design and performance. • Assessment of the existing condition of the receiving environment and sensitivity to on-site system impacts.	✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓
System Selection	• Summarise potential treatment and land application systems considered including advantages and limitations. • Preliminary design calculations for a minimum of 2-4 options. • Brief statement justifying selection of treatment and land application system.	✓ ✓ ✓
Design	• Detailed wastewater characterisation (quality and quantity) including temporal variation using existing data for the subject site or similar facilities. • Establishment of clear, site-specific design criteria based on typical or published performance. • Process design in accordance with Tchobanoglous and Burton (2003) or Crites and Tchobanoglous (1997) detailing the rationale, assumed performance and capacity to manage design flows and loads. Process performance should be supported by published data or information that demonstrates the suitability of the process to the site and development. • Daily water, nutrient and pathogen modelling to size any land application areas (see DSC Technical Manual). • Hydraulic design of collection, treatment and land application components to demonstrate viability of the process. • Design drawings (CAD or similar) and specifications for all system components.	✓ ✓ ✓ ✓ ✓
Site Plan	• Survey plan. • Proposed allotment boundaries, dimensions and area; • Location of existing buildings, swimming pools, paths, groundwater bores, dams and waterways; • Location of exclusion zones (e.g. setback distances and unsuitable site and soil conditions); • Location of all system components and any reserve areas to	✓

	clearly demonstrate viability; • Half metre elevation contours; and • Location of existing and proposed drainage pipework (centreline).	
Cumulative Impacts (Where required)	• Summary of approach taken and confirmation of compliance with the Minimum Standards documented in 3.2.4. • Methodology documenting the basis and source of input data including reference to site specific data, published information or the Technical Manual to justify use. • Results demonstrating compliance with local water quality objectives and adequate management of health risk as defined and demonstrated in Table 2-15 and Section 10 of the Technical Manual. • Brief discussion of long-term risks to health and environment and recommended management measures to address impacts.	As per discussion with Council
Appendices	• Soil bore logs for all test pits. • Raw laboratory results for soil analysis. • All design calculations and assumptions including screenshots of cumulative impact spreadsheets/models.	✓ ✓ ✓

1 Author Statement

This WMR was prepared by Ben Colautti who is an Environmental Consultant with W&A, holding a Bachelor of Civil (Environmental) Engineering from the University of Technology Sydney. He has completed the On-site Wastewater Management professional short-course with the Centre for Environmental Training (CET) and has prepared WMR's for residential and commercial sites across the Central Coast and Hunter regions.

2 Introduction

This WMR has been undertaken in reference to the assessment and design principles of:

- *AS/NZS 1547:2012* On-site Domestic Wastewater Management (Standards Australia/Standards New Zealand, 2012);
- Environment & Health Protection Guidelines: On-site Sewage Management for Single Households (Department of Local Government (DLG), 1998);
- Dungog Shire Council (2015) On-site Sewage Development Assessment Framework (DAF). Revision 3, dated 4 June 2015; and
- Dungog Shire Council (2015) On-site Sewage Management Technical Manual. Revision 2, dated 4 June 2015.

The following table presents information on the property investigated.

Feature	Description
Site Address	29 Park Street, East Gresford, NSW
Lot / DP	Lot 7002 DP 96464 & Lot 1 DP11562
Local Government Area	Dungog Shire Council
Land Zoning	RE1 (Public Recreation)
Lot Size (ha)	11.35
Climate Zone category	Southern

Sewer Connection Available	No
Potable Water Supply	Roof (tank) water supply

3 Site Description

Gresford Showground is a public recreation and parkland facility. Its predominant purpose is to provide the local residents of East Gresford, Gresford and the region with a place for community congregation, community events and general public recreation. A skate park, tennis courts, amenity blocks and camping grounds are available daily to the public. Other facilities on-site are specifically used for events and functions, these include storage buildings, pavilions, canteen and BBQ areas, club house, rodeo arena, grandstands and animal yards.

The community events are organised and/or permitted by the Gresford Park Trust, who source funding through donations, fundraising events and grants to organise events and functions for, and on behalf of, the community. Regular events held at the Site include motocross, equestrian, rodeos, mud runs and the local agricultural show.

There are four (4) amenity blocks on Site that service wastewater needs for visitors. Identified as Blocks 1, 2, 3 & 4, they are located as shown on Figure 1, Appendix A. Block 1 consists a single toilet within the tennis court clubhouse; Block 2 (known as the 'pavilion toilets') generally service event attendees, with some non-event visitor usage from campers and skaters; Block 3 (known as the 'pony club toilets') service event attendees, and Block 4 (known as the 'camping toilets') primarily service campground visitors (both event and non-event).

4 Site Usage

This section will outline W&A's determination of predicted visitor rates at the Site.

Aside from camping during the Easter and Christmas holiday breaks and periodic events throughout the year, the Site is assumed to have predominantly low usage.

Operational matters and assumptions were taken into consideration in the development of 'design' wastewater generation estimates for the Site. Where noted, the information is based on discussions with Site management (Gresford Park Trust). With uncertainties and limitations in data W&A have made some assumptions regarding visitor rates at the Site, W&A accepts that there will be some discrepancies in estimations and refers back to the client for confirmation.

4.1 Non-Event Attendance

Outside of formal 'event' periods, Site usage is typically comprised of the following use categories:

- Campers (short-term holiday or recreational);
- Skate Park users;
- Tennis court users and;
- Comfort stop (toilet break) or recreational users (dog walkers etc).

The Site experiences seasonal variation in attendance. A 'High' season period occurs from mid-December to mid-February (and the Easter break); 'Shoulder' season ranges from mid-February to March & October to mid- December, and the 'Low' season occurs outside of these times (April to September).

The following considerations and assumptions are made in regards to non-event usage, based on W&A analysis and anecdotal experience:

- Camp ground usage during non-event periods is seasonally dependant, with intra-week variability also noted:
  - For an average weekend day (Sat-Sun) during the Shoulder season ~**30%** of available camping sites are occupied, with the equivalent of **≈150** campers on-site. An average weekday (Mon-Fri) will see an occupancy of ~**12%**, with the equivalent of **≈60** campers on-site.
  - For an average weekend day during the Low season ~**25%** of the camping grounds are occupied, with the equivalent of **≈130** campers on-site. An average weekday will see an occupancy of ~**2%**, with the equivalent of **≈10** campers on-site.
  - For an average weekend day during the High season attendance increase to ~**96%** of the available camping sites, the equivalent of **≈500** people on-site. An average weekday will see an occupancy of ~**67%**, with the equivalent of **≈350** campers on-site.

Gresford Park Trust indicated that the Site experiences 300-500 visitors per day during Christmas break. With a typical breakdown of ~33% (167) of visitors utilising powered Sites and ~67% (333) of visitors utilising unpowered campsites.

- Skate Park users will be serviced by ‘Block 2’ facilities. Attendance is estimated as **10** (ten) visits per weekday and **30** for an average (shoulder) weekend day. With an assumed peak visitor rate of ≈50 people.
- There may be up to **15** weekday and **30** weekend day comfort stop and recreational users at the Site during an average (shoulder) period, these people will be entering the Site specifically to use the toilets or entering recreationally (e.g. walk the dog or exercising etc) and may make use of the facilities.

Seasonality is also expected to influence the number of Skate Park, comfort stop and recreational users. To allow for this variability, the visitation rates during a shoulder season (defined above) are increased by 30% to estimate high season attendance and reduced by 30% to estimate low season attendance.

- People using the tennis court will be serviced by ‘Block 1’ facilities. Tennis court usage is generally low with an approximate attendance of 8 (eight) weekday and 20 (twenty) weekend day visits. With an assumed peak visitor rate of **≈100** people for a busy day (i.e. tournament).

4.2 Event Attendance

Two (2) large annual events; the ‘agricultural show’ and the ‘rodeo’, as well as an array of smaller events and functions also occur at the Site. The Trust has indicated that both the Agricultural show and Rodeo attract approximately 5,000 people per event. Other small events, such as the Pony Club, Mud Run, Motocross and other (non-specific) community functions generally attract between 1,000-3,000 visitors per event. The majority of these events are ‘annual’ or part of a long-term calendar program for the Site.

The following considerations and assumptions are made in regards to events:

- If the event duration is ≥2 days, it is assumed that **80%** of event attendees will utilise available camping for at least 1 of the nights.

- If the event duration is <2 days, it is assumed that **20%** of event attendees will camp on Site.
- For event attendees who are day visitors (i.e. non-camping), it is assumed that ~**75%** will use the upgraded facilities at Block 2, with the remainder (**25%**) using Block 3 amenities.
- All events at the Site occur on a weekend, with 3-day events also including a Friday or Monday.
- Staffing is assumed for each event based on W&A estimations.

The Gresford Showground event schedule for 2021 (see Appendix E), along with attendance information provided by the Trust and the assumptions outlined, is used to inform Site usage during ‘event’ periods. These estimates are summarised in the following table.

Event	How long (days)	Patronage	Staff	Event Campers (Total)	Event patrons (Day Visit)
Pony Club (PRPC) (1 d)	1	300	5	60	240
Pony Club (PRPC) (2 d)	2	300	6	240	60
Dressage	1	500	6	100	400
RFS	1	500	6	100	400
Dungog Motorcycle	2	500	10	400	100
American Moto	2	1000	18	520	480
Mud Run	2	1000	18	520	480
Show (day 1)	2	2000	40	200	1800
Show (day 2)	2	5000	40	500	4500
Penning	2	500	8	400	100
Rodeo (day 1)	3	3000	40	200	2800
Rodeo (day 2)	3	5000	40	520	4480
Rodeo (day 3)	3	2000	40	50	1950
E' Zone	2	1000	10	520	480
PRPC Zone	2	300	6	240	60

4.3 Camping

Based on the (draft) Site Plan provided, camping facilities are to be predominantly located in the south-east portion of the Site. Proposed camping grounds and parking areas will occupy a large portion of undeveloped area in this location and will be responsible for a sufficient portion of sewage generated at the Site.

The following considerations and assumptions are made in regards to camping at the Site:

- Currently, ≈4,200m^2 of powered and ≈9,600m^2 of unpowered campsite area is available.
- The proposal will expand camping areas to 4,600m^2 (additional 400m^2) of powered camping area and ≈14,000m^2 (additional 4,400m^2) of unpowered camping area. Total area of available camping = **18,600m²** (Perception Planning 'Draft Site Plan, Job No: J000480').
- A standard campsite is ~50sqm; however, due to informally organised camp grounds, pathways between Sites, surface rock, topography, vehicles/horse floats within the campsite and parked cars using campgrounds as parking. The footprint for each

campsite is taken as 90m². Therefore, the maximum number of available camping sites within the camping ground is estimated as 208 (18,600/90).

- The average number of visitors per campsite is assumed as 2.5, based on the fact that most campers will be couples with horse floats; therefore, the camp ground is assumed to have a maximum capacity of **520** (208 x 2.5) visitors. The assumed breakdown being **394** (unpowered) and **126** (powered).
- Caravans, RV users, people with fold out tents and horse floats are all included in the definition of "campers".
- Once proposed campgrounds have been fully developed, and assuming all (existing & proposed) campgrounds are occupied, the anticipated utilisation of facilities is as follows:
  - Block 2 will service ~32% of campers;
  - Block 3 will service ~8% of campers; and
  - Block 4 will service ~60% of campers.

5 Wastewater Generation

This section outlines the methods used to predict wastewater generation from existing and proposed uses at the Site, as well as how this wastewater is distributed between amenities.

5.1 Wastewater Quantity

5.1.1 Flow Allowances

Flow allowances for each development component were obtained from National and NSW guidelines, as referenced in the following table. Where necessary, estimates are provided based on W&A experience or anecdotal advice.

Development	Flow Allowance (L/Person/day)	Source
Powered Campsites	**75**	*Septic Guidelines 2001 "laundry, showers and WC" (reduced from 86 to 75L from Water meter data, section 5.1.4)*
Unpowered Campsites	**27**	*Septic Guidelines 2001 "WC"*
Event Attendees, Sport Facility & Recreational users	**10**	*Table H4, AS/NZ 1547:2012 "meetings, roof tank supply"*
Non-resident Staff	**30**	*Table H4, AS/NZ 1547:2012 "non-resident staff"*

Wastewater generation is calculated by multiplying the visitor rate (refer Section 4) for both non-event and event periods and the associated flow allowance for each contribution (refer table above)).

5.1.2 Non-Event Generation

From these values, seasonal non-event wastewater generation tables were developed for the Site. The tables approximate inter-week and seasonal variability at each wastewater generation point. For ease of analysis, generation for Block 1 is reported separately, while generation from Blocks 2, 3 & 4 is combined. Copies of each generation table produced are provided in Appendix B and summarised below.

		Low		Shoulder		High	
		WW Gen (L/day)	working	WW Gen (L/day)	working	WW Gen (L/day)	working
Skate Park (L/day)	Weekday	70	(10 x 7)	100	(10 x 10)	130	(10 x 13)
	Weekend Day	210	(10 x 21)	300	(10 x 30)	390	(10 x 39)
Recreational Users/Comfort Stop (L/day)	Weekday	105	(10 x 10.5)	150	(10 x 15)	195	(10 x 19.5)
	Weekend Day	210	(10 x 21)	300	(10 x 30)	390	(10 x 39)
Campers (L/day)	Weekday	3,900	(75 x 52)	4,680	(75 x 62.4)	15,402	(75 x 124)
	Weekend Day	9,462	(75 x 124)	10,164	(75 x 124)	19,452	(75 x 124)

5.1.3 Event Generation

Wastewater generation during individual 'events' is a function of both visitor and camping contributions, along with associated staff and (minor) non-event visitor contributions. For each event, as outlined in the Gresford Showground schedule, W&A made the following wastewater generation estimates:

Event	WW Gen (Camping - Powered)	WW Gen (Camping - Unpowered)	WW Gen (Camping - Total)	WW Gen (Day visitors)	WW Gen (Staff)	**WW Gen (TOTAL)**
Pony Club (PRPC) (1 d)	4,500	0	4,500	2,400	150	7,050
Pony Club (PRPC) (2 d)	9,300	3,132	12,432	600	180	13,220
Dressage	7,500	0	7,500	4,000	180	11,680
RFS	7,500	0	7,500	4,000	180	11,680
Dungog Motorcycle	9,300	7,452	16,752	1,000	300	18,060
American Moto	9,300	10,692	19,992	4,800	540	25,340
Mud Run	9,300	10,692	19,992	4,800	540	25,340
Show (day 1)	9,300	2,052	11,352	18,000	1,200	30,560
Show (day 2)	9,300	10,692	19,992	44,800	1,200	66,000
Penning	9,300	7,452	16,752	1,000	240	18,000
Rodeo (day 1)	9,300	2,052	11,352	28,000	1,200	40,560
Rodeo (day 2)	9,300	10,692	19,992	44,800	1,200	66,000
Rodeo (day 3)	3,750	0	3,750	19,500	1,200	24,450
E' Zone	9,300	10,692	19,992	4,800	300	25,100
PRPC Zone	9,300	3,132	12,432	600	180	13,220

5.1.4 Data Calibration

Available water usage data was used to 'quality check' W&A estimates for wastewater generation during both event and non-event periods. Water meter data was provided by the Trust based on two (2) registered meters; 'Arena' and 'Camp'.

A total of 5 useable months of data were obtained (mid-March 2021 to mid-August 2021) and were used to compare with W&A estimates for the corresponding periods (refer adjacent table).

Using this information, W&A found that generation was typically over-estimated during mid-level 'events' (i.e. Mud Run and Motocross) and flow allowances for camping contributions were adjusted accordingly.

Overall, good agreement was achieved between the observed water usage data and the W&A estimates during event periods.

Dates of readings (year-2021)	Time between readings (days)	Total Flow for time period (kL)	Average daily flow (L) within that period
18-Mar	7	116	16,580
29-Mar	11	128	11,640
8-Apr	10	121	12,100
19-Apr	11	191	17,370
27-Apr	8	85	10,630
10-May	13	58	4,470
13-May	3	11	3,670
16-May	3	30	10,000
25-May	9	73	8,120
28-May	3	30	10,000
31-May	3	54	18,000
8-Jun	8	77	9,630
21-Jun	13	117	9,000
30-Jun	9	40	4,450
13-Jul	13	66	5,080
19-Jul	6	17	2,840
26-Jul	7	60	8,580
3-Aug	8	44	5,500
10-Aug	7	47	6,720

5.2 Generation Distribution

Due to the dispersed nature of wastewater generation at the Site, particularly during 'event' periods when visitors are moving about, it was also necessary to analyse how wastewater generation would be distributed.

As previously described, with the exception of tennis court usage, all wastewater generated during both event and non-event periods would be portioned between Block 2, 3 and 4. To approximate the distribution of the total daily flow between each generation point, W&A used the following assumptions:

- Skate Park, recreational and comfort stop users will exclusively use the Block 2 amenities.
- Event attendees who are day visitors (non-campers), as well as event affiliated staff, are expected to predominantly (~75%) use the upgraded Block 2 amenities, with some overflow (25%) also using Block 3.
- Campers are expected to exclusively use the Block 4 amenities; however, Block's 2 and 3 are also expected to accommodate some overflow during periods of high campground utilisation.

  The following table summarises the assumed proportion of camper usage between each amenity block depending on the range of total campers on Site.

	Block		
Campers on-site	**2**	**3**	**4**
0 - 125	0%	6%	94%
125 - 318	0%	3%	98%
318 - 353	0%	13%	87%
353 - 520	32%	8%	60%

5.3 Summary

As shown, wastewater generation at the Site is highly variable, with long periods of low attendance punctuated by regular periods of short-duration moderate generation and occasional large events.

Based on estimates, annualised 'average' wastewater generation at the Site is expected to be ~**8,660L/day**, ranging from ~950L/day during the low-season and increasing to a maximum (peak) of up to ~**66,600L/day** during the Agricultural Show or Rodeo events. A graph summarising expected annual wastewater generation is provided in Appendix B.

The distribution of 'average' and 'peak' daily wastewater generation at each amenities Block (not including tennis court users), is summarised below.

	Block 2	Block 3	Block 4	Total
Average (L)	840	620	6,950	**8,656**
Peak (L)	35,100	12,700	18,800	**66,592**

5.4 Wastewater Quality

The contaminants in wastewater have the potential to create undesirable public health concerns and pollute waterways unless managed appropriately. As a result, domestic wastewater must be treated to remove the majority of pollutants and enable attenuation of the remaining pollutants through soil processes and plant uptake.

The majority of 'sanitary' wastewater generated at the Site is expected to be of 'typical' domestic nature, with combined wastewater streams; blackwater (toilet) and greywater (kitchen, laundry and shower) wastes. As such, untreated sanitary wastewater is expected to have characteristics similar to that described in the table below; which incorporates information taken from the NSW DLG (1998).

Parameter	Loading	Greywater %	Blackwater %
Daily Flow	8,660 L	65	35
Biochemical Oxygen Demand	200-300mg/L	35	65
Suspended Solids	200-300mg/L	40	60
Total Nitrogen	20-100mg/L	20-40	60-80
Total Phosphorus	10-25mg/L	50-70	30-50
Faecal Coliforms	10^3 – 10^{10}cfu/100ml	Medium – High	High

5.5 Food Trucks

During events (especially the Rodeo and Agricultural show), a clubhouse with BBQ area and canteen will serve event attendees with cooked and uncooked food. Additionally, contract food service providers (food trucks) will be available on Site serving cooked food to attendees. Waste oil, grease and fat from Food Trucks must NOT be introduced to the OSSM system/s at the Site.

Management of these wastes remains the responsibility of the contractor provider and must be acknowledged in the license/approval conditions to attend each event. It is our understanding that most operators already adopt this approach and collect their waste oil and grease for off-site disposal.

5.6 Dump Point

A caravan dump point is proposed near the Block 4 Septic tanks. This will store caravan and RV collected wastewater to be removed via vacuum truck at a later date.

W&A have estimated the required size of the Dump Point tank based on the expected pump-out frequency; the average caravan/RV sullage tank size and the 'typical' frequency with which users will utilise the service.

The 'Dump point' pump out frequency is assumed to occur once (1x) per year, in coordination with other tanks prior to the event season. The average sullage tank size in the range of caravan/RV vehicles examined is ~80L. The frequency of (Caravan/RV) users making use of the Dump point facility has been estimated as ~240 separate uses per year.

This totals to a proposed dump volume of 19,200L (240 x 80L) per year. Based on this analysis W&A propose 20,000L of tank storage in the form of two 10,000L tanks to service as a Dump Point station.

6 Site and Soil Assessment

A Site investigation was undertaken by Connor Morton & Ben Colautti of W&A on the 28th July 2021. The following tables present the results of our site and soil investigation for the property.

A description of the Site physical constraints and the degree of limitation they pose to on-site sewage management (OSSM) is provided in the Table below. Reference is made to the rating scale in NSW DLG (1998) and, where appropriate, the DSC DAF (2015).

SITE ASSESSMENT			
Parameter	**Data / Observation**	**Reference**	**Classification / Outcome**
Climate	The Site experiences a temperate climate typical of south-eastern Australia. Median annual rainfall for the Site is 882.2mm. Monthly rainfall ranges from 31mm in August to 86.8mm in March. Mean annual pan evaporation for the Site is 1568.5mm. Potential evaporation exceeds rainfall for all months of a typical year at the Site.	BOM Stations: 61024 (Rainfall) and 061288 (Evaporation)	Minor limitation
Hydraulic balance (daily) attached:	Yes	per DSC DAF (2015) procedure	
Nutrient balance (annual) attached:	Yes		
Land application area (LAA) sizing attached:	Yes		
Wet weather storage requirement:	No	N/A	
Flooding		W&A analysis from previous job along the Allyn River (Ref: Job No. 1471)	Minor limitation
Land application area above 1:20 ARI flood level:	Yes		
Land application area above 1:100 ARI flood level:	Likely		
Electrical components above 1:100 ARI flood level:	Yes		
Exposure	The Site is predominantly cleared of vegetation. Good exposure to sun and prevailing wind.	Minor limitation	
Slope	Ranges from 1% to 8% within the 'available' effluent management areas (EMA).	Minor to Moderate limitation	
Landform	Undulating hills generally <10% slope,	Minor limitation	
Run-on and Seepage	No run-on or up-slope seepage observed in the vicinity of the available EMA at the time of Site inspection (Figure 1, Appendix A).	Minor limitation	
Erosion Potential	None observed in available EMA.	Moderate limitation	
Site Drainage	Moderately well drained. No signs of surface saturation; however, some mottling was	Minor to Moderate limitation	

SITE ASSESSMENT			
Parameter	**Data / Observation**	**Reference**	**Classification / Outcome**
	observed in subsoil horizons within the proposed LAA, indicating imperfect drainage at times during the climate cycle.		
Fill	None observed or apparent.	Minor limitation	
Groundwater	No shallow groundwater encountered during soil survey to ~850mm in proposed LAA (BH1). NSW Office of Water groundwater bore registry indicates no bores are located within 250m of the Site. The NSW DLG (1998) recommended 250m buffer distance to domestic groundwater bores can therefore be achieved within the available EMA.	Minor limitation	
Buffers Applicable Permanent rivers and creeks (100m):	Yes	Achievable (shown on Site Plan).	
Intermittent creeks and drainages (40m):	Yes	Achievable (shown on Site Plan).	
Domestic groundwater wells and bores (250m):	N/A		
Other sensitive receptors:	N/A		
Lot boundaries (3m if EMA downslope-6m if EMA upslope):	Yes	Achievable (shown on Site Plan).	
Buildings, driveways and swimming pools (3m if EMA downslope-6m if EMA upslope):	Yes	Achievable (shown on Site Plan).	
Limiting horizon (groundwater, bedrock etc.) (0.6m):	Yes	Achievable with preferred LAA type (SSI).	
Surface Rock / Outcrop	Surface rock (300-350mm deep) and rock outcrops were observed throughout the western portion of the Site. These areas have been excluded from 'useable land' calculations.	Major limitation	
Available EMA	A total of 2,170m^2 of usable EMA has been identified. However, to conform with the Masterplan objectives for the proposal, the Client has expressed preference for the proposed LAA to be isolated to a ~1,600m^2 area in the SE of the Site, adjacent to the Camping amenities.	Moderate to Major limitation	
Concluding Remarks Surface rock is a major constraint to OSSM at the Site. Identified limitations can be successfully avoided and/or mitigated by OSSM design.			

SITE ASSESSMENT			
Parameter	**Data / Observation**	**Reference**	**Classification / Outcome**
Available EMA is identified in the eastern portion of the Site, subject to on-site flow balancing and OSSM design.			

SOIL ASSESSMENT (physical)			
Parameter	**Data / Observation**	**Reference**	**Classification / Outcome**
Soil Depth	>300mm. Refusal in all test pits at 850 (BH1), 300 (BH2) & 350mm (BH3) due to river cobble, stiff bedrock & weathered bedrock respectively.	Moderate limitation	
Soil Profile	**BH1** A_1: 0 - 350mm, weakly structured light clay (Cat 5) B_1: 350 - 850mm, massive medium clay (Cat 6) **BH2** A: 0 - 300mm, massive sandy clay (Cat 5) **BH3** A: 0 - 350mm, weakly structured sandy clay loam (Cat 4) *Soil borelogs presented in Appendix C*	Major limitation Mitigation available through design.	
Depth to Water Table	No shallow (episodic) water table encountered in any BH.	Minor limitation	
Coarse Fragments (%)	0-50% (<200mm), cobblestone in EMA.	Moderate limitation	
Soil Permeability	< 0.06m/day (inferred)	Based on massive medium clay (Cat 6) subsoil	Major limitation
Modified Emerson Aggregate Class (EAT)	Topsoil: 3(2)-2(1) (slight to moderate dispersion) Subsoil: 5 (stable)	Moderate limitation Mitigation recommended (see Section 10.1).	
Soil Landscape	The Site is located within the **Gresford** (gd) and **Paterson River** (pa) Soil Landscapes. The 'gd' soil landscape is located on rolling low hills to hills on Carboniferous sediments. Slopes are typically <25%, with relief 40-160m and elevation 80-200m. Groundcover consists of cleared tall open forest and rock outcrops occur occasionally on crests. Soils are typically moderately deep and moderately well-drained Natric Brown Kurosols, with shallow, moderately	Dungog 1:100,000 Sheet (Henderson, 2000)	

<table>
<tr><td></td><td>well-drained bleached Leptic Tenosols on upper slopes and crests.

The ‘pa’ soil landscape located on the narrow to moderately broad floodplains on Quaternary alluvium in the Gresford Hills and Williams Range regions along the Paterson and Allyn Rivers. Deep, rapidly drained Stratic Rudosols (sandy Alluvial Soils) on levees and recent alluvial deposits along channel banks. Deep, well-drained Brown Dermosols (Brown Earths) on alluvial plains.</td><td></td></tr>
<tr><td colspan="3">Concluding Remarks

Site soils are predominantly characterised by the ‘Gresford’ soil landscape; sandy clay loam to sandy clay topsoils (Cat 4/5) to ~100-350mm depth, underlain by weather (sandstone) parent material. The soil Landscape transitions to ‘Paterson River’ along the Allyn River; these soils involve weakly structured light clay topsoil underlain by massive medium clay subsoil (~300-700mm depth). Soil structure is typically weak to massive. The Available EMA sits on the boundary between the two soil landscapes but is reflective of ‘Paterson River’.

Based on identified soil characteristics a (maximum) design irrigation rate (DIR) of 2mm/day is recommended for irrigation systems and a (maximum) design loading rate (BLR) of 5mm/day is recommended for subsoil absorption systems, with reference to Tables M1 and L1 AS/NZS 1547:2012 for the limiting Cat 6 subsoil.

Soil conditions are generally moderate in the available EMA; instability, coarse fragments (cobblestone) and permeability limitations present.

Potential negative consequences associated with coarse fragments, soil dispersion (EAT) and instability can be mitigated through appropriate LAA placement and soil improvement measures (see Section 10.1). Identified soil permeability limitations will be mitigated through conservative LAA sizing and design.</td></tr>
</table>

<table>
<tr><th colspan="5">SOIL ASSESSMENT (chemical)</th></tr>
<tr><th>Parameter</th><th colspan="2">Data / Observation</th><th>Reference</th><th>Classification / Outcome</th></tr>
<tr><td>pH</td><td>Topsoil: 6.73-6.85
Subsoil: 6.78</td><td>Neutral</td><td colspan="2">Minor limitation</td></tr>
<tr><td>EC (EC_e)</td><td>Topsoil: 0.6-0.784
Subsoil: 0.329</td><td>Non-saline</td><td colspan="2">Minor limitation</td></tr>
<tr><td>ESP (%)</td><td>1.7</td><td>Non-sodic</td><td rowspan="3">Based on soil laboratory results for samples taken from a nearby site on the same soil landscape (1471_East Gresford_2015)</td><td>Minor limitation</td></tr>
<tr><td>CEC (me/100g)</td><td>9.1</td><td>Very Low Fertility</td><td>Major limitation</td></tr>
<tr><td>P-sorption (mg/kg)</td><td>111</td><td>Low</td><td>Major limitation</td></tr>
<tr><td colspan="5">Concluding Remarks

Very Low fertility and low p-sorption capacity of the soils pose major limitations to OSSM within the available EMA. Practices to mitigate these limitations are outlined in section 10.1.</td></tr>
</table>

7 Existing OSSM Arrangements

This section describes the existing OSSM systems as well as performance of treatment units and LAA's on-site.

At present, three (3) separate (stand-alone) OSSM systems are operating at the Site, each receiving wastewater generated from one or more amenity blocks. OSSM 1 services the tennis court toilet (Block 1), OSSM 2 services the Pavilion amenities (Block 2) and OSSM 3 services both the Pony Club and Camping amenities (Blocks 3 and 4, respectively). The arrangement of current OSSM systems at the Site is provided as Figure 2, Appendix A.

7.1 OSSM 1

Wastewater from Block 1 is treated in a ≈2,000L concrete septic tank (Ø1.4m), followed by a ≈1,500L collection well, before being displaced to a ≈150m^2 (10m x 15m) absorption bed located south-east of the tennis courts. W&A estimate the peak hydraulic load to this OSSM system is ~1,000L/day (≈100 visitors during tournament).

The existing septic tank is considered to be appropriately sized for the maximum hydraulic load expected, providing in excess of 2 days hydraulic residence time (HRT) for effective primary treatment. Both the septic tank and collection well were in good condition and the subsoil LAA displayed no signs of seepage or pooling.

W&A consider OSSM 1 suitable for continued use at the Site, providing that the treatment tanks and LAA are suitably defended from damage or disturbance. W&A recommend the existing LAA is fenced off from access to prevent accidental damage from parking.

7.2 OSSM 2

Facilities in the 'Pavilion' amenities block (Block 2) include 8 toilets, ~3m of urinal and 3 handbasins. Available facilities will be expanded as part of the current project to include an additional 7 toilets (including a disabled toilet) and 5 handbasins. Wastewater generated from Block 2 is currently treated in a ≈2,100L (Ø1.65m) concrete septic tank, followed by a ≈2,100L (Ø1.65m) collection well. Treated effluent is then displaced into a ~155m^2 (12m x 13m) absorption bed located approximately 20m east of the block.

Both existing tanks are old, displaying signs of concrete cancer and are considered to be significantly undersized for the expected hydraulic loads. The existing LAA is heavily overgrown with vegetation and shows significant signs of overloading with seepage and pooling along the northern boundary. Investigation of historical aerial photography suggests occasional effluent seepage away from the LAA into a drainage channel on an adjacent property and towards the Allyn River. The LAA is located within the 40m buffer zone from the drainage channel and 6m buffer from the property boundary recommended by the NSW guideline (DLG, 1998).

W&A consider OSSM 2 no longer serviceable and unable to meet the future needs of the Site. The LAA is not compliant with current regulatory guidelines or Council policy (DSC DAF, 2015) and should therefore be replaced.

7.3 OSSM 3

Facilities in the 'Pony Club' amenities block (Block 3) include 6 toilets and 2 handbasins. No changes to this amenities building are proposed under the current project. Wastewater generated from Block 3 is currently treated in a ≈2,700L (Ø1.65m) concrete septic tank, followed by a ≈2,700L (Ø1.65m) pump well. A submersible (Mono) pump transfers primary effluent from the pump well to a combined LAA south of Block 3, via 32mm PVC pipe.

Facilities in the ‘Camping’ amenities block (Block 4) include 6 toilets, 4 showers and 3 handbasins. No changes to this amenities building are proposed under the current project. Wastewater generated from Block 4 is currently treated in a ≈7,500L (Ø2.25m) concrete septic tank, followed by a ≈2,700L (Ø1.55m) septic tank and ≈2,700L (Ø1.55m) pump well. A submersible (Mono) pump transfers primary effluent from the pump well to a combined LAA south of Block 3, via 32mm PVC pipe.

The existing (combined) LAA for OSSM 3 is approximately 500m^2 in area (22m x 23m) and comprises a subsoil absorption bed. The LAA is located ~40m west Block 4 and forms part of the preferred location for effluent application at the Site. The existing LAA is heavily overgrown with vegetation and shows significant signs of overloading with pooling in the north-east. Settling and soil loss are apparent, with gravel distribution aggregate being close to or exposed at the surface in areas. The LAA is located outside of the 100m buffer zone from the Allyn River as recommended by the NSW guideline (DLG, 1998).

7.4 Summary

While several of the concrete (septic/collection well) tanks are in working order, analysis suggests they are significantly undersized for the expected hydraulic loads and should be replaced. Similarly, the existing LAA appears under-sized and overloaded. Replacement and upgrade are recommended.

8 Proposed OSSM System

This section describes proposed changes to OSSM at the Site.

Given that existing LAAs for OSSM 2 and OSSM 3 are performing poorly and a number of the existing concrete tanks are no longer serviceable or significantly undersized, it is recommended that the system is re-designed to incorporate an appropriate level of treatment, followed by sufficient storage to prevent hydraulic overloading of the effluent LAA during periods of heavy use.

Where possible, the proposed upgrades will utilise or re-purpose existing infrastructure.

8.1 Design Overview

The primary objective of the proposed OSSM upgrade is to simplify servicing arrangements by providing adequate pre-treatment and transfer of effluent to a centralised treatment system capable of reliably producing ‘primary’ effluent quality suitable for long-term effluent land application at sustainable loading rates. The proposed OSSM system aims to: (i) minimise the impact to Site users; (ii) simplify maintenance and management, and (iii) comply with Council’s current regulatory requirements regarding environmental and public health protection. To achieve these objectives, the recommended upgrade design will be as follows:

(i) Block 1 will continue to be serviced by the existing stand-alone OSSM system (OSSM 1) to manage generated wastewater from the tennis court users;

(ii) OSSM 2 and OSSM 3 will be modified and consolidated to one (1) central OSSM system servicing Blocks 2, 3 & 4; and

(iii) generated wastewater from Blocks 2, 3, and 4 will be stored in balance tanks (as required), with controlled application to a new consolidated LAA.

8.2 Proposed OSSM Upgrades

Proposed upgrades to OSSM at the Site will include the following wastewater servicing infrastructure (refer to Figure 3, Appendix A):

8.2.1 Pre-treatment

To prevent issues with debris (rags, floatable materials etc.) causing problems with the sewerage reticulation and transfer system, ('interceptor') septic tanks will be used at Blocks 2, 3 & 4 (see Figure 3, Appendix A for reference). As appropriate, the existing arrangements may be retained; however, the following additions are recommended:

- All existing tanks at Block 2 will be removed and replaced with one (1) 10,000L septic tank and one (1) 10,000L collection (pump) well; and
- The existing septic tank at Block 3 will be removed and replaced with one (1) 10,000L septic tank. The existing 2,700L collection (pump) well will be retained.

8.2.2 Collection and Transfer

Pre-treated wastewater generated from each amenities block will be collected in an adjacent collection (pump) well for pressure transfer to a central treatment facility (STP).

8.2.2.1 Pumps

Each collection (pump) well will be fitted with dual (duty/standby) macerating pumps with the capability to pump fine solids to the STP.

The proposed arrangement will minimise the risk of blockages and the redundancy configuration shall be automated to ensure load switching in the event of failure of each individual pump set.

The pumps will be demand (float switch) controlled, with high-level override to utilise both pumps in the event of 'peak' flow conditions. This will ensure that during high flow periods the collection (pump) wells will not exceed capacity or contingency if one pump fails.

8.2.2.2 Sewerage

The majority of the sewerage network (pipework) is proposed for replacement under the proposed OSSM upgrade for the Site. New infrastructure will include:

- Suitably-sized pressure rising mains to transfer pre-treated effluent from the collection (pump) wells at Blocks 2, 3 and 4 to the inlet of the STP;
- Replacement or realignment of the drain from Block 2 to the new 10,000L septic tank at Blocks 2 and 3; and
- Installation of a new service line to distribute effluent to the (upgraded) effluent LAA

8.2.3 STP Design

As detailed (Section 5.3), 'average' wastewater generation at the Site is expected to be ~**8,660L/day**, ranging from ~950L/day during the low-season and increasing to a maximum 'peak' of up to **66,600L/day** during the Agricultural Show or Rodeo events. Based on traditional sewer design procedure, instantaneous flow values may be ~6,000L/hour for short periods.

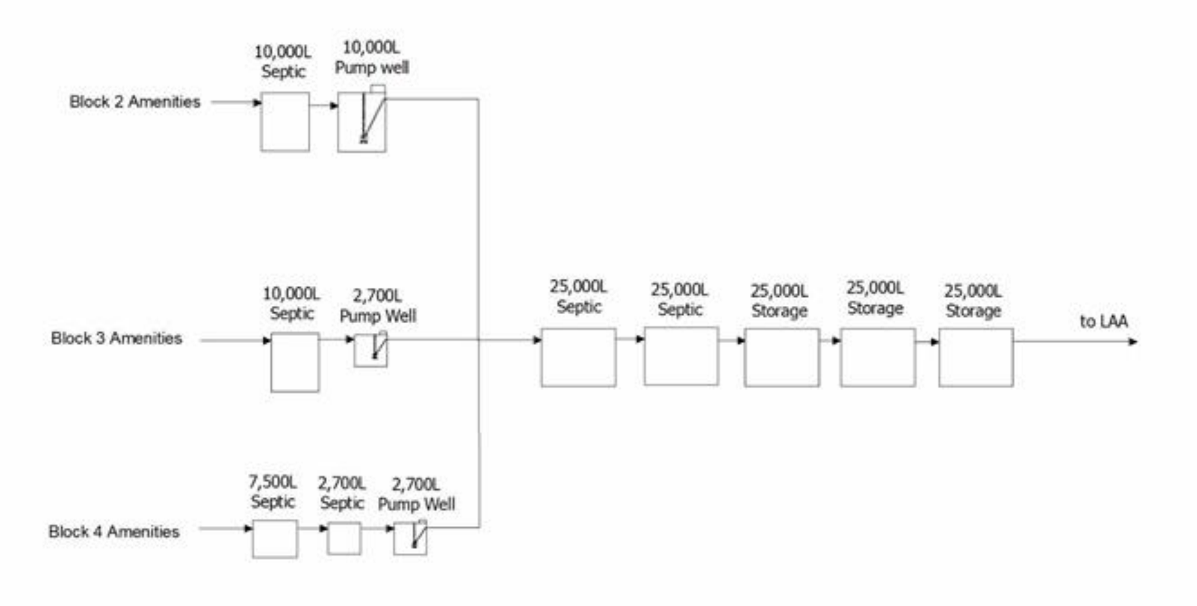
Primary treatment is aimed at the removal of dissolved and suspended organic material by a combination of physical and biological methods, including settling of solids and anaerobic microbial digestion. For effective primary treatment, it is generally accepted that the hydraulic retention time (HRT) within a treatment system should be greater than 24 hours, although this may be reduced for short periods without significant long-term impact on treatment performance.

The recommended STP design comprises the installation of additional ‘primary’ septic tanks in a centralised location to service (combined) wastewater generation from Blocks 2, 3 and 4.

W&A recommend that the size of the STP is based on achieving a (minimum) ‘primary’ treatment effluent standard to minimise the risk of long-term impact to the new LAA. Therefore, to achieve this outcome, a minimum of two (2) 25,000L septic tanks are proposed. The tanks shall be installed in-series, effectively creating a (2x) baffled 50kL primary treatment STP. The preferred location for the installation is east of the animal yards.

The exact positioning of the new tanks will depend on the local gradient and level controls and can be determined in consultation with a licensed plumber and Council prior to obtaining consent for the installation. See Figure 3, Appendix A for proposed tank locations.

The below schematic shows the proposed OSSM network design:



8.3 Treated Effluent Quality

With proposed upgrades, the existing STP is expected to reliably produce effluent of (minimum) primary standard, suitable for further treatment and dispersal within the preferred effluent land application system (absorption beds).

Parameter	Expected Effluent Quality
Biochemical Oxygen Demand	~150mg/L
Suspended Solids	~50mg/L
Faecal Coliforms	>10,000cfu/100mL
Total Phosphorus	≤15mg/L
Total Nitrogen	≤60mg/L

The listed phosphorus and nitrogen concentration values are upper limits (only) and have been adopted for nutrient balance modelling.

8.4 System Operation and Management

Successful performance of wastewater treatment systems relies on periodic monitoring and maintenance, which will be the responsibility of the Owner. The treatment systems should be serviced by a suitably qualified technician at the prescribed intervals.

8.4.1 Pump-out

W&A propose a ‘strategic’ pump-out should occur once a year just prior to the Rodeo. This is proposed as 2 (two) 20,000L[1] tanker pump-outs. One of which will empty or significantly reduce the volume within the interceptor (septic) tanks immediately outside of amenities Block 2, 3 & 4. The other 20,000L tanker will empty the caravan dump point tanks.

The ‘interceptor tanks’ outside each amenities block will experience wastewater flows throughout the year which will periodically exceed the recommended 24-hour hydraulic residence time (HRT) this is especially predicted to occur at Block 4. The sludge build up will be high in these tanks and will require more desludging than normal. By desludging before the Rodeo once a year, it is both removing solid build up within the tanks (which increases the tanks effective volume) and creates air space to be replaced with wastewater during an event day.

Adopting a ‘strategic’ pump-out approach will also remove large debris (rags, cloth etc.) from the waste stream and assist in preventing blockages of the respective pump stations for each Block.

8.5 Contingency Plan

W&A have designed the OSSM system to be able to manage a peak Holiday day as well as a peak ‘Event’ (i.e. 3-day Rodeo) with one pump-out over the year (prior to the Rodeo).

However, it should be noted that the anticipated wastewater loads are based on expected visitor numbers as outlined in Section 4. In particular, the assumed (maximum) attendance value of 5,000 visitors for large events (Rodeo and Agricultural) is critically important. If these values are likely to be exceeded, W&A recommend the development of a Contingency Plan for managing excess wastewater generation on these days.

W&A recommend the Trust seek a ‘guarantee of service’ contract with a local pump-out/vacuum truck contractor. This will ensure that sewage can be removed conveniently from the OSSM system during the Rodeo or any other future multiple day event.

9 Proposed Effluent Management

This section describes the Sites capability for effluent management and provides design details, including sizing of the required LAA. As detailed above, Primary treatment has been considered for the Site.

---

[1] *A 20,000L pump out is roughly equivalent to the daily wastewater produced from 1,000 event day visitors.*

9.1 Onsite Effluent Management Options

W&A have considered the suitability of various land application systems in relation to the identified Site and soil limitations. In determining the suitability of the various options, W&A have assessed the Site constraints and the relative environmental and public health risks associated with each.

The table below provides a summary analysis of the range of effluent land application options considered, and presents recommendation for the preferred approach to be used in conjunction with primary treatment systems on-site.

Land Application Option	Suitable	Reasoning
Absorption Trenches/Beds	Yes (With detailed design and mitigation)	Site soils within the EMA are not conducive with absorption systems. However, a suitably textured imported fill raised at a suitable height above the limiting clay layer will allow for Absorption Bed Construction within the EMA. Along with an appropriately conservative Design Loading Rate (DLR) and effluent storage allowance.
ETA Beds	Possible	While allowable, would have relatively higher construction costs and lower effluent load rate.
Mounds	Possible	Considered suitable, but discounted due to their substantial cost.
Surface Irrigation	No	Not enough EMA
Subsurface Irrigation	No	Not enough EMA

Due to limited available EMA at the Site and observed Cat 6 subsoils, a raised pressure-dosed absorption bed is the preferred effluent land application option for the Site. A description of the preferred effluent management method and (nominal) sizing are presented below.

9.2 Buffers

Buffer distances from LAAs are recommended to minimise risk to public health, maintain public amenity and protect sensitive environments. Buffer or setback distances are recommended to provide a form of mitigation against unidentified hazards and reduce potential pathways of human and environmental exposure.

The following environmental buffers are required, based on Table 6-8 of the DSC DAF (2015):

- 250m from domestic groundwater bores;
- 100m from permanent watercourses;
- 40m from intermittent watercourses and dams;
- 6m if area up-gradient and 3m if area down-gradient of driveways, swimming pools and buildings;
- 12m if area up-gradient and 6m if area down-gradient of property boundary; and
- 0.6m vertical separation from hardpan or bedrock.

All recommended buffer distances are achievable on-site, besides that to intermittent watercourses (drainage lines), as shown on the Site Plan (Appendix A, Figure 1).

9.3 Land Application Area (LAA) Sizing

Daily soil-water and nutrient balance modelling were undertaken to determine the sustainable application rate for Site soils and to estimate the necessary size of the upgraded LAA to manage the ‘design’ hydraulic and nutrient loads from the Site

9.4 Daily Modelling Overview

The Land Application Mass balance (LAM) is a Microsoft Excel based daily water, nutrient and pathogen mass balance model developed by BMT WBM for predicting the performance of OSSM systems under varying environmental conditions. The algorithms in the model have been derived from the Decentralised Sewer Model (DSM) and tailored to suit a single site application. It can assess long-term environmental and human health performance of wastewater systems.

The LAM requires a range of bio-physical parameters as inputs to determine whether a LAA option would be sustainable at the Site. The model predicts OSSM performance by simulating the movement of pollutants within the effluent load as it travels from the point source (on-site or community-scale systems) as surface or subsurface flows. The LAM does not predict the minimum area required to achieve zero surface runoff or deep drainage, instead, like the nominated area approach of the monthly water balance, the model predicts the surface and subsurface discharges based on a set of nominated conditions such as receptor sensitivity, soil, slope, climate, wastewater input and available area.

A summary of the model processes, inputs and results is provided below.

9.4.1 Model Inputs

The simulations were run for a data period of 60 years (1961-2021) and represent a conservative estimate of long-term performance based on available information and a set of assumptions as detailed.

Simulations were carried out for the preferred land application, as follows:

- Run 001 modelled flow into the LAA

Daily climate data used in the model was sourced from 'SILO Data Drill' information available through the QLD Department of Environment and Science. The adopted SILO data set uses the (FAO56) Penman-Monteith methodology to estimate reference evapotranspiration (ET_0), which is a function of both evaporation and transpiration factors, based on a specific reference crop planted in the LAA (assumes turf).

Rather than simplistic loading rates, as utilised in monthly modelling, the LAM inputs include a more detailed estimation of the soils ability to receive, store and transmit water by approximating parameters such as effective saturation, field capacity, and the infiltration exponent. Soil input data is based on Hazelton and Murphy (2007) soil data guide and soil investigations undertaken within the EMA for the Site. The proposed fill and the underlying limiting natural topsoil was used to define soil input data (moderately structured loam & light clay respectively).

Phosphorus sorption (P-sorption) data was obtained via 5-point isotherm analytical results taken from a composite soil sample collected nearby (by W&A) and analysed by an independent NATA accredited laboratory (Lanfax Laboratories Pty Ltd). For reference, a copy of the laboratory report is attached in Appendix C.

The input data sheets used in the modelling are presented in Appendix D.

9.4.2 Pollutant Attenuation Factors

Natural attenuation of excess effluent nutrient loads from a LAA will occur within the underlying soil and groundwater, providing reductions in contaminant concentrations to mitigate off-site export.

Pollutant attenuation rates for hydraulic, nitrogen and phosphorus loads are adopted from Table 10.7 in the DSC DAF Technical Manual (2015). These attenuation rates have been established through modelling undertaken in several case studies for the inland/rolling hills and coastal/estuarine regions of the LGA and depending on whether DSC prescribed setbacks are achievable.

Based on the location and soil characteristics of the property, the ‘inland / rolling hills’ catchment scenario has been adopted, with attenuation rates of 40% for hydraulics, 90% for nitrogen, 98% for phosphorus and 99% for pathogens considered appropriate based on achieving 50% of standard setbacks.

All proposed LAAs are outside the 40m buffer to intermittent watercourses and dams, compliant with Note 2 of Table 10.7 in the DSC DAF Technical Manual (2015).

9.4.3 Results and Compliance

Hydraulic and nutrient generation is divided into surplus loads discharged to the ground surface as ‘surface surcharge’ or draining below the root zone with subsequent (eventual) groundwater migration to surface water bodies or aquifers as ‘deep drainage’. The following sections outline the results of the modelling and their compliance with the required acceptance criteria.

The model was run to confirm that the proposed OSSM system can sustainably assimilate the projected wastewater loads.

Copies of all LAM inputs and output results are presented in Appendix D.

9.4.3.1 Hydraulic Loads

Modelling of the movement of water, from both applied effluent (based from the “LAA volume” column of the flow balancing spreadsheet in Appendix B) and rainfall, through the soil is a key component of the LAM. The table below presents the mean annual overflow, surface surcharge and deep drainage predicted for the 60-year modelling period.

Parameter	Run001
Run Description	60 year modelled flow
Total LAA (m^2)	1,200m^2
Surface Surcharge Frequency (days/year)	5.7
Surface Surcharge as % total WWF	2.9
Deep Drainage (mm/day)	6.11

The modelling results show that surface surcharge is not expected to occur for an average WWF day. With approximately 209 days of the year being below average and many other days being slightly higher the LAA will rarely see runoff (surcharge) frequency. During the proposed high WWF period during the rodeo, agricultural show and Christmas & Easter breaks the LAA can feasibly be dosed at **16,000L** a day (with use of balance tanks). Low effluent dose rates prior to the events will allow for sufficient drying out of the beds and the underlying soil, this will reduce the chance of surcharge.

The modelling shows that the LAA will be in danger of surcharging the most during successive high dose days over the Christmas break with slightly less chance during either the 2-day Local Show or the 3-day Rodeo. The rest of the year (~350 days) shows little to no surcharge chance. Thus, the DSC DAF (2015) requirement of 95% containment via deep drainage and evapotranspiration is achieved.

9.4.3.2 Nutrient and Pathogen Results

The following table summarises the predicted mean annual nutrient and pathogen loads generated by the LAA design and potentially released beyond the LAA footprint.

Parameter	TP (kg/yr)	TN (kg/yr)	Total Virus (MPN/L)
Deep Drainage Output	42.4	5.2	4.5
Surface Surcharge Output	1.0	0.2	N/A

LAM modelling shows that nutrient export through surface surcharge is not expected or unlikely to occur through the OSSM system. Deep drainage is the principal pathway for nutrient export for the design model run.

9.5 Effluent Flow Balancing

As shown in the graph in Appendix B the Site experiences high variability in wastewater load generation, it is common to introduce ‘flow balancing’ to ensure a more constant daily load of effluent to the Land Application Area, and to manage diurnal (daily) and seasonal fluctuations. This involves the installation of effluent storage tanks to hold excess effluent during busy periods and eliminate surge flows that can cause overloading of the LAA. It also allows for optimisation of LAA by incrementally dosing the LAA of ‘peak’ flows upon entering lower generation periods.

To determine the required size of effluent storage necessary to adequately balance the expected hydraulic loads from the Site, an 18-month flow balancing analysis was prepared (copy attached at Appendix B). The analysis is used iteratively to determine an optimal balance between effluent storage volume and LAA loading capacity, taking into consideration the variable generation volumes estimated throughout the operating year and EMA available on-site.

Based on EMA analysis in Section 6 W&A determined that 1,600m^2 of available EMA was present at the Site. A daily water balance was carried out and determined that a safe maximum loading rate onto the available EMA would equate to ~16,000L /day.

One pump-out will occur before the Rodeo (see Section 8.4.1).

Based on abovementioned information; a maximum LAA loading rate of 16,000L, a 20,000L pump-out prior to the Rodeo and predicted wastewater generation over an 18-month period (see section 5), the analysis determined that 71,436L of storage is needed at the Site to ensure that the LAA will not be overloaded.

This is rounded to **75,000L** of actual storage within flow balancing tanks. This ensures that a LAA dose rate of **16,000L/day** can be managed for high-flow periods throughout the year. Effluent storage levels within the balance tanks throughout an 18-month period are shown within the 'cumulative wastewater storage' column as well as graphically in Appendix B.

Effluent storage ensures that the LAA is not overloaded. An overloaded LAA will cause pooling or seepage which will cause damage to the soil structure resulting in the transfer of wastewater contaminants to environmentally sensitive features like the Allyn River.

9.5.1 Balance tanks

W&A propose that 75,000L of effluent storage during large events on-site will be accomplished via 3 (three) 25,000L concrete tanks (see Figure 3, Appendix A). These tanks are proposed to sit on a level pad and will be connected in a way that ensures a storage set-up which reflects the sporadic flow at the Site. An irrigation plan provided in the final approval documentation will specify how this optimization can occur.

9.6 Absorption Bed Construction

The proposed beds must be installed above the existing ground surface to achieve adequate separation from the most limiting soil horizon. The preferred arrangement comprises the construction of 6 pressure-dosed beds having dimensions of 4.0m (width), 0.3m (depth) and lengths ranging from 54-47.5m. With each bed laterally spaced at 1.5m, this arrangement equates to 1,194m^2 of LAA (1,200m^2 rounded) of bed "basal" area within the EMA. These will be constructed within a raised platform of good quality moderately to strongly-structured loam (certified to receive effluent) 1 metre high (to achieve a minimum separation of 600mm between the base of the bed and limiting soil horizon) with a 3:1 batter extending down from all sides.

The beds should be constructed in accordance with Appendix L in AS/NZS1547:2012 and the construction diagram presented as Figure 4 in Appendix A of this WMR.

The beds must be installed by a professional experienced in wastewater to ensure that effluent is distributed evenly across the entire area serviced. The finished ground surface of the beds should be slightly mounded to allow for settling to occur. The installer should also be careful to ensure that the minimum buffer distances from the LAA to property boundaries and the road are met.

9.6.1 Fill

W&A have determined that the best approach is to import clean, good-quality (Cat 3) loam fill to re-construct the raised-bed LAA. This will support a DLR (Design Loading rate) of 15 L/m^2/day (AS/NZ 1547:2012) and allow for sustainable land application of effluent during 'peak' generation periods (reducing storage requirements).

The raised bed with a 3:1 batter will need to be 1m high to adequately provide ~600mm of free draining soil from the base of the bed to the natural surface. The volume of fill required is estimated as follows:

- Main area: 1,600m^2 x 1m = 1,600m^3
- Batter: 162m [perimeter] x 1m x 3m x 0.5 = 243m^3
- Bed volume will be 0.3m x ~1,200m^2 = 360m^3
- Total: 1,600 + 243 - 360 = 1,483m^3

Therefore, the total fill required for bed construction will be 1,500m^3 (rounded)

9.6.2 Effluent dosing

A suitable effluent dosing method is via Low Pressure Effluent Dosing (LPED) lines in conjunction with a suitably sized (timer activated) external pump and automatic sequencing valves. This dosing method will provide effective distribution over the basal area of the beds while avoiding potential spot loading associated with perforated gravity distribution lines. Pressure distribution can be achieved by either drilled 25-32mm PVC pipe sleeved with 100mm slotted PVC pipe or 90mm agricultural drainage pipe. Manual flush valves (in valve box) must be fitted to the terminal end of the pressurised distribution manifold in the beds to ensure fouling of the pressure distribution laterals does not occur.

The effluent storage tanks should also be fitted with a high-water level alarm incorporating an audible (buzzer) and visual (strobe light or similar) alarm components alerting Management of an operational problem.

The land application system should be installed by a licenced plumber experienced in wastewater, ensuring that effluent is distributed evenly across the entire area serviced. The absorption beds should be constructed in accordance Figure 4 in Appendix A.

9.7 LAA Positioning

The preferred location of the LAA is identified east of the block 4 amenities. This area will be specified as a Section 88b. instrument as a prescribed effluent disposal area.

9.8 Reserve LAA

Council may require nomination of a reserve LAA in the event of future problems with the preferred land application system installed. The provision of a reserve LAA is NOT achievable within the available EMA (Figure 1, Appendix A).

10 Mitigation Measures

10.1 Soil Improvement

Given that Site soils are identified as moderately dispersive and have low phosphorus sorption capacity they may impact vegetative growth and soil stability within the LAA. These properties can combine to reduce the soils’ capacity to sustainably manage wastewater.

Prolonged application of sodium rich wastewater can exacerbate the situation. Application of calcium mineral is a recognised way of reducing the effects of soil instability. It does this by supplying calcium to the affected soil and thereby elevating calcium concentrations with respect to sodium. Added calcium will improve the soil CEC and Ca/Mg ratio, improving fertility, while reducing the potential for soil structural degradation.

Calcium in the form of gypsum is recommended to be applied on the LAA. Gypsum is only slowly soluble in water, so simply broadcasting at the surface can be of limited benefit as it can take a long time for the calcium to penetrate the soil and reach the deeper soil layers. It is therefore recommended to incorporate the amendment into the soil during construction of the land application system. This will be done by scattering the gypsum at the top surface of the natural soil before the loam fill is placed. A suitable gypsum application rate of approximately 0.5kg/m^2 should be applied.

10.2 Vegetation Establishment

Vegetation that is suited to the application of effluent, preferably with high water and nutrient requirements (such as turf) should be established over the LAAs immediately following construction. A complete vegetation cover is important to reduce the erosion hazard and optimise water and nutrient uptake. It is recommended to establish and maintain a vegetated buffer around the LAAs. It should be planted with moisture-tolerant vegetation and remain well maintained to maximise moisture uptake. Plants must be selected that will not be so large as to shade the LAAs once fully grown. It is important that the LAAs receive maximum exposure to sun and wind to maximise evapotranspiration.

To maximise assimilation of effluent-borne nutrients within the LAAs, vegetation clippings should be removed from the LAAs and mulched elsewhere on-site for use on other landscaped areas that are not used for wastewater application. Mulching clippings back onto the area from which they were cut is not recommended. An alternative is to dispose clippings in the general waste bin, or green waste bin collection service, if provided.

10.3 Water Saving Measures

To minimise wastewater generation, it is recommended that all domestic water use fixtures in each new dwelling be installed in accordance with BASIX requirements, including installation of ‘standard water reduction fittings.

Standard water reduction fixtures for internal and external water use include:

- Taps – WELS 4-star (or better) rated;
- Toilets – 4.5/3.0 litre dual flush pan and cistern;
- Showers – WELS 3-star (or better) rated; and
- Dishwashers (if used) – AAA rated using as little as 18 litres per wash.

Implementation of these measures is expected to reduce water use, and thereby wastewater generation, by as much as 10-15%.

11 Conclusions and Recommendations

This completes our assessment of the Site's capability for sustainable OSSM in relation to the W&A audit of the existing system as well as proposed developments at Gresford Showground - 29 Park Street, East Gresford, NSW and presents suitable options for OSSM servicing at the Site. Specifically, W&A recommend the following:

- Wastewater generated at the Site will be treated to a primary standard.
- The OSSM system will be upgraded and reconfigured to consolidate the treatment of wastewater servicing Block 2, 3 & 4. The proposed changes will include:
  - decommissioning of redundant tanks at Blocks 2 and 3;
  - installation of new 10,000L interceptor (septic) tanks at Blocks 2 and 3;
  - installation of a new 10,000L pump well at Block 2;
  - replacement of existing pump-sets installed in pump wells at Blocks 2, 3 and 4 to include dual macerator pump assemblies;
  - installation of 2 (two) new 25,000L septic tanks to receive all effluent generated from the 3 amenities blocks; and
  - installation of 3 (three) new flow balance tanks (totalling 75,000L) to temporarily store treated effluent prior to land application.
- Installation of a (minimum) **1,200m^2** of **raised absorption beds** is recommended and must be located within the available EMA specified to comply with adopted setbacks from surface waters, property boundaries and other improvements (NSW DLG, 1998);
- Special controls will be installed to evenly distribute effluent over the entire bed LAA with LPED dosed periodically from the effluent balance tanks via an external pump (with timed controls);
- A good quality (loam) topsoil must be imported and installed 1m high across the whole LAA to achieve a minimum separation of 600mm between the base of the bed and limiting soil horizons;
- A suitable gypsum application rate of approximately 0.5kg/m^2 should be applied at the base of the land application systems during installation;
- Vegetation must be established over the LAA immediately after installation; and
- Vehicles and grazing animals must be prevented from entering the designated LAA.

Yours Sincerely,

Ben Colautti
Environmental Consultant
Whitehead & Associates Environmental Consultants Pty Ltd

Appendix A

Figures

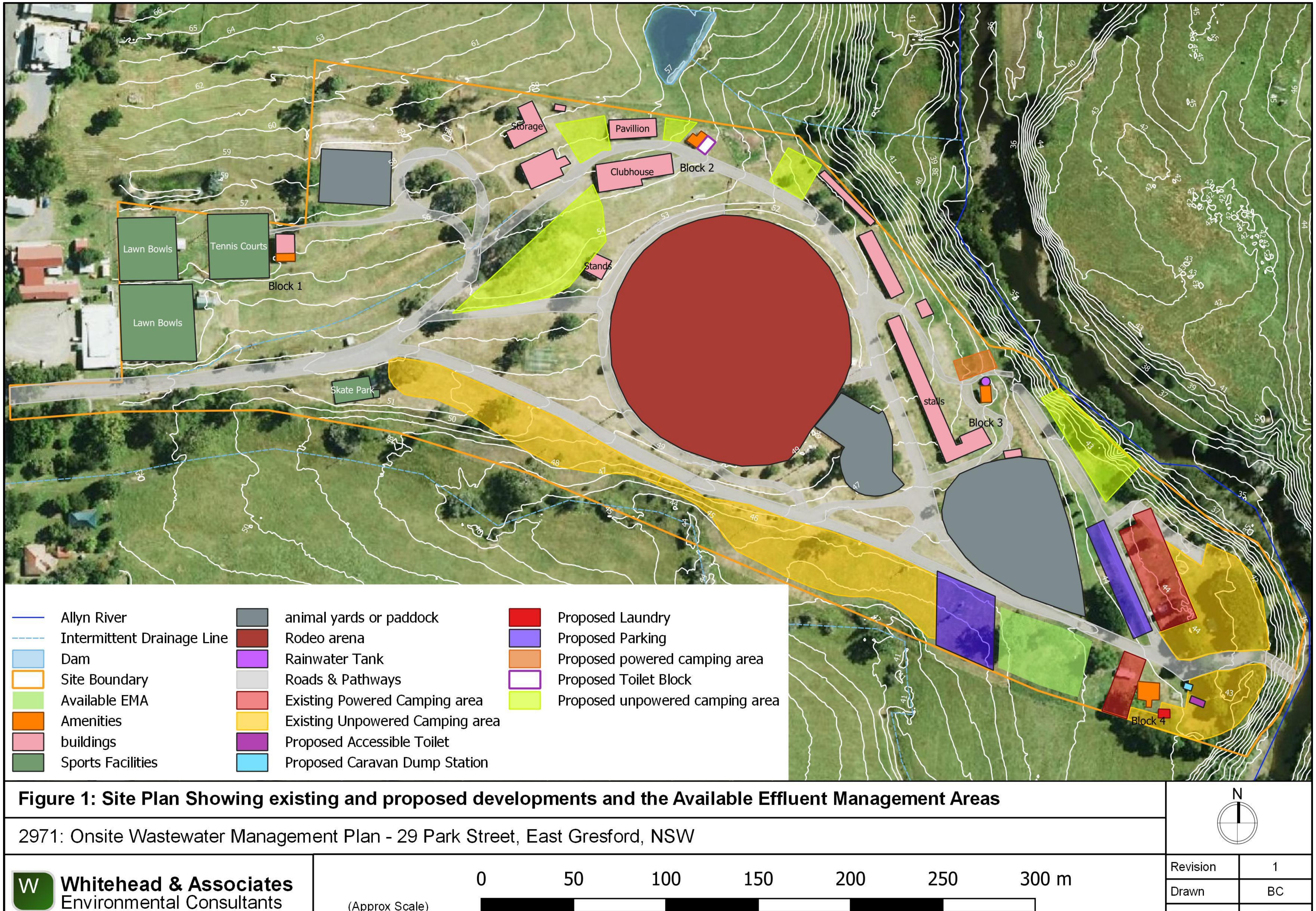


Figure 1: Site Plan Showing existing and proposed developments and the Available Effluent Management Areas

2971: Onsite Wastewater Management Plan - 29 Park Street, East Gresford, NSW

Whitehead & Associates
Environmental Consultants

Revision	1
Drawn	BC
Approved	MS

Figure 2: Site Plan Showing Existing OSSM

2971: Onsite Wastewater Management Plan - 29 Park Street, East Gresford, NSW

Whitehead & Associates
Environmental Consultants

Revision	1
Drawn	BC
Approved	MS

Figure 3: Site Plan Showing Proposed OSSM & EMA

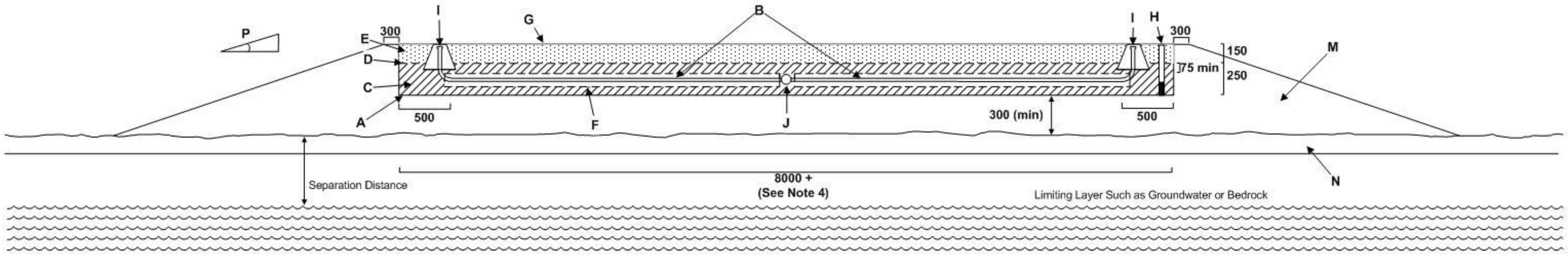
2971: Onsite Wastewater Management Plan - 29 Park Street, East Gresford, NSW

Whitehead & Associates
Environmental Consultants

(Approx Scale) 0 50 100 150 200 m

Revision	2
Drawn	BC
Approved	MS

Cross Section View



Raised Pressure Dosed Absorption Bed Construction

Note 1 The layout and dimensions used in this drawing are for general guidance only. The location, configuration and layout of individual beds will need to be determined on a site-specific basis. The purpose of this drawing is to illustrate a typical configuration and specify minimum system components.

Note 4 Consideration should be given to ensuring all beds have a level base when determining an appropriate width. The distribution manifold must also be level. Beds longer than 30m will require specialist hydraulic design.

A The base of the trench must be level to ensure even distribution of effluent. Base levels should be checked with a dumpy / laser level.

B Pressurised dosing laterals consisting of 25mm PVC pipe with 3mm holes drilled (deburred) at 400mm centres facing upwards. The total number and length of laterals will be determined by the required bed size (m^2) and the lateral spacings shown in this drawing. It is essential that effluent is distributed evenly across the distribution bed. A residual head (or squirt height) of 1.5m should be achieved across the distribution laterals. The squirt height across the laterals must be tested prior to covering with agricultural / slotted pipe, with no more than 15% variation in height observed. Consideration must also be given to static head and friction loss when sizing pumps. A full hydraulic design must be carried out.

C 20-40mm distribution aggregate.

D Geotextile filter cloth.

E Clean local or imported topsoil (sandy loam to loam).

F 90mm slotted PVC or agricultural pipe over manifold laterals.

G Grass must be established across the construction area as soon as possible. The bed surface should be slightly mounded.

H Inspection port on downhill side of bed. Made from 50mm PVC pipe with perforations in the aggregate level of the bed.

I Individual flush points for each lateral. May be a screw cap fitting on a 90 degree elbow level with the bed surface or a pressure controlled flush valve (such as those used for subsurface irrigation systems) inside an irrigation control box. Manual flushing should be carried out at least every twelve months.

J PVC or polyethylene dosing manifold. Larger systems may require different pipe sizes and orifice reducers at lateral connection points.

K Upslope stormwater diversion drain. Subsoil drainage may be necessary on particular sites.

L Pump dosed effluent from treatment system (minimum secondary treatment).

M The base of the absorption bed is to be raised to a height of 500mm above the natural ground surface (total bed height 900mm). Compaction should be minimised when installing the bed. The fill must be a sandy loam to loam with minimal clay content.

N Prepare the site by clearing all shrubs, trees and boulders. Scarify the natural soils across the entire basal area to a minimum depth of 200mm taking care not to compact the basal area in the process. This should extend to at least 1 m beyond the perimeter.

O The bed dimensions shown are an example only. The basal area of the land application area must be determined based on the load and soil characteristics of the Site. A minimum bed length to width ratio of 3:1 must be adopted when developing individual designs and beds must be installed parallel to the Site contours. The location and orientation of the area should be based on a site by a suitably qualified person. The system may comprise a single bed or preferably multiple smaller beds.

P Batter slope 1(vertical):3 (horizontal) maximum.

Plan View

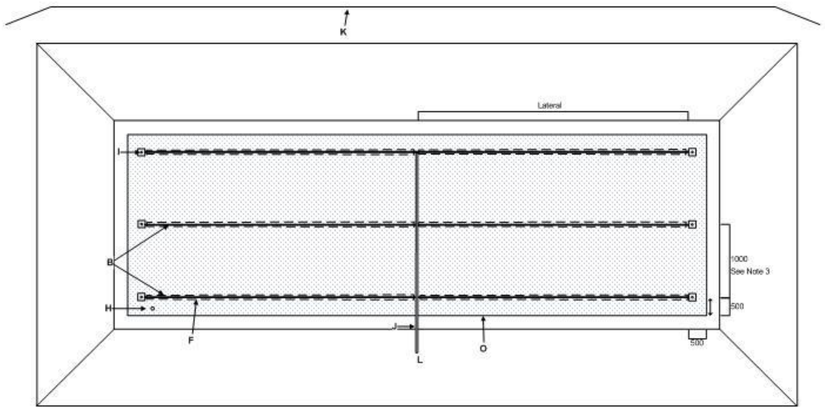


FIGURE 4

Whitehead & Associates
Environmental Consultants

Project:
Drawn:
Approved:
Scale:

Appendix B

Wastewater Generation &

Flow Balancing

OSSM 1 - Block 1

	Source	Typical Wastewater Flow Design Allowance (L/p/day)[1]	Unit	Number	Design Wastewater Flow (L/day)
Tennis Courts	Weekday	10	players	8	80
	Weekend day	10	players	20	200
	Peak day	10	players	100	1,000

Block 2, 3 & 4 (shoulder season)

	Source	Typical Wastewater Flow Design Allowance (L/p/day)[1]	Unit	Number	Design Wastewater Flow (L/day)
Skate Park	Weekday	10	Skaters	10	100
	Weekend day	10	Skaters	30	300
Pit Stop/ recreational	Weekday	10	visitor	15	150
	Weekend day	10	visitor	30	300
Camping	Powered Campers (weekday)	75	Camper	62	4,680
	Powered Campers (Weekend day)	75	Camper	124	9,300
	Unpowered Campers (weekday)	27	Camper	0	0
	Unpowered Campers (Weekend day)	27	Camper	32	864
				Design Weekday (L/d)	**4,930**
				Design Weekend day (L/d)	**10,764**

Block 2, 3 & 4 (low season)

	Source	Typical Wastewater Flow Design Allowance (L/p/day)[1]	Unit	Number	Design Wastewater Flow (L/day)
Skate Park	Weekday	10	Skaters	7	70
	Weekend day	10	Skaters	21	210
Pit Stop	Weekday	10	visitor	11	105
	Weekend day	10	visitor	21	210
Camping	Powered Campers (weekday)	75	Camper	10	780
	Powered Campers (Weekend day)	75	Camper	124	9,300
	Unpowered Campers (weekday)	27	Camper	0	0
	Unpowered Campers (Weekend day)	27	Camper	6	162
				Design Weekday (L/d)	**955**
				Design Weekend day (L/d)	**9,882**

Block 2, 3 & 4 (high season)

	Source	Typical Wastewater Flow Design Allowance (L/p/day)[1]	Unit	Number	Design Wastewater Flow (L/day)
Skate Park	Weekday	10	Skaters	13	130
	Weekend day	10	Skaters	39	390
Pit Stop	Weekday	10	visitor	20	195
	Weekend day	10	visitor	39	390
Camping	Powered Campers (weekday)	75	Camper	124	9,300
	Powered Campers (Weekend day)	75	Camper	124	9,300
	Unpowered Campers (weekday)	27	Camper	226	6,102
	Unpowered Campers (Weekend day)	27	Camper	376	10,152
				Design Weekday (L/d)	**15,727**
				Design Weekend day (L/d)	**20,232**

→ If there is effluent in the balance tank the load rate is 16000L If not, the load rate is the WW generation value for that day

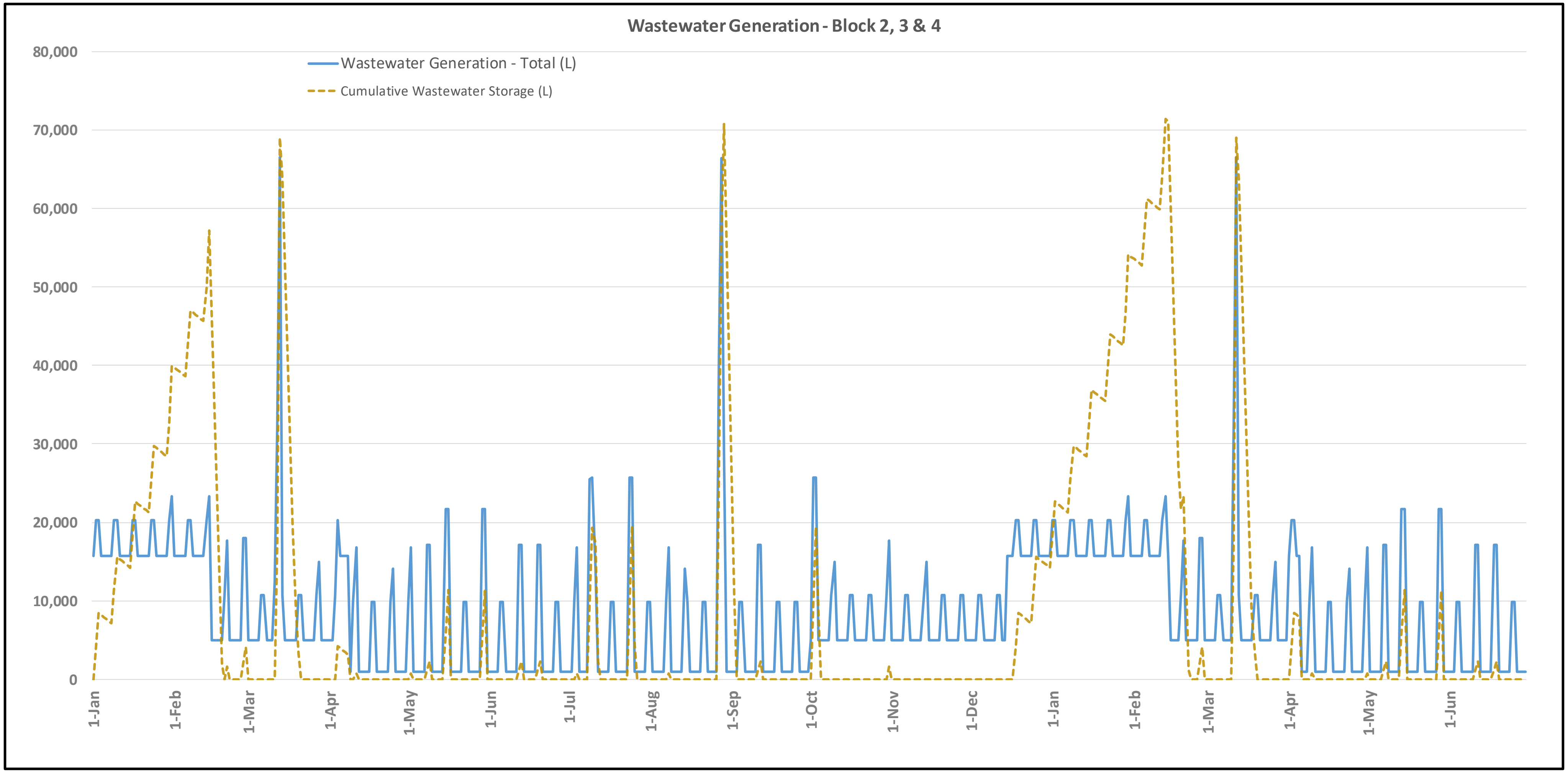
Total Pumpouts (1 year): 1

	Average	Peak
High flow period	17,100	23,330
Shoulder period	7,910	66,600
Low flow period	5,410	66,420

Date	Day	Season	Event	WASTEWATER GENERATION: Event Attendee		Non-event Camper	Total Campers on-site	Block 2	Block 3	Block 4	Wastewater Generation - Total (L)	LAA volume (L)	Stored Wastewater (L)	Stored Wastewater from Previous Day (L)	Cumulative Wastewater Storage (L)	Cumulative Storage Managed by Pumpout (L)	Pump out	Peak Day	Maximum Storage Requirement	Average daily generation (L)	
				Day Attendee	Camping Attendee							16,000					20,000	66,592	71,436	8,656	
1-Jan	friday	high		0	0	350	350	325	924	14478	15727	15,727	0	0	0	0					
2-Jan	saturday	high		0	0	500	500	780	1167	18285	20232	16,000	4,232	0	4,232	4,232					
3-Jan	sunday	high		0	0	500	500	780	1167	18285	20232	16,000	4,232	4,232	8,464	8,464					
4-Jan	monday	high		0	0	350	350	325	924	14478	15727	16,000	-273	8,464	8,191	8,191					
5-Jan	tuesday	high		0	0	350	350	325	924	14478	15727	16,000	-273	8,191	7,918	7,918					
6-Jan	wednesday	high		0	0	350	350	325	924	14478	15727	16,000	-273	7,918	7,645	7,645					
7-Jan	thursday	high		0	0	350	350	325	924	14478	15727	16,000	-273	7,645	7,372	7,372					
8-Jan	friday	high		0	0	350	350	325	924	14478	15727	16,000	-273	7,372	7,099	7,099					
9-Jan	saturday	high		0	0	500	500	780	1167	18285	20232	16,000	4,232	7,099	11,331	11,331					
10-Jan	sunday	high		0	0	500	500	780	1167	18285	20232	16,000	4,232	11,331	15,563	15,563					
11-Jan	monday	high		0	0	350	350	325	924	14478	15727	16,000	-273	15,563	15,290	15,290					
12-Jan	tuesday	high		0	0	350	350	325	924	14478	15727	16,000	-273	15,290	15,017	15,017					
13-Jan	wednesday	high		0	0	350	350	325	924	14478	15727	16,000	-273	15,017	14,744	14,744					
14-Jan	thursday	high		0	0	350	350	325	924	14478	15727	16,000	-273	14,744	14,471	14,471					
15-Jan	friday	high		0	0	350	350	325	924	14478	15727	16,000	-273	14,471	14,198	14,198					
16-Jan	saturday	high		0	0	500	500	780	1167	18285	20232	16,000	4,232	14,198	18,430	18,430					
17-Jan	sunday	high		0	0	500	500	780	1167	18285	20232	16,000	4,232	18,430	22,662	22,662					
18-Jan	monday	high		0	0	350	350	325	924	14478	15727	16,000	-273	22,662	22,389	22,389					
19-Jan	tuesday	high		0	0	350	350	325	924	14478	15727	16,000	-273	22,389	22,116	22,116					
20-Jan	wednesday	high		0	0	350	350	325	924	14478	15727	16,000	-273	22,116	21,843	21,843					
21-Jan	thursday	high		0	0	350	350	325	924	14478	15727	16,000	-273	21,843	21,570	21,570					
22-Jan	friday	high		0	0	350	350	325	924	14478	15727	16,000	-273	21,570	21,297	21,297					
23-Jan	saturday	high		0	0	500	500	780	1167	18285	20232	16,000	4,232	21,297	25,529	25,529					
24-Jan	sunday	high		0	0	500	500	780	1167	18285	20232	16,000	4,232	25,529	29,761	29,761					
25-Jan	monday	high		0	0	350	350	325	924	14478	15727	16,000	-273	29,761	29,488	29,488					
26-Jan	tuesday	high		0	0	350	350	325	924	14478	15727	16,000	-273	29,488	29,215	29,215					
27-Jan	wednesday	high		0	0	350	350	325	924	14478	15727	16,000	-273	29,215	28,942	28,942					
28-Jan	thursday	high		0	0	350	350	325	924	14478	15727	16,000	-273	28,942	28,669	28,669					
29-Jan	friday	high		0	0	350	350	325	924	14478	15727	16,000	-273	28,669	28,396	28,396					
30-Jan	saturday	high		0	0	500	500	780	1167	18285	20232	16,000	4,232	28,396	32,628	32,628					
31-Jan	sunday	high	Pony Club (PRPC) (1 d)	240	60	500	520	2693	1837	18792	23322	16,000	7,322	32,628	39,950	39,950					January
1-Feb	monday	high		0	0	350	350	325	924	14478	15727	16,000	-273	39,950	39,677	39,677					
2-Feb	tuesday	high		0	0	350	350	325	924	14478	15727	16,000	-273	39,677	39,404	39,404					
3-Feb	wednesday	high		0	0	350	350	325	924	14478	15727	16,000	-273	39,404	39,131	39,131					
4-Feb	thursday	high		0	0	350	350	325	924	14478	15727	16,000	-273	39,131	38,858	38,858					
5-Feb	friday	high		0	0	350	350	325	924	14478	15727	16,000	-273	38,858	38,585	38,585					
6-Feb	saturday	high		0	0	500	500	780	1167	18285	20232	16,000	4,232	38,585	42,817	42,817					
7-Feb	sunday	high		0	0	500	500	780	1167	18285	20232	16,000	4,232	42,817	47,049	47,049					
8-Feb	monday	high		0	0	350	350	325	924	14478	15727	16,000	-273	47,049	46,776	46,776					
9-Feb	tuesday	high		0	0	350	350	325	924	14478	15727	16,000	-273	46,776	46,503	46,503					
10-Feb	wednesday	high		0	0	350	350	325	924	14478	15727	16,000	-273	46,503	46,230	46,230					
11-Feb	thursday	high		0	0	350	350	325	924	14478	15727	16,000	-273	46,230	45,957	45,957					
12-Feb	friday	high		0	0	350	350	325	924	14478	15727	16,000	-273	45,957	45,684	45,684					
13-Feb	saturday	high		0	0	500	500	780	1167	18285	20232	16,000	4,232	45,684	49,916	49,916					
14-Feb	sunday	high	Pony Club (PRPC) (1 d)	240	60	500	520	2693	1837	18792	23322	16,000	7,322	49,916	57,238	57,238					
15-Feb	monday	Shoulder		0	0	62	62	250	281	4399	4930	16,000	-11,070	57,238	46,168	46,168					
16-Feb	tuesday	Shoulder		0	0	62	62	250	281	4399	4930	16,000	-11,070	46,168	35,098	35,098					
17-Feb	wednesday	Shoulder		0	0	62	62	250	281	4399	4930	16,000	-11,070	35,098	24,028	24,028					
18-Feb	thursday	Shoulder		0	0	62	62	250	281	4399	4930	16,000	-11,070	24,028	12,958	12,958					
19-Feb	friday	Shoulder		0	0	62	62	250	281	4399	4930	16,000	-11,070	12,958	1,888	1,888					
20-Feb	saturday	Shoulder		0	0	156	156	600	610	9554	10764	16,000	-5,236	1,888	0	0					
21-Feb	sunday	Shoulder	Dressage	400	100	156	256	3735	1817	12092	17644	16,000	1,644	0	1,644	1,644					
22-Feb	monday	Shoulder		0	0	62	62	250	281	4399	4930	16,000	-11,070	1,644	0	0					
23-Feb	tuesday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0					
24-Feb	wednesday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0					
25-Feb	thursday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0					
26-Feb	friday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0					
27-Feb	saturday	Shoulder	PRPC Zone	60	240	156	396	1185	1194	15645	18024	16,000	2,024	0	2,024	2,024					
28-Feb	sunday	Shoulder	PRPC Zone	60	240	156	396	1185	1194	15645	18024	16,000	2,024	2,024	4,048	4,048					February
1-Mar	monday	Shoulder		0	0	62	62	250	281	4399	4930	16,000	-11,070	4,048	0	0					
2-Mar	tuesday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0					
3-Mar	wednesday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0					
4-Mar	thursday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0					
5-Mar	friday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0					
6-Mar	saturday	Shoulder		0	0	156	156	600	610	9554	10764	10,764	0	0	0	0					
7-Mar	sunday	Shoulder		0	0	156	156	600	610	9554	10764	10,764	0	0	0	0					
8-Mar	monday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0					
9-Mar	tuesday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0					
10-Mar	wednesday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0					
11-Mar	thursday	Shoulder		50	150	62	212	625	826	10986	12437	12,437	0	0	0	0					
12-Mar	friday	Shoulder	Show (day 1)	1800	200	62	262	14650	5582	12255	32487	15,000	17,487	0	17,487	17,487					
13-Mar	saturday	Shoulder	Show (day 2)	4480	520	156	520	35100	12700	18792	66592	15,000	51,592	17,487	69,079	69,079					
14-Mar	sunday	Shoulder		0	0	156	156	600	610	9554	10764	16,000	-5,236	69,079	63,843	63,843					
15-Mar	monday	Shoulder		0	0	62	62	250	281	4399	4930	16,000	-11,070	63,843	52,773	52,773					
16-Mar	tuesday	Shoulder		0	0	62	62	250	281	4399	4930	16,000	-11,070	52,773	41,703	41,703					
17-Mar	wednesday	Shoulder		0	0	62	62	250	281	4399	4930	16,000	-11,070	41,703	30,633	30,633					
18-Mar	thursday	Shoulder		0	0	62	62	250	281	4399	4930	16,000	-11,070	30,633	19,563	19,563					
19-Mar	friday	Shoulder		0	0	62	62	250	281	4399	4930	16,000	-11,070	19,563	8,493	8,493					
20-Mar	saturday	Shoulder		0	0	156	156	600	610	9554	10764	16,000	-5,236	8,493	3,257	3,257					
21-Mar	sunday	Shoulder		0	0	156	156	600	610	9554	10764	16,000	-5,236	3,257	0	0					
22-Mar	monday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0					
23-Mar	tuesday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0					
24-Mar	wednesday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0					
25-Mar	thursday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0					
26-Mar	friday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0					
27-Mar	saturday	Shoulder		0	0	156	156	600	610	9554	10764	10,764	0	0	0	0					
28-Mar	sunday	Shoulder	Pony Club (PRPC) (1 d)	240	60	156	216	2513	1345	11077	14934	14,934	0	0	0	0					
29-Mar	monday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0					
30-Mar	tuesday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0					
31-Mar	wednesday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0					March
1-Apr	thursday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0					
2-Apr	friday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0					
3-Apr	saturday	Shoulder		0	0	156	156	600	610	9554	10764	10,764	0	0	0	0					
4-Apr	sunday	High		0	0	500	500	780	1167	18285	20232	16,000	4,232	0	4,232	4,232					
5-Apr	monday	High		0	0	350	350	325	924	14478	15727	16,000	-273	4,232	3,959	3,959					
6-Apr	tuesday	High		0	0	350	350	325	924	14478	15727	16,000	-273	3,959	3,686	3,686					
7-Apr	wednesday	High		0	0	350	350	325	924	14478	15727	16,000	-273	3,686	3,413	3,413					
8-Apr	thursday	High		0	0	350	350	325	924	14478	15727	16,000	-273	3,413	3,140	3,140					
9-Apr	friday	Low		0	0	10	10	175	47	733	955	16,000	-15,045	3,140	0	0					
10-Apr	saturday	Low		0	0	130	130	420	568	8894	9882	9,882	0	0	0	0					
11-Apr	sunday	Low	RFS	400	100	130	230	3555	1775	11432	16762	16,000	762	0	762	762					
12-Apr	monday	Low		0	0	10	10	175	47	733	955	16,000	-15,045	762	0	0					
13-Apr	tuesday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0					
14-Apr	wednesday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0					
15-Apr	thursday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0					
16-Apr	friday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0					
17-Apr	saturday	Low		0	0	130	130	420	568	8894	9882	9,882	0	0	0	0					
18-Apr	sunday	Low		0	0	130	130	420	568	8894	9882	9,882	0	0	0	0					
19-Apr	monday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0					
20-Apr	tuesday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0					
21-Apr	wednesday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0					
22-Apr	thursday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0					
23-Apr	friday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0					
24-Apr	saturday	Low		0	0	130	130	420	568	8894	9882	9,882	0	0	0	0					
25-Apr	sunday	Low	Pony Club (PRPC) (1 d)	240	60	130	190	2333	1302	10417	14052	14,052	0	0	0	0					
26-Apr	monday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0					
27-Apr	tuesday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0					
28-Apr	wednesday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0					
29-Apr	thursday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0					
30-Apr	friday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0					April
1-May	saturday	Low		0	0	130	130	420	568	8894	9882	9,882	0	0	0	0					
2-May	sunday	Low	Dressage	400	100	130	230	3555	1775	11432	16762	16,000	762	0	762	762					
3-May	monday	Low		0	0	10	10	175	47	733	955	16,000	-15,045	762	0	0					
4-May	tuesday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0					
5-May	wednesday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0					
6-May	thursday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0					
7-May	friday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0					
8-May	saturday	Low	Pony Club (PRPC) (2 d)	60	240	130	370	1005	1152	14985	17142	16,000	1,142	0	1,142	1,142					
9-May	sunday	Low	Pony Club (PRPC) (2 d)	60	240	130	370	1005	1152	14985	17142	16,000	1,142	1,142	2,284	2,284					
10-May	monday	Low		0	0	10	10	175	47	733	955	16,000	-15,045	2,284	0	0					
11-May	tuesday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0					
12-May	wednesday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0					
13-May	thursday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0					
14-May	friday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0					
15-May	saturday	Low	Dungog Motorcycle	100	400	130	520	1395	1525	18792	21712	16,000	5,712	0	5,712	5,712					
16-May	sunday	Low	Dungog Motorcycle	100	400	130	520	1395	1525	18792	21712	16,000	5,712	5,712	11,424	11,424					
17-May	monday	Low		0	0	10	10	175	47	733	955	16,000	-15,045	11,424	0	0					
18-May	tuesday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0					
19-May	wednesday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0					
20-May	thursday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0					
21-May	friday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0					
22-May	saturday	Low		0	0	130	130	420	568	8894	9882	9,882	0	0	0	0					
23-May	sunday	Low		0	0	130	130	420	568	8894	9882	9,882	0	0	0	0					
24-May	monday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0					
25-May	tuesday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0					
26-May	wednesday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0					
27-May	thursday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0					
28-May	friday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0					
29-May	saturday	Low	Penning	100	400	130	520	1350	1510	18792	21652	16,000	5,652	0	5,652	5,652					
30-May	sunday	Low	Penning	100	400	130	520	1350	1510	18792	21652	16,000	5,652	5,652	11,304	11,304					
31-May	monday	Low		0	0	10	10	175	47	733	955	16,000	-15,045	11,304	0	0					May
1-Jun	tuesday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0					
2-Jun	wednesday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0					
3-Jun	thursday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0					
4-Jun	friday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0					
5-Jun	saturday	Low		0	0	130	130	420	568	8894	9882	9,882	0	0	0	0					
6-Jun	sunday	Low		0	0	130	130	420	568	8894	9882	9,882	0	0	0	0					
7-Jun	monday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0					
8-Jun	tuesday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0					
9-Jun	wednesday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0					
10-Jun	thursday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0					
11-Jun	friday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0					
12-Jun	saturday	Low	Pony Club (PRPC) (2 d)	60	240	130	370	1005	1152	14985	17142	16,000	1,142	0	1,142	1,142					
13-Jun	sunday	Low	Pony Club (PRPC) (2 d)	60	240	130	370	1005	1152	14985	17142	16,000	1,142	1,142	2,284	2,284					
14-Jun	monday	Low		0	0	10	10	175	47	733	955	16,000	-15,045	2,284	0	0					
15-Jun	tuesday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0					
16-Jun	wednesday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0					
17-Jun	thursday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0					
18-Jun	friday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0					
19-Jun	saturday	Low	PRPC Zone	60	240	130	370	1005	1152	14985	17142	16,000	1,142	0	1,142	1,142					
20-Jun	sunday	Low	PRPC Zone	60	240	130	370	1005	1152	14985	17142	16,000	1,142	1,142	2,284	2,284					
21-Jun	monday	Low		0	0	10	10	175	47	733	955	16,000	-15,045	2,284	0	0					
22-Jun	tuesday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0					
23-Jun	wednesday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0					
24-Jun	thursday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0					
25-Jun	friday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0					
26-Jun	saturday	Low		0	0	130	130	420	568	8894	9882	9,882	0	0	0	0					
27-Jun	sunday	Low		0	0	130	130	420	568	8894	9882	9,882	0	0	0	0					
28-Jun	monday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0					
29-Jun	tuesday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0					
30-Jun	wednesday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0					June

1-Jul	thursday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0		
2-Jul	friday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0		
3-Jul	saturday	Low		0	0	130	130	420	568	8894	9882	9,882	0	0	0	0		
4-Jul	sunday	Low	Dressage	400	100	130	230	3555	1775	11432	16762	16,000	762	0	762	762		
5-Jul	monday	Low		0	0	10	10	175	47	733	955	16,000	-15,045	762	0	0		
6-Jul	tuesday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0		
7-Jul	wednesday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0		
8-Jul	thursday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0		
9-Jul	friday	Low	American Moto	480	520	10	520	4180	2535	18792	25507	16,000	9,507	0	9,507	9,507		
10-Jul	saturday	Low	American Moto	480	520	130	520	4425	2535	18792	25752	16,000	9,752	9,507	19,259	19,259		
11-Jul	sunday	Low	Pony Club (PRPC) (1 d)	240	60	130	190	2333	1302	10417	14052	16,000	-1,948	19,259	17,311	17,311		
12-Jul	monday	Low		0	0	10	10	175	47	733	955	16,000	-15,045	17,311	2,266	2,266		
13-Jul	tuesday	Low		0	0	10	10	175	47	733	955	16,000	-15,045	2,266	0	0		
14-Jul	wednesday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0		
15-Jul	thursday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0		
16-Jul	friday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0		
17-Jul	saturday	Low		0	0	130	130	420	568	8894	9882	9,882	0	0	0	0		
18-Jul	sunday	Low		0	0	130	130	420	568	8894	9882	9,882	0	0	0	0		
19-Jul	monday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0		
20-Jul	tuesday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0		
21-Jul	wednesday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0		
22-Jul	thursday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0		
23-Jul	friday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0		
24-Jul	saturday	Low	Mud Run	480	520	130	520	4425	2535	18792	25752	16,000	9,752	0	9,752	9,752		
25-Jul	sunday	Low	Mud Run	480	520	130	520	4425	2535	18792	25752	16,000	9,752	9,752	19,504	19,504		
26-Jul	monday	Low		0	0	10	10	175	47	733	955	16,000	-15,045	19,504	4,459	4,459		
27-Jul	tuesday	Low		0	0	10	10	175	47	733	955	16,000	-15,045	4,459	0	0		
28-Jul	wednesday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0		
29-Jul	thursday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0		
30-Jul	friday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0		
31-Jul	saturday	Low		0	0	130	130	420	568	8894	9882	9,882	0	0	0	0		**July**
1-Aug	sunday	Low		0	0	130	130	420	568	8894	9882	9,882	0	0	0	0		
2-Aug	monday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0		
3-Aug	tuesday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0		
4-Aug	wednesday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0		
5-Aug	thursday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0		
6-Aug	friday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0		
7-Aug	saturday	Low		0	0	130	130	420	568	8894	9882	9,882	0	0	0	0		
8-Aug	sunday	Low	Dressage	400	100	130	230	3555	1775	11432	16762	16,000	762	0	762	762		
9-Aug	monday	Low		0	0	10	10	175	47	733	955	16,000	-15,045	762	0	0		
10-Aug	tuesday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0		
11-Aug	wednesday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0		
12-Aug	thursday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0		
13-Aug	friday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0		
14-Aug	saturday	Low	Pony Club (PRPC) (1 d)	240	60	130	190	2333	1302	10417	14052	14,052	0	0	0	0		
15-Aug	sunday	Low		0	0	130	130	420	568	8894	9882	9,882	0	0	0	0		
16-Aug	monday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0		
17-Aug	tuesday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0		
18-Aug	wednesday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0		
19-Aug	thursday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0		
20-Aug	friday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0		
21-Aug	saturday	Low		0	0	130	130	420	568	8894	9882	9,882	0	0	0	0		
22-Aug	sunday	Low		0	0	130	130	420	568	8894	9882	9,882	0	0	0	0		
23-Aug	monday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0		
24-Aug	tuesday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0		
25-Aug	wednesday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0		
26-Aug	thursday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0		
27-Aug	friday	Low	Rodeo (day 1)	2800	200	10	200	22075	7981	10671	40727	15,000	25,727	0	25,727	5,727	1	
28-Aug	saturday	Low	Rodeo (day 2)	4480	520	130	520	34920	12700	18792	66412	15,000	51,412	5,727	57,139	57,139		
29-Aug	sunday	Low	Rodeo (day 3)	1950	50	130	100	15945	5625	7050	28620	15,000	13,620	57,139	70,759	70,759		
30-Aug	monday	Low		0	0	10	10	175	47	733	955	16,000	-15,045	70,759	55,714	55,714		
31-Aug	tuesday	Low		0	0	10	10	175	47	733	955	16,000	-15,045	55,714	40,669	40,669		**August**
1-Sep	wednesday	Low		0	0	10	10	175	47	733	955	16,000	-15,045	40,669	25,624	25,624		
2-Sep	thursday	Low		0	0	10	10	175	47	733	955	16,000	-15,045	25,624	10,579	10,579		
3-Sep	friday	Low		0	0	10	10	175	47	733	955	16,000	-15,045	10,579	0	0		
4-Sep	saturday	Low		0	0	130	130	420	568	8894	9882	9,882	0	0	0	0		
5-Sep	sunday	Low		0	0	130	130	420	568	8894	9882	9,882	0	0	0	0		
6-Sep	monday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0		
7-Sep	tuesday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0		
8-Sep	wednesday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0		
9-Sep	thursday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0		
10-Sep	friday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0		
11-Sep	saturday	Low	Pony Club (PRPC) (2 d)	60	240	130	370	1005	1152	14985	17142	16,000	1,142	0	1,142	1,142		
12-Sep	sunday	Low	Pony Club (PRPC) (2 d)	60	240	130	370	1005	1152	14985	17142	16,000	1,142	1,142	2,284	2,284		
13-Sep	monday	Low		0	0	10	10	175	47	733	955	16,000	-15,045	2,284	0	0		
14-Sep	tuesday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0		
15-Sep	wednesday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0		
16-Sep	thursday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0		
17-Sep	friday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0		
18-Sep	saturday	Low		0	0	130	130	420	568	8894	9882	9,882	0	0	0	0		
19-Sep	sunday	Low		0	0	130	130	420	568	8894	9882	9,882	0	0	0	0		
20-Sep	monday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0		
21-Sep	tuesday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0		
22-Sep	wednesday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0		
23-Sep	thursday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0		
24-Sep	friday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0		
25-Sep	saturday	Low		0	0	130	130	420	568	8894	9882	9,882	0	0	0	0		
26-Sep	sunday	Low		0	0	130	130	420	568	8894	9882	9,882	0	0	0	0		
27-Sep	monday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0		
28-Sep	tuesday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0		
29-Sep	wednesday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0		
30-Sep	thursday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0		**September**
1-Oct	friday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0		
2-Oct	saturday	Shoulder	E' Zone	480	520	156	520	4425	2475	18792	25692	16,000	9,692	0	9,692	9,692		
3-Oct	sunday	Shoulder	E' Zone	480	520	156	520	4425	2475	18792	25692	16,000	9,692	9,692	19,384	19,384		
4-Oct	monday	Shoulder		0	0	62	62	250	281	4399	4930	16,000	-11,070	19,384	8,314	8,314		
5-Oct	tuesday	Shoulder		0	0	62	62	250	281	4399	4930	16,000	-11,070	8,314	0	0		
6-Oct	wednesday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0		
7-Oct	thursday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0		
8-Oct	friday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0		
9-Oct	saturday	Shoulder		0	0	156	156	600	610	9554	10764	10,764	0	0	0	0		
10-Oct	sunday	Shoulder	Pony Club (PRPC) (1 d)	240	60	156	216	2513	1345	11077	14934	14,934	0	0	0	0		
11-Oct	monday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0		
12-Oct	tuesday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0		
13-Oct	wednesday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0		
14-Oct	thursday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0		
15-Oct	friday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0		
16-Oct	saturday	Shoulder		0	0	156	156	600	610	9554	10764	10,764	0	0	0	0		
17-Oct	sunday	Shoulder		0	0	156	156	600	610	9554	10764	10,764	0	0	0	0		
18-Oct	monday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0		
19-Oct	tuesday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0		
20-Oct	wednesday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0		
21-Oct	thursday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0		
22-Oct	friday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0		
23-Oct	saturday	Shoulder		0	0	156	156	600	610	9554	10764	10,764	0	0	0	0		
24-Oct	sunday	Shoulder		0	0	156	156	600	610	9554	10764	10,764	0	0	0	0		
25-Oct	monday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0		
26-Oct	tuesday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0		
27-Oct	wednesday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0		
28-Oct	thursday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0		
29-Oct	friday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0		
30-Oct	saturday	Shoulder		0	0	156	156	600	610	9554	10764	10,764	0	0	0	0		
31-Oct	sunday	Shoulder	Dressage	400	100	156	256	3735	1817	12092	17644	16,000	1,644	0	1,644	1,644		**October**
1-Nov	monday	Shoulder		0	0	62	62	250	281	4399	4930	16,000	-11,070	1,644	0	0		
2-Nov	tuesday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0		
3-Nov	wednesday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0		
4-Nov	thursday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0		
5-Nov	friday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0		
6-Nov	saturday	Shoulder		0	0	156	156	600	610	9554	10764	10,764	0	0	0	0		
7-Nov	sunday	Shoulder		0	0	156	156	600	610	9554	10764	10,764	0	0	0	0		
8-Nov	monday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0		
9-Nov	tuesday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0		
10-Nov	wednesday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0		
11-Nov	thursday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0		
12-Nov	friday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0		
13-Nov	saturday	Shoulder		0	0	156	156	600	610	9554	10764	10,764	0	0	0	0		
14-Nov	sunday	Shoulder	Pony Club (PRPC) (1 d)	240	60	156	216	2513	1345	11077	14934	14,934	0	0	0	0		
15-Nov	monday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0		
16-Nov	tuesday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0		
17-Nov	wednesday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0		
18-Nov	thursday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0		
19-Nov	friday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0		
20-Nov	saturday	Shoulder		0	0	156	156	600	610	9554	10764	10,764	0	0	0	0		
21-Nov	sunday	Shoulder		0	0	156	156	600	610	9554	10764	10,764	0	0	0	0		
22-Nov	monday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0		
23-Nov	tuesday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0		
24-Nov	wednesday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0		
25-Nov	thursday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0		
26-Nov	friday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0		
27-Nov	saturday	Shoulder		0	0	156	156	600	610	9554	10764	10,764	0	0	0	0		
28-Nov	sunday	Shoulder		0	0	156	156	600	610	9554	10764	10,764	0	0	0	0		
29-Nov	monday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0		
30-Nov	tuesday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0		**November**
1-Dec	wednesday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0		
2-Dec	thursday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0		
3-Dec	friday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0		
4-Dec	saturday	Shoulder		0	0	156	156	600	610	9554	10764	10,764	0	0	0	0		
5-Dec	sunday	Shoulder		0	0	156	156	600	610	9554	10764	10,764	0	0	0	0		
6-Dec	monday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0		
7-Dec	tuesday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0		
8-Dec	wednesday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0		
9-Dec	thursday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0		
10-Dec	friday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0		
11-Dec	saturday	Shoulder		0	0	156	156	600	610	9554	10764	10,764	0	0	0	0		
12-Dec	sunday	Shoulder		0	0	156	156	600	610	9554	10764	10,764	0	0	0	0		
13-Dec	monday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0		
14-Dec	tuesday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0		
15-Dec	wednesday	High		0	0	350	350	325	924	14478	15727	15,727	0	0	0	0		
16-Dec	thursday	High		0	0	350	350	325	924	14478	15727	15,727	0	0	0	0		
17-Dec	friday	High		0	0	350	350	325	924	14478	15727	15,727	0	0	0	0		
18-Dec	saturday	High		0	0	500	500	780	1167	18285	20232	16,000	4,232	0	4,232	4,232		
19-Dec	sunday	High		0	0	500	500	780	1167	18285	20232	16,000	4,232	4,232	8,464	8,464		
20-Dec	monday	High		0	0	350	350	325	924	14478	15727	16,000	-273	8,464	8,191	8,191		
21-Dec	tuesday	High		0	0	350	350	325	924	14478	15727	16,000	-273	8,191	7,918	7,918		
22-Dec	wednesday	High		0	0	350	350	325	924	14478	15727	16,000	-273	7,918	7,645	7,645		
23-Dec	thursday	High		0	0	350	350	325	924	14478	15727	16,000	-273	7,645	7,372	7,372		
24-Dec	friday	High		0	0	350	350	325	924	14478	15727	16,000	-273	7,372	7,099	7,099		
25-Dec	saturday	High		0	0	500	500	780	1167	18285	20232	16,000	4,232	7,099	11,331	11,331		
26-Dec	sunday	High		0	0	500	500	780	1167	18285	20232	16,000	4,232	11,331	15,563	15,563		
27-Dec	monday	High		0	0	350	350	325	924	14478	15727	16,000	-273	15,563	15,290	15,290		
28-Dec	tuesday	High		0	0	350	350	325	924	14478	15727	16,000	-273	15,290	15,017	15,017		
29-Dec	wednesday	High		0	0	350	350	325	924	14478	15727	16,000	-273	15,017	14,744	14,744		
30-Dec	thursday	High		0	0	350	350	325	924	14478	15727	16,000	-273	14,744	14,471	14,471		
31-Dec	friday	High		0	0	350	350	325	924	14478	15727	16,000	-273	14,471	14,198	14,198		**December**

1-Jan	saturday	High		0	0	500	500	780	1167	18285	20232	16,000	4,232	14,198	18,430	18,430	
2-Jan	sunday	High		0	0	500	500	780	1167	18285	20232	16,000	4,232	18,430	22,662	22,662	
3-Jan	monday	High		0	0	350	350	325	924	14478	15727	16,000	-273	22,662	22,389	22,389	
4-Jan	tuesday	High		0	0	350	350	325	924	14478	15727	16,000	-273	22,389	22,116	22,116	
5-Jan	wednesday	High		0	0	350	350	325	924	14478	15727	16,000	-273	22,116	21,843	21,843	
6-Jan	thursday	High		0	0	350	350	325	924	14478	15727	16,000	-273	21,843	21,570	21,570	
7-Jan	friday	High		0	0	350	350	325	924	14478	15727	16,000	-273	21,570	21,297	21,297	
8-Jan	saturday	High		0	0	500	500	780	1167	18285	20232	16,000	4,232	21,297	25,529	25,529	
9-Jan	sunday	High		0	0	500	500	780	1167	18285	20232	16,000	4,232	25,529	29,761	29,761	
10-Jan	monday	High		0	0	350	350	325	924	14478	15727	16,000	-273	29,761	29,488	29,488	
11-Jan	tuesday	High		0	0	350	350	325	924	14478	15727	16,000	-273	29,488	29,215	29,215	
12-Jan	wednesday	High		0	0	350	350	325	924	14478	15727	16,000	-273	29,215	28,942	28,942	
13-Jan	thursday	High		0	0	350	350	325	924	14478	15727	16,000	-273	28,942	28,669	28,669	
14-Jan	friday	High		0	0	350	350	325	924	14478	15727	16,000	-273	28,669	28,396	28,396	
15-Jan	saturday	High		0	0	500	500	780	1167	18285	20232	16,000	4,232	28,396	32,628	32,628	
16-Jan	sunday	High		0	0	500	500	780	1167	18285	20232	16,000	4,232	32,628	36,860	36,860	
17-Jan	monday	High		0	0	350	350	325	924	14478	15727	16,000	-273	36,860	36,587	36,587	
18-Jan	tuesday	High		0	0	350	350	325	924	14478	15727	16,000	-273	36,587	36,314	36,314	
19-Jan	wednesday	High		0	0	350	350	325	924	14478	15727	16,000	-273	36,314	36,041	36,041	
20-Jan	thursday	High		0	0	350	350	325	924	14478	15727	16,000	-273	36,041	35,768	35,768	
21-Jan	friday	High		0	0	350	350	325	924	14478	15727	16,000	-273	35,768	35,495	35,495	
22-Jan	saturday	High		0	0	500	500	780	1167	18285	20232	16,000	4,232	35,495	39,727	39,727	
23-Jan	sunday	High		0	0	500	500	780	1167	18285	20232	16,000	4,232	39,727	43,959	43,959	
24-Jan	monday	High		0	0	350	350	325	924	14478	15727	16,000	-273	43,959	43,686	43,686	
25-Jan	tuesday	High		0	0	350	350	325	924	14478	15727	16,000	-273	43,686	43,413	43,413	
26-Jan	wednesday	High		0	0	350	350	325	924	14478	15727	16,000	-273	43,413	43,140	43,140	
27-Jan	thursday	High		0	0	350	350	325	924	14478	15727	16,000	-273	43,140	42,867	42,867	
28-Jan	friday	High		0	0	350	350	325	924	14478	15727	16,000	-273	42,867	42,594	42,594	
29-Jan	saturday	High		0	0	500	500	780	1167	18285	20232	16,000	4,232	42,594	46,826	46,826	
30-Jan	sunday	High	Pony Club (PRPC) (1 d)	240	60	500	520	2693	1837	18792	23322	16,000	7,322	46,826	54,148	54,148	
31-Jan	monday	High		0	0	350	350	325	924	14478	15727	16,000	-273	54,148	53,875	53,875	January
1-Feb	tuesday	High		0	0	350	350	325	924	14478	15727	16,000	-273	53,875	53,602	53,602	
2-Feb	wednesday	High		0	0	350	350	325	924	14478	15727	16,000	-273	53,602	53,329	53,329	
3-Feb	thursday	High		0	0	350	350	325	924	14478	15727	16,000	-273	53,329	53,056	53,056	
4-Feb	friday	High		0	0	350	350	325	924	14478	15727	16,000	-273	53,056	52,783	52,783	
5-Feb	saturday	High		0	0	500	500	780	1167	18285	20232	16,000	4,232	52,783	57,015	57,015	
6-Feb	sunday	High		0	0	500	500	780	1167	18285	20232	16,000	4,232	57,015	61,247	61,247	
7-Feb	monday	High		0	0	350	350	325	924	14478	15727	16,000	-273	61,247	60,974	60,974	
8-Feb	tuesday	High		0	0	350	350	325	924	14478	15727	16,000	-273	60,974	60,701	60,701	
9-Feb	wednesday	High		0	0	350	350	325	924	14478	15727	16,000	-273	60,701	60,428	60,428	
10-Feb	thursday	High		0	0	350	350	325	924	14478	15727	16,000	-273	60,428	60,155	60,155	
11-Feb	friday	High		0	0	350	350	325	924	14478	15727	16,000	-273	60,155	59,882	59,882	
12-Feb	saturday	High		0	0	500	500	780	1167	18285	20232	16,000	4,232	59,882	64,114	64,114	
13-Feb	sunday	High	Pony Club (PRPC) (1 d)	240	60	500	520	2693	1837	18792	23322	16,000	7,322	64,114	71,436	71,436	
14-Feb	monday	High		0	0	350	350	325	924	14478	15727	16,000	-273	71,436	71,163	71,163	
15-Feb	tuesday	Shoulder		0	0	62	62	250	281	4399	4930	16,000	-11,070	71,163	60,093	60,093	
16-Feb	wednesday	Shoulder		0	0	62	62	250	281	4399	4930	16,000	-11,070	60,093	49,023	49,023	
17-Feb	thursday	Shoulder		0	0	62	62	250	281	4399	4930	16,000	-11,070	49,023	37,953	37,953	
18-Feb	friday	Shoulder		0	0	62	62	250	281	4399	4930	16,000	-11,070	37,953	26,883	26,883	
19-Feb	saturday	Shoulder		0	0	156	156	600	610	9554	10764	16,000	-5,236	26,883	21,647	21,647	
20-Feb	sunday	Shoulder	Dressage	400	100	156	256	3735	1817	12092	17644	16,000	1,644	21,647	23,291	23,291	
21-Feb	monday	Shoulder		0	0	62	62	250	281	4399	4930	16,000	-11,070	23,291	12,221	12,221	
22-Feb	tuesday	Shoulder		0	0	62	62	250	281	4399	4930	16,000	-11,070	12,221	1,151	1,151	
23-Feb	wednesday	Shoulder		0	0	62	62	250	281	4399	4930	16,000	-11,070	1,151	0	0	
24-Feb	thursday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0	
25-Feb	friday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0	
26-Feb	saturday	Shoulder	PRPC Zone	60	240	156	396	1185	1194	15645	18024	16,000	2,024	0	2,024	2,024	
27-Feb	sunday	Shoulder	PRPC Zone	60	240	156	396	1185	1194	15645	18024	16,000	2,024	2,024	4,048	4,048	
28-Feb	monday	Shoulder		0	0	62	62	250	281	4399	4930	16,000	-11,070	4,048	0	0	February
1-Mar	tuesday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0	
2-Mar	wednesday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0	
3-Mar	thursday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0	
4-Mar	friday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0	
5-Mar	saturday	Shoulder		0	0	156	156	600	610	9554	10764	10,764	0	0	0	0	
6-Mar	sunday	Shoulder		0	0	156	156	600	610	9554	10764	10,764	0	0	0	0	
7-Mar	monday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0	
8-Mar	tuesday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0	
9-Mar	wednesday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0	
10-Mar	thursday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0	
11-Mar	friday	Shoulder	Show (day 1)	1800	200	62	262	14650	5582	12255	32487	15,000	17,487	0	17,487	17,487	
12-Mar	saturday	Shoulder	Show (day 2)	4480	520	156	520	35100	12700	18792	66592	15,000	51,592	17,487	69,079	69,079	
13-Mar	sunday	Shoulder		0	0	156	156	600	610	9554	10764	16,000	-5,236	69,079	63,843	63,843	
14-Mar	monday	Shoulder		0	0	62	62	250	281	4399	4930	16,000	-11,070	63,843	52,773	52,773	
15-Mar	tuesday	Shoulder		0	0	62	62	250	281	4399	4930	16,000	-11,070	52,773	41,703	41,703	
16-Mar	wednesday	Shoulder		0	0	62	62	250	281	4399	4930	16,000	-11,070	41,703	30,633	30,633	
17-Mar	thursday	Shoulder		0	0	62	62	250	281	4399	4930	16,000	-11,070	30,633	19,563	19,563	
18-Mar	friday	Shoulder		0	0	62	62	250	281	4399	4930	16,000	-11,070	19,563	8,493	8,493	
19-Mar	saturday	Shoulder		0	0	156	156	600	610	9554	10764	16,000	-5,236	8,493	3,257	3,257	
20-Mar	sunday	Shoulder		0	0	156	156	600	610	9554	10764	16,000	-5,236	3,257	0	0	
21-Mar	monday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0	
22-Mar	tuesday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0	
23-Mar	wednesday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0	
24-Mar	thursday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0	
25-Mar	friday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0	
26-Mar	saturday	Shoulder		0	0	156	156	600	610	9554	10764	10,764	0	0	0	0	
27-Mar	sunday	Shoulder	Pony Club (PRPC) (1 d)	240	60	156	216	2513	1345	11077	14934	14,934	0	0	0	0	
28-Mar	monday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0	
29-Mar	tuesday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0	
30-Mar	wednesday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0	
31-Mar	thursday	Shoulder		0	0	62	62	250	281	4399	4930	4,930	0	0	0	0	March
1-Apr	friday	High		0	0	350	350	325	924	14478	15727	15,727	0	0	0	0	
2-Apr	saturday	High		0	0	500	500	780	1167	18285	20232	16,000	4,232	0	4,232	4,232	
3-Apr	sunday	High		0	0	500	500	780	1167	18285	20232	16,000	4,232	4,232	8,464	8,464	
4-Apr	monday	High		0	0	350	350	325	924	14478	15727	16,000	-273	8,464	8,191	8,191	
5-Apr	tuesday	High		0	0	350	350	325	924	14478	15727	16,000	-273	8,191	7,918	7,918	
6-Apr	wednesday	Low		0	0	10	10	175	47	733	955	16,000	-15,045	7,918	0	0	
7-Apr	thursday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0	
8-Apr	friday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0	
9-Apr	saturday	Low		0	0	130	130	420	568	8894	9882	9,882	0	0	0	0	
10-Apr	sunday	Low	RFS	400	100	130	230	3555	1775	11432	16762	16,000	762	0	762	762	
11-Apr	monday	Low		0	0	10	10	175	47	733	955	16,000	-15,045	762	0	0	
12-Apr	tuesday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0	
13-Apr	wednesday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0	
14-Apr	thursday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0	
15-Apr	friday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0	
16-Apr	saturday	Low		0	0	130	130	420	568	8894	9882	9,882	0	0	0	0	
17-Apr	sunday	Low		0	0	130	130	420	568	8894	9882	9,882	0	0	0	0	
18-Apr	monday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0	
19-Apr	tuesday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0	
20-Apr	wednesday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0	
21-Apr	thursday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0	
22-Apr	friday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0	
23-Apr	saturday	Low		0	0	130	130	420	568	8894	9882	9,882	0	0	0	0	
24-Apr	sunday	Low	Pony Club (PRPC) (1 d)	240	60	130	190	2333	1302	10417	14052	14,052	0	0	0	0	
25-Apr	monday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0	
26-Apr	tuesday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0	
27-Apr	wednesday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0	
28-Apr	thursday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0	
29-Apr	friday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0	
30-Apr	saturday	Low		0	0	130	130	420	568	8894	9882	9,882	0	0	0	0	April
1-May	sunday	Low	Dressage	400	100	130	230	3555	1775	11432	16762	16,000	762	0	762	762	
2-May	monday	Low		0	0	10	10	175	47	733	955	16,000	-15,045	762	0	0	
3-May	tuesday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0	
4-May	wednesday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0	
5-May	thursday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0	
6-May	friday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0	
7-May	saturday	Low	Pony Club (PRPC) (2 d)	60	240	130	370	1005	1152	14985	17142	16,000	1,142	0	1,142	1,142	
8-May	sunday	Low	Pony Club (PRPC) (2 d)	60	240	130	370	1005	1152	14985	17142	16,000	1,142	1,142	2,284	2,284	
9-May	monday	Low		0	0	10	10	175	47	733	955	16,000	-15,045	2,284	0	0	
10-May	tuesday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0	
11-May	wednesday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0	
12-May	thursday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0	
13-May	friday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0	
14-May	saturday	Low	Dungog Motorcycle	100	400	130	520	1395	1525	18792	21712	16,000	5,712	0	5,712	5,712	
15-May	sunday	Low	Dungog Motorcycle	100	400	130	520	1395	1525	18792	21712	16,000	5,712	5,712	11,424	11,424	
16-May	monday	Low		0	0	10	10	175	47	733	955	16,000	-15,045	11,424	0	0	
17-May	tuesday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0	
18-May	wednesday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0	
19-May	thursday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0	
20-May	friday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0	
21-May	saturday	Low		0	0	130	130	420	568	8894	9882	9,882	0	0	0	0	
22-May	sunday	Low		0	0	130	130	420	568	8894	9882	9,882	0	0	0	0	
23-May	monday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0	
24-May	tuesday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0	
25-May	wednesday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0	
26-May	thursday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0	
27-May	friday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0	
28-May	saturday	Low	Penning	100	400	130	520	1350	1510	18792	21652	16,000	5,652	0	5,652	5,652	
29-May	sunday	Low	Penning	100	400	130	520	1350	1510	18792	21652	16,000	5,652	5,652	11,304	11,304	
30-May	monday	Low		0	0	10	10	175	47	733	955	16,000	-15,045	11,304	0	0	
31-May	tuesday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0	May
1-Jun	wednesday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0	
2-Jun	thursday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0	
3-Jun	friday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0	
4-Jun	saturday	Low		0	0	130	130	420	568	8894	9882	9,882	0	0	0	0	
5-Jun	sunday	Low		0	0	130	130	420	568	8894	9882	9,882	0	0	0	0	
6-Jun	monday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0	
7-Jun	tuesday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0	
8-Jun	wednesday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0	
9-Jun	thursday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0	
10-Jun	friday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0	
11-Jun	saturday	Low	Pony Club (PRPC) (2 d)	60	240	130	370	1005	1152	14985	17142	16,000	1,142	0	1,142	1,142	
12-Jun	sunday	Low	Pony Club (PRPC) (2 d)	60	240	130	370	1005	1152	14985	17142	16,000	1,142	1,142	2,284	2,284	
13-Jun	monday	Low		0	0	10	10	175	47	733	955	16,000	-15,045	2,284	0	0	
14-Jun	tuesday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0	
15-Jun	wednesday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0	
16-Jun	thursday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0	
17-Jun	friday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0	
18-Jun	saturday	Low	PRPC Zone	60	240	130	370	1005	1152	14985	17142	16,000	1,142	0	1,142	1,142	
19-Jun	sunday	Low	PRPC Zone	60	240	130	370	1005	1152	14985	17142	16,000	1,142	1,142	2,284	2,284	
20-Jun	monday	Low		0	0	10	10	175	47	733	955	16,000	-15,045	2,284	0	0	
21-Jun	tuesday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0	
22-Jun	wednesday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0	
23-Jun	thursday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0	
24-Jun	friday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0	
25-Jun	saturday	Low		0	0	130	130	420	568	8894	9882	9,882	0	0	0	0	
26-Jun	sunday	Low		0	0	130	130	420	568	8894	9882	9,882	0	0	0	0	
27-Jun	monday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0	
28-Jun	tuesday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0	
29-Jun	wednesday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0	
30-Jun	thursday	Low		0	0	10	10	175	47	733	955	955	0	0	0	0	June


Wastewater Generation - Block 2, 3 & 4
Wastewater Generation - Total (L)
Cumulative Wastewater Storage (L)
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
1-Jan
1-Feb
1-Mar
1-Apr
1-May
1-Jun
1-Jul
1-Aug
1-Sep
1-Oct
1-Nov
1-Dec
1-Jan
1-Feb
1-Mar
1-Apr
1-May
1-Jun

Appendix C

Soil Borelogs and Data Summary

Whitehead & Associates
Environmental Consultants

Key to Soil Borelogs

Symbols

W	Watertable depth	●	Sample collected
X	Depth of refusal		

Moisture condition

D	Dry
SM	Slightly moist
M	Moist
VM	Very moist
W	Wet / saturated

Graphic Log and Textures

S - Sand
LS - Loamy sand
CS - Clayey sand

CL - Clay loam
SCL - Sandy clay loam
SiCL - Silty clay loam

Gravel (G)

SL - Sandy loam

LC - Light clay
SC - Sandy clay

Parent material (stiff)

L - Loam
LFS - Loam fine sandy
SiL - Silty loam

MC - Medium clay
HC - Heavy clay

Parent material (weathered)

Soil Bore Log

Whitehead & Associates
Environmental Consultants

Client:	Emma Eldridge of Gresford Park Trust	**Borehole No:**	**BH1**
Site:	Gresford Show ground; 29 Park Street, East Gresford, NSW	Excavated/logged by:	Connor Morton & Ben Colautti
Date:	28th July 2021	Excavation type:	Auger, crowbar & shovel
Notes:	- refer to site plan for position of borehole		

PROFILE DESCRIPTION

Depth (m)	Graphic Log	Sampling depth/name	Horizon	Texture	Structure	Colour	Mottles/ Gley	Coarse Fragments	Moisture Condition	Comments
0.1, 0.2, 0.3		BH1/1	A1	LC	weak	very dark grayish brown	N/A	20-50% (<200mm)	M	Large Cobble in Profile
0.4, 0.5, 0.6, 0.7, 0.8		BH1/2	B1	MC	massive	dark brown	7% orange/light brown	10-20% (<60mm)	M	cobble in profile
0.9, 1, 1.1, 1.2		Refusal on Floater								

SOIL BORE LOG

Whitehead & Associates
Environmental Consultants

Client:	Emma Eldridge of Gresford Park Trust	**Borehole No:**	**BH2**
Site:	Gresford Show ground; 29 Park Street, East Gresford, NSW	Excavated/logged by:	Connor Morton & Ben Colautti
Date:	28th July 2021	Excavation type:	Auger, crowbar & shovel
Notes:	- refer to site plan for position of borehole		

PROFILE DESCRIPTION

Depth (m)	Graphic Log	Sampling depth/name	Horizon	Texture	Structure	Colour	Mottles/ Gley	Coarse Fragments	Moisture Condition	Comments
0.1		BH2/1	A	SC	massive	brown	N/A	N/A	D	dry compacted sand. Thin layer of massive clay before bedrock
0.2										
0.3										
0.4		Refusal on Parent material (Stiff)								
0.5										
0.6										
0.7										
0.8										
0.9										
1										
1.1										
1.2										

Soil Bore Log

Whitehead & Associates
Environmental Consultants

Client:	Emma Eldridge of Gresford Park Trust	**Borehole No:**	**BH3**
Site:	Gresford Show ground; 29 Park Street, East Gresford, NSW	Excavated/logged by:	Connor Morton & Ben Colautti
Date:	28th July 2021	Excavation type:	Auger, crowbar & shovel
Notes:	- refer to site plan for position of borehole		

PROFILE DESCRIPTION

Depth (m)	Graphic Log	Sampling depth/name	Horizon	Texture	Structure	Colour	Mottles/ Gley	Coarse Fragments	Moisture Condition	Comments
0.1		BH3/1	A	SCL	weak	dark yellowish brown	N/A	20-50%	D	compacted
0.2										
0.3										
0.4		Refusal on Parent material (Weathered)								
0.5										
0.6										
0.7										
0.8										
0.9										
1										
1.1										
1.2										

Soil Sampling Schedule and Results of pH, EC and Emerson Aggregate Test Analysis												
Site	**Sample Name**	**Sample Depth** (mm)	**Texture Class**	**EAT** [1]	**Rating** [2]	**pH** $_f$ [3]	**pH** $_{1:5}$ [4]	**Rating**	**EC** $_{1:5}$ (µS/cm)	**ECe** (dS/m) [5]	**Rating**	**Other analysis** [6]
BH1	BH1/1	350	LC	3(2)	Low	n/a	6.73	Neutral	98	0.78	Non-saline	Ca, Mg, Na, K, P-Sorb, CEC & ESP
	BH1/2	850	MC	5	Low	n/a	6.78	Neutral	47	0.33	Non-saline	
	Ref		F							0.00		
BH2	BH2/1	300	SC	2(1)	Mod	n/a	6.85	Neutral	75	0.00	Non-saline	
	Ref		PM(S)							0.00		
BH3	BH3/1	350	SCL	2(1)	Mod	n/a	6.84	Neutral	83	0.00	Non-saline	
	Ref		PM(W)							0.00		

Notes:- (also refer Interpretation Sheet 1)

[1] The modified Emerson Aggregate Test (EAT) provides an indication of soil susceptibility to dispersion.

[2] Ratings describe the likely hazard associated with land application of treated wastewater.

[3] pH measured in the field using Raupac Indicator.

[4] pH measured on 1:5 soil:water suspensions using a *Hanna Combo* hand-held pH/EC/temp meter.

[5] Electrical conductivity of the saturated extract (Ece) = $EC_{1:5}$(µS/cm) x MF / 1000. Units are dS/m. MF is a soil texture multiplication factor.

[6] External laboratories used for the following analyses, if indicated:

- CEC (Cation exchange capacity)
- Psorb (Phosphorus sorption capacity)
- Bray Phosphorus
- Organic carbon
- Total nitrogen

Sheet 2 - Results of External Laboratory Analysis

Site	Name	Depth (mm)	CEC (me/100g)	Rating	Ca (mg/kg)	Rating	Mg (mg/kg)	Rating	Na (mg/kg)	Rating	K (mg/kg)	Rating	ESP (%)	Rating	P-sorp. (mg/kg)	Rating
1471_East Gresford_2015	1471	400	9.1	L	1214	M	300	M	36	L	45	VL	1.7	NS	111	H

Phone Office/Lab (02) 6775 1157

email: lanfaxlabs@bigpond.com.au
Website: http://www.lanfaxlabs.com.au
Lab address: 493 Old Inverell Road
Postal address: PO Box 4690 Armidale NSW 2350
Director: Dr Robert Patterson FIEAust, CPSS, CPAg
Soil Scientists and Environmental Engineers

Lanfax Laboratories

ABN 72 212 385 096
Quality Assurance and Quality Control by Approved Methods

5th June 2015

Whitehead & Associates
197 Main Road
Cardiff NSW 2285

Soil Report: Job No. 1471
Sample received 1st June 2015, sample date
Samples dried to 50°C, crushed and sieved to minus 2 mm prior to analysis

Whitehead & Assoc. Job 1471 27MAY15

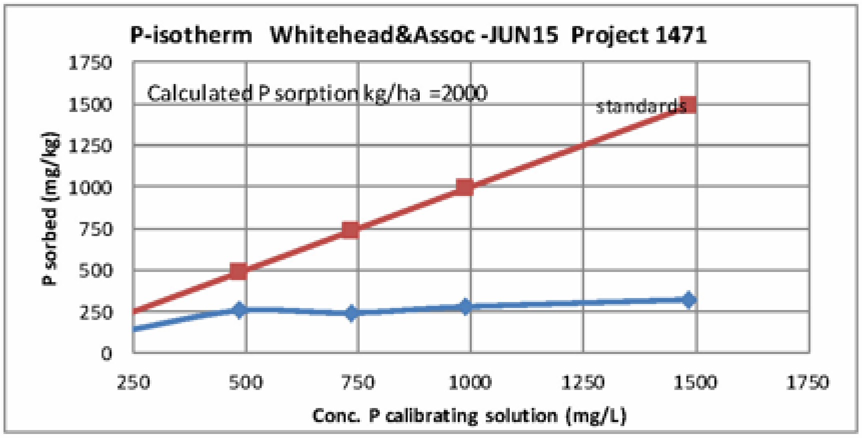
Exc.Al+ H	Ca		K		Mg		Na		Base Sat.	ESP	CEC	Ca/Mg	Site Location
cmol+/kg	mg/kg	cmol+/kg	mg/kg	cmol+/kg	mg/kg	cmol+/kg	mg/kg	cmol+/kg	%	%	cmol+/kg	ratio	Sample ID
0.3	1214	6.06	45	0.12	300	2.47	36	0.15	96.5	1.7	9.1	2.4	Whitehead & Assoc. 1471

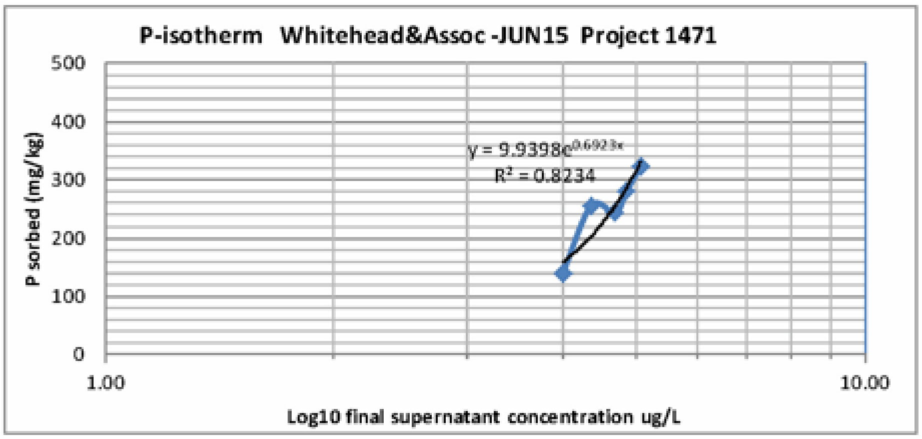
Methods: Rayment & Lyons 2011
P sorption modified method 9J1 - elevated equilibrating solutions, ICP determination of P
Cations: Method 15D3, no pretreatment
Exchangeable Acidity: Method 15G1

Yours faithfully,

R Patterson

Dr Robert Patterson FIEAust, CPSS(3), CPAg
Soil Scientist and Environmental Engineer





Percent sorbed is the proportion of the initial P sorbed during equilibration

P-isotherm Whitehead&Assoc -JUN15 Pro

Initial P mgP/L	filtrate P mg/L	sorbed P mg/kg	Sample I.D.	Percent sorbed (%)		Std line	filtrate C ugP/L	Y axis Log C	X axis
24.0	10.00	139.5	Whitehead&Assoc -JUN15	58.3		240	9999	4.00	139.5
48.7	23.09	256.2	Project 1471	52.6		487	23090	4.36	256.2
73.4	49.13	242.7		33.1		734	49133	4.69	242.7
99.0	71.00	279.8		28.3		990	70997	4.85	279.8
148.4	116.14	322.6		21.7		1484	116143	5.06	322.6

Calculated P sorption kg/ha = 2000

Appendix D

Water and Nutrient Balance Modelling

Land Application Management Tool

Run Model

Site Data	
Application Area (m^2)	1200
Land Application Type	3
Storage Type	1
Application Method	1
Storage Capacity (m^3)	0
Storage Depth (m)	0
Average Slope (%)	1
Soil Type	pa_fill
Crop Type	Default

Soil Data	Layer # (Single Layer Version) 1
Effective Saturation (mm)	414.0
Field Capacity (mm)	300.0
Permanent Wilting Point (mm)	100.0
Saturated Hydraulic Conductivity (mm/day)	1500.0
Soil Depth for P Sorption (m)	0.6
Bulk Density (kg/m^3)	1400.0
Depression Storage (mm)	0.0
Infiltration Rate (mm/day)	200.0
Infiltration Exponent	1.5
Coefficient P Sorption	79.3
Exponent P Sorption	0.30
Exponent P Desorption	0.15

Add New

Land Application and Acceptance Rates	
Storage Seepage (mm/day)	0
Fixed Application Depth (mm)	0
Soil Water Trigger (mm)	0
Additional Application Depth (mm)	0
Nitrogen Crop Uptake (kg/ha/yr)	260
Phosphorus Crop Uptake (kg/ha/yr)	30

Wastewater Characteristics

Constant Daily WWF (m^3/day)	0
Total Nitrogen (mg/L)	60
Total Phosphorus (mg/L)	15
Virus (MPN/L)	100

Use WWF timeseries instead? Yes

View Data

8.8 m^3/day

Crop Data	
January	1
February	1
March	1
April	1
May	1
June	1
July	1
August	1
September	1
October	1
November	1
December	1

Add New

Meteorological Data

View Data

Number of Years: 60.8

	R	ET	E	T
Max	221.6	9.3	16.5	35.2
Min	0.0	0.4	0.2	6.1
Average	2.5	3.4	4.0	18.0
Median	0.0	3.1	3.6	18.0
Standard Deviation	8.1	1.7	2.2	4.9

ONLY grey cells require input.

Refer to comments within cells for instructions

Land Application Management Tool

Summary of Results

View Timeseries Results

Runoff (surcharge) frequency	**5.7**	days/year
Runoff (surcharge) volume	**2.9**	% of total WWF volume
Deep drainage volume	**2675.4**	m3/yr — **6.11** mm/day
Total phosphorus load in runoff	**1.0**	kg/yr
Total nitrogen load in runoff	**0.2**	kg/yr
Total phosphorus load in deep drainage	**42.5**	kg/yr
PO4 concentration in deep drainage	**11.5**	g/cub.m
Total nitrogen load in deep drainage	**5.2**	kg/yr
NO3 concentration in deep drainage	**1.3**	g/cub.m
Total site virus load	**12423721**	MPN/yr
Total site virus concentration	**4.5**	MPN/L
Total site phosphorus load	**43.5**	kg/yr
Total site nitrogen load	**5.4**	kg/yr
Storage overflow frequency	**0**	number of years
	0.0	days/year
Storage overflow volume	**0.0**	cub.m/yr
	0.0	% of total WWF volume

Appendix E

General Notes

2021 Calendar

Calendar*pedia*
Your source for calendars

January	February	March	April	May	June
1 Fr New Year's Day	1 Mo	1 Mo	1 Th	1 Sa	1 Tu
2 Sa	2 Tu	2 Tu	2 Fr	2 Su DRESSAGE	2 We
3 Su	3 We	3 We	3 Sa	3 Mo	3 Th
4 Mo	4 Th	4 Th	4 Su	4 Tu	4 Fr
5 Tu	5 Fr	5 Fr	5 Mo	5 We	5 Sa
6 We	6 Sa	6 Sa	6 Tu	6 Th	6 Su
7 Th	7 Su	7 Su	7 We	7 Fr	7 Mo
8 Fr	8 Mo	8 Mo	8 Th	8 Sa PRPC	8 Tu
9 Sa	9 Tu	9 Tu	9 Fr	9 Su PRPC	9 We
10 Su	10 We	10 We	10 Sa	10 Mo	10 Th
11 Mo	11 Th	11 Th	11 Su Gresford RFS Exer	11 Tu	11 Fr
12 Tu	12 Fr	12 Fr GDAS SHOW	12 Mo	12 We	12 Sa PRPC
13 We	13 Sa	13 Sa GDAS SHOW	13 Tu	13 Th	13 Su PRPC
14 Th	14 Su PRPC	14 Su	14 We	14 Fr	14 Mo
15 Fr	15 Mo	15 Mo	15 Th	15 Sa Dungog Motorcycle	15 Tu
16 Sa	16 Tu	16 Tu	16 Fr	16 Su Dungog Motorcycle	16 We
17 Su	17 We	17 We	17 Sa	17 Mo	17 Th
18 Mo	18 Th	18 Th	18 Su	18 Tu	18 Fr
19 Tu	19 Fr	19 Fr	19 Mo	19 We	19 Sa PRPC Zone Day
20 We	20 Sa	20 Sa	20 Tu	20 Th	20 Su PRPC Zone Day
21 Th	21 Su DRESSAGE	21 Su	21 We	21 Fr	21 Mo
22 Fr	22 Mo	22 Mo	22 Th	22 Sa	22 Tu
23 Sa	23 Tu	23 Tu	23 Fr	23 Su	23 We
24 Su	24 We	24 We	24 Sa	24 Mo	24 Th
25 Mo	25 Th	25 Th	25 Su PRPC	25 Tu	25 Fr
26 Tu	26 Fr	26 Fr	26 Mo	26 We	26 Sa Function booked
27 We	27 Sa PRPC ZONE	27 Sa	27 Tu	27 Th	27 Su
28 Th	28 Su PRPC ZONE	28 Su PRPC	28 We	28 Fr	28 Mo
29 Fr		29 Mo	29 Th	29 Sa *PENNING tbc*	29 Tu
30 Sa		30 Tu	30 Fr	30 Su *PENNING tbc*	30 We
31 Su PRPC		31 We		31 Mo	

2021 Calendar

July		August		September		October		November		December	
1 Th		1 Su		1 We		1 Fr		1 Mo		1 We	
2 Fr		2 Mo		2 Th		2 Sa	E' ZONE TBC	2 Tu		2 Th	
3 Sa		3 Tu		3 Fr		3 Su	E' ZONE TBC	3 We		3 Fr	
4 Su	DRESSAGE	4 We		4 Sa		4 Mo		4 Th		4 Sa	
5 Mo		5 Th		5 Su		5 Tu		5 Fr		5 Su	
6 Tu		6 Fr		6 Mo		6 We		6 Sa		6 Mo	
7 We		7 Sa		7 Tu		7 Th		7 Su		7 Tu	
8 Th		8 Su	DRESSAGE	8 We		8 Fr		8 Mo		8 We	
9 Fr	American Motor Cyc	9 Mo		9 Th		9 Sa		9 Tu		9 Th	
10 Sa	American Motor Cyc	10 Tu		10 Fr		10 Su	PRPC	10 We		10 Fr	
11 Su	PRPC	11 We		11 Sa	PRPC	11 Mo		11 Th		11 Sa	
12 Mo		12 Th		12 Su	PRPC	12 Tu		12 Fr		12 Su	
13 Tu		13 Fr		13 Mo		13 We		13 Sa		13 Mo	
14 We		14 Sa	PRPC	14 Tu		14 Th		14 Su	PRPC	14 Tu	
15 Th		15 Su		15 We		15 Fr		15 Mo		15 We	
16 Fr		16 Mo		16 Th		16 Sa		16 Tu		16 Th	
17 Sa		17 Tu		17 Fr		17 Su		17 We		17 Fr	
18 Su		18 We		18 Sa		18 Mo		18 Th		18 Sa	
19 Mo		19 Th		19 Su		19 Tu		19 Fr		19 Su	
20 Tu		20 Fr		20 Mo		20 We		20 Sa		20 Mo	
21 We		21 Sa		21 Tu		21 Th		21 Su		21 Tu	
22 Th		22 Su		22 We		22 Fr		22 Mo		22 We	
23 Fr		23 Mo		23 Th		23 Sa		23 Tu		23 Th	
24 Sa	Mud Run TBC	24 Tu		24 Fr		24 Su		24 We		24 Fr	
25 Su	Mud Run TBC	25 We		25 Sa		25 Mo		25 Th		25 Sa	Christmas Day
26 Mo		26 Th		26 Su		26 Tu		26 Fr		26 Su	
27 Tu		27 Fr	RODEO	27 Mo		27 We		27 Sa		27 Mo	
28 We		28 Sa	RODEO	28 Tu		28 Th		28 Su		28 Tu	
29 Th		29 Su	RODEO	29 We		29 Fr		29 Mo		29 We	
30 Fr		30 Mo		30 Th		30 Sa		30 Tu		30 Th	
31 Sa		31 Tu				31 Su	DRESSAGE			31 Fr	New Year's D. (obs.

Soil Physical Properties / Chemistry

pH

This test is used to determine the acidity or alkalinity of native soils. pH is measured on a scale of 0 to 14, with 7 being neutral. Results below 7 are considered acid, while those above 7 are alkaline. For land application of effluent, soil with a pH of 4.5 to 8.5 should typically pose no constraints. Soil pH affects the solubility and fixation of some nutrients; this in turn reduces soil fertility and plant growth. By correcting soil pH beneficial plant growth is improved, assisting in the assimilation of nutrient and improving evapotranspiration of effluent. Most Australian soils are naturally acidic.

Electrical Conductivity

Electrical conductivity (EC) is a measure of a soil or soil/water extracts ability to conduct an electrical current. It is used as an indirect measure of a soil's accumulation of water-soluble salts, mainly of sodium, with minor potassium, calcium and magnesium. High EC within a land application area reflects general soil salinity and is undesirable for vegetation growth. The tolerance of vegetation species to soil salinity varies among plant types. Typically, EC readings of <4dS/m pose no constraints. There are a number of measures available to counter high soil EC values for land application of effluent; however, the most important measure relates to the conservative selection of application rates and appropriate application area sizing.

Emerson Aggregate Test

The Emerson Aggregate Test (EAT) is a measure of soil dispersibility and susceptibility to erosion and structural degradation. It assesses the physical changes that occur in a single ped of soil when immersed in water, specifically whether the soil slakes and falls apart or disperses and clouds the water. Dispersive soils pose limitations to on-site sewage management because of the potential loss of soil structure when effluent is applied. Soil pores can become smaller or completely blocked, causing a decrease in soil permeability, which can lead to system failure.

Cation Exchange Capacity

The cation exchange capacity (CEC) is the capacity of the soil to hold and exchange cations (positively charged molecules). Because some soils have a dominant negative charge, they can adsorb cations. Soils bind cations such as calcium, magnesium, potassium and sodium, preventing them from being leached from the soil profile and making them available as plant nutrients. CEC is a major controlling agent for soil structural stability, nutrient availability for plants and the soils' reaction to fertilisers and other ameliorants. A CEC of greater than 15 cmol+/kg or me/100g is recommended for land application systems. Adding organic matter (compost/humus) to soil can greatly increase its CEC.

Exchangeable Sodium Percentage

The exchangeable sodium percentage (ESP) is an important indicator of soil sodicity, which affects soil structural stability and overall susceptibility to dispersion. Sodic soils tend to have a low infiltration capability, low hydraulic conductivity, and a high susceptibility to erosion. When sodium dominates the exchangeable cation complex, soil structural stability declines significantly. Soil ESP is considered acceptable for effluent application areas when it is below 5%, marginal between 5% – 10% and limiting >10%. The ESP of application area soils can be improved by the measured application of calcium (lime/gypsum).

Phosphorus Sorption Capacity

Phosphorus sorption (P-sorption) capacity is a direct measure of a soils ability to adsorb phosphorus. Phosphorus is an important plant nutrient and is the limiting available nutrient in many aquatic environments. Excess phosphorus can increase the production of nuisance vegetative growth such as algae. The P-sorption capacity of the soil in an effluent application area relates to its ability to assimilate the phosphorus in the wastewater for the design life of the application area. P-sorption values greater than 400mg/kg is considered acceptable for land application of effluent, while values below 150mg/kg present a constraint.