# GRASS FIELD MAINTENANCE

Guide to sports field surface quality and maintenance


FOOTBALL WEST

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# Contents






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## Introduction

Football is a sport that uses a round ball, and is played predominantly on the ground. The quality of the football experience is therefore directly related to the quality of the playing surface, and in 99% of cases, that means the quality of the grass field on which the game is played.

This Grass Field Maintenance Guide is an invaluable document for all football clubs and/or associations seeking to keep their playing surfaces in the best possible condition while achieving that goal cost efficiently.

Many clubs rely on their local councils for maintenance of their grounds and it is strongly advised clubs establish and stay in close communication with their relevant councils to remain proactive in the treatment of the soil and grass which can preserve the playing surface and save a lot of money in the long run.

Adverse weather, which can cause the postponement or cancellation of games and training due to the deterioration of the surface, are conditions all football clubs have to contend with but with a dedicated plan it is possible to reduce the incidence of forced cancellations and maintain a quality playing surface.

This Guide allows clubs and councils to stay a step ahead of the game with a 12 month plan that anticipates potential problems and gives clear advice about the correct timing and type of maintenance that permits stakeholders to achieve best practice outcomes.

High traffic on limited playing spaces is a problem faced by many football clubs however with diligent soil and grass treatment, combined with judicious use of grounds, playing fields can be better maintained, avoiding expensive returfing and top dressing.

It is Football Wests responsibility to continue to develop the game and a key part of that role is to help clubs and associations throughout the state to sustain grass playing fields in the best condition possible.

The following document, compiled by Football West, FNSW Facilities and Advocacy Unit in association with Turf Agronomist David Worrad B.Sc. Agr, is an easy-to-read, practical guide to grass field maintenance.

## Aim

Directed at the community football club utilizing local government grounds this guide aims to:

- Help focus discussion between clubs and local government on realistic expectations of surface quality relative to intensity of usage
- Define the key maintenance activities that influence surface quality
- Provide a guide to seasonal activities and costing to optimize surface quality

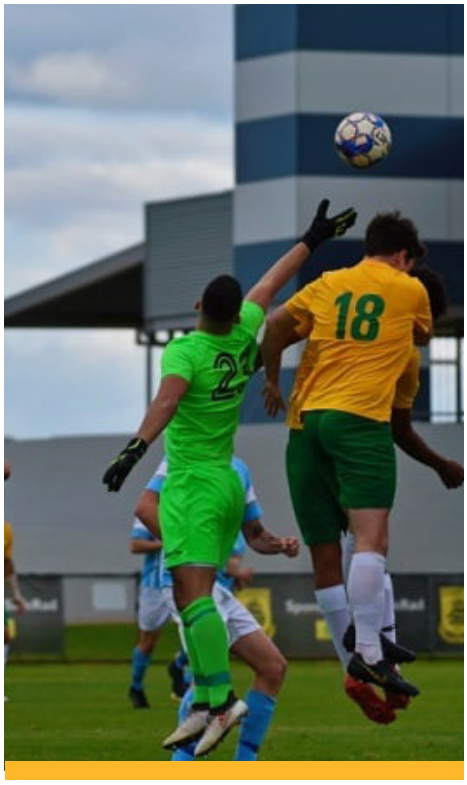
For a playing field to provide a safe, well grassed winter surface a number of key activities must be undertaken from spring i.e. immediately after the season concludes. The success with which these activities are implemented will have a significant correlation to the quality of surface with which you enter the first game of a new season. Financial resources available to dedicate to playing field maintenance will directly impact surface quality. The amount of usage thereafter will dictate how long that surface quality is retained. Deterioration of the playing surface can increase hardness and decrease traction making the surface unsafe for play.

## Soil testing and nutrition

Sports fields should have a soil test in winter to check pH and nutrient levels. If deficiencies are identified the required treatment can be exactly calculated and this should be applied during spring renovation. Deficiencies can act like a hand brake on spring regeneration, slowing recovery and not allowing the turf to reach its full potential. Local governments have access to independent, quality assured laboratories to conduct the necessary tests.

If amendment materials e.g. lime, gypsum and dolomite are required then the surface should be aerated either just before or after their application. It is critical such amendments have every opportunity to move into the soil profile.

Fertilizer can then be applied to stimulate spring regrowth. The best value is gained by making spring applications, usually twice 4-6 weeks apart, to maximize the speed of surface recovery from winter wear. If funds are limited, fertilizing can be limited to the wear corridors down the field. There are numerous brands and qualities of product which can be used. Ideally though they should be based on controlled release nitrogen which tends to stimulate shoot growth rather than wasteful, excessive leaf growth. Summer fertilizing can be minimized if good surface recovery occurs. Damage is caused by scalping of excess leaf growth. However if a playing field is intensively used regular fertilizing may be required throughout the entire year in an attempt to match growth to wear. Therefore a field can require anywhere between 2 to 10 fertilizer applications in a 12 month



period to achieve suitable surface quality.

In a value for money sense amendments and fertilizer provide the greatest "bang for your buck" costing only $7.00 - $10.00 per 100sq.m. applied.

## Watering requirements

Turf requires adequate amounts of water to fully utilize applied nutrients and hence to grow strongly. The science of irrigation systems and water supply will not be addressed here however fields without a good quality, well designed irrigation system and / or with limited water supply are severely restricted in the surface quality they can achieve. There are numerous irrigation design, installation and auditing companies in NSW.

For optimum spring recovery from winter wear, soils should be kept at "field capacity", approximately 15-20% soil moisture. Excess soil moisture creates anaerobic conditions that damages root systems, creates disease and wastes money. Low soil moisture creates wilting, reduces wear tolerance, impedes growth and makes the playing surface harder and less stable.

During periods of water restrictions good turf coverage reduces moisture loss from the soil. Additionally specialist soil wetting agents ensure optimum water use efficiency.

## Use of Wetting Agents

Wetting agents have become an integral 'tool' in turf management. During times of water restrictions or extended periods of water stress to turf, playing field profiles can become hydrophobic or 'water repellent'. It is during these times where valuable water is lost due to run-off or evaporation.

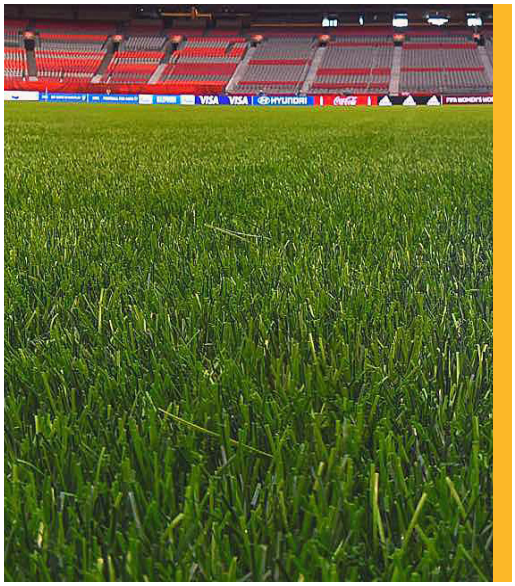
Wetting agents come in a liquid or granular form and assist in providing water penetration and uniform distribution of water into the root zone. Regular applications will help prevent soils becoming dry and therefore becoming very difficult to re-wet. Such products will significantly increase water holding capacity of soil therefore reducing the quantity and frequency of irrigation.

Being safe to the turf surface, some of these products will not be activated until it is watered in with sufficient irrigation or rainfall to deliver it to the rootzone.

When laying new playing fields, turf underlay fertilisers with slow release Nitrogen and an added moisture retaining crystal element are now available. These products aid in water retention, nutrition and provide soil amendment qualities while increasing the rate of establishment during the early grow in stages. Perhaps the most critical time when it comes to protecting your clubs investment.

## Turf species selection and winter oversowing

In most of WA the choice of turf is either couchgrass (Cynodon spp) or kikuyu (Pennisetum clandestinum). There are 2 clear camps of opinion on which provides the better turf surface. Kikuyu is faster growing so recovers more quickly in spring through lateral stem growth. Kikuyu though has lower wear tolerance and loses leaf cover more rapidly in winter. Couch produces rhizomes, underground stems, which enable it to maintain a presence in the soil in winter longer than kikuyu. As a result couch surfaces in winter tend to have poorer colour but are more stable and hold the surface level for longer. Couchgrass fields require less spring returfing than an equally maintained and used kikuyu fields. Nearly all high profile venues are couchgrass while most amenity sports fields are kikuyu.



There are many new varieties of couch available. All vary in their colour, texture and growth characteristics. But all require adequate nutrition, irrigation, aeration and weed control to provide a suitable quality surface. The choice of turf is less important than the level of maintenance the field receives.

In autumn sports fields can be oversown with a winter active turf seed, usually ryegrass. Applied at 300-500kg/ha the ryegrass germinates in 7-10 days and provides a playable surface in approximately 4 weeks. Throughout winter ryegrass provides an attractive green appearance, helps stabilize the surface through its fibrous root structure and also dries the surface following excess rainfall. As with couch and kikuyu, ryegrass is susceptible to wear from usage so can also be worn away and killed if wear is high enough. It also requires regular fertilizer applications to keep it growing throughout winter. Apart from its susceptibility to wear, the other major drawback of ryegrass is its damaging impact on the underlying couch or kikuyu. Spring and summer recovery of couch and kikuyu is negatively impacted by ryegrass. If a field is oversown with a rye variety allowance in field use must be made for a longer spring recovery.

## Renovation – aeration / returfing / topdressing / drainage

Sports fields surfaces become compacted from use. Not only can this make the surface hard and potentially dangerous but a compacted surface inhibits turf growth. Regular aeration softens the surface, allows air and moisture movement into the soil and promotes healthy turf growth. Aeration of a playing surface in spring is critical to encouraging spring recovery. There are numerous types of equipment available including Vertidrain, Earthquake , Aeravator etc. It would be nearly impossible to aerate too often providing the field has adequate irrigation. In spring turf needs time to repair and it is critical heavily used fields in winter are allowed time to recovery turf density in spring.

The most expensive recurring turf maintenance activities are returfing and topdressing. When a surface is used to the extent that its stems are worn away then a number of cascading impacts follow. Critically these negatively impact surface playing quality and safety. When stems are removed the surface starts being worn away and depressions begin to appear. These areas, being devoid of turf, become very hard and present safety concerns both from physical harm and potential infection of abrasions. In spring these areas are slowest to recover and may require returfing. Topdressing may also be necessary to fill the depressions and restore a flat surface. In a value for money sense returfing is by far the most expensive and least rewarding activity in turf maintenance. Additionally new turf requires more watering and fertilizer, takes many weeks to establish and is the most susceptible part of a field to damage the following winter. Maintaining a sustainable sports field playing surface requires usage to be managed so that returfing and topdressing are not required. Funds required to keep a good surface are then drastically reduced, money which

could be channeled into better nutrition and weed control thus leading to a better quality surface.

Most local government sports fields have a loam to clay loam texture. As mentioned above such profiles are easily compacted and percolation of water through the profile is very slow. In these fields major damage is inflicted by usage after a significant rain event. Local government often close fields after rain in an attempt to preserve the playing surface. Sodden fields are more easily damaged leading more quickly into the problems detailed above. Drainage systems can be installed in situ that incorporate a cross linked sand / gravel matrix that channel rainwater from the surface to either irrigation tanks or stormwater. Removal of surface water allows fields to be in play much more quickly after rainfall events and help greatly reduce surface damage from playing on a wet surface. Such drainage systems cost approximately $60,000 per hectare with a limited number of companies capable of providing a quality product.

## Mowing

A prime characteristic of good quality turf is high stem density. Such surfaces provide better ball bounce and roll, better traction, less surface hardness and uniform appearance. Mowing plays a key role in improving stem density. Ideally turf is mown regularly enough to prevent scalping i.e. excessive clipping removal. Mowing height is also important. While elite venues can sustain lower cutting heights the average local sports field would be cut at 25-40mm depending on play requirement. Cutting too high creates excess thatch while cutting too low stresses the turf. Rainfall during summer can accelerate turf growth beyond the capacity for mowing to keep pace. At these times a turf growth regulator, Primo Maxx, can be sprayed. Primo slows leaf growth and tightens the stems to improve density. Primo makes good turf better.

## Pest management

Turf quality can be reduced when insect and disease attack occurs. Additionally annual weeds which germinate in spring and autumn compete with turf for ground coverage. Insect, weed and disease control is particularly complex. Controlling these problems requires expert, qualified technicians as there are significant regulatory requirements regarding pesticide recommendation, purchase and application.

## Weeds

There are a wide range of weeds of turf. The most concerning for sports field maintenance are:

### Crabgrass (Eleusine indica)

Germinates in early spring thus competing strongly for ground coverage when the couch / kikuyu is recovering from winter. This is now the major weed problem in sports field turf. Post emergent control is very difficult, especially in kikuyu. Pre emergent herbicides must be applied in late August to stop the weed seed emerging. Usually a follow up application is required in November / December provided the field will not be oversown with rye in autumn because the pre emergent will stop rye germinating.

### Summer grass (Digitaria sanguinalis)

Also germinates in spring and poses the same threat as crabgrass. Different chemistry is required for post emergent control. The same pre emergent controls summer grass and crabgrass.

### Crowsfoot (Eleusine tristachya)

An increasingly troublesome weed because it is very difficult to control with herbicides.

### Various broadleaf weeds

There are many species of broadleaf that tend to germinate through autumn and winter. Bindii and White Clover

are most common and require control because of seed sting and attraction of bees. There are many other weeds including Capeweed, Dandelion and Lamb's Tongue. All broadleaf weeds compete with the turf for water, nutrients and ground cover so should be controlled earlier than later. Spraying to control these weeds should commence from July.

## Insects

Sports turf is susceptible to attack by a number of insect pests. Insects eat either the leaf or root matter of turf thereby reducing vigour which can lead to death. Even if the turf does not die it is weakened and then exhibits drought stress symptoms and becomes easily damaged from play. There are a few species that require control if a high quality playing surface is to be achieved.


### Argentinian Scarab (Cyclocephala signaticollis)

This scarab species is highly damaging and probably becoming the major insect pest of turf in WA. Signs of infestation are seen from February as birds rip up turf to eat the larvae which are feeding on the root system. Bird damage can devastate the playing surface leaving poor quality turf leading into winter. Control is limited with only Acelepryn insecticide providing reliable control however it must be applied in September - October as a preventive application. Curative control of Argentinian Scarab is ineffective.

### African Black Beetle (Heteronychus arator)

To the naked eye this scarab looks very similar to the Argentinian Scarab. It is however a problem in turf from October to January but tends not to attract the damage seen with Argentinian Scarab. Control is also required with preventive application in September – October.

### Billbug (Spenophorus brunipennis)

This weevil insect is a problem again from October to December, then again to a lesser extent from February to April. Damage is very obvious as dead looking clumps of turf can be easily picked away from the ground with thumb and forefinger. The cream coloured larvae can often be found just underneath. As for the other pests a September to October insecticide application controls this insect.

### Mites

These are a growing pest problem in sports turf, almost unheard of 15 year ago, now most sports fields have some degree of infestation. There are many different species affecting many different turf species. Control is very difficult and requires a detailed strategy involving nutrition and various miticides.

There are other less significant insect pests such as cutworms, mole crickets etc.

## Diseases

Sport turf is rarely affected by diseases to the extent that treatment is required. Kikuyu can get a leaf spotting disease which can be associated with mite infestation. Couch can also get a leaf disease in autumn following ongoing rainfall. Elite sports fields based on a sand construction can get a winter disease called Spring Dead Spot. Usually the turf can naturally grow out of the problem with an additional fertilizer application.

## Activity cost summary

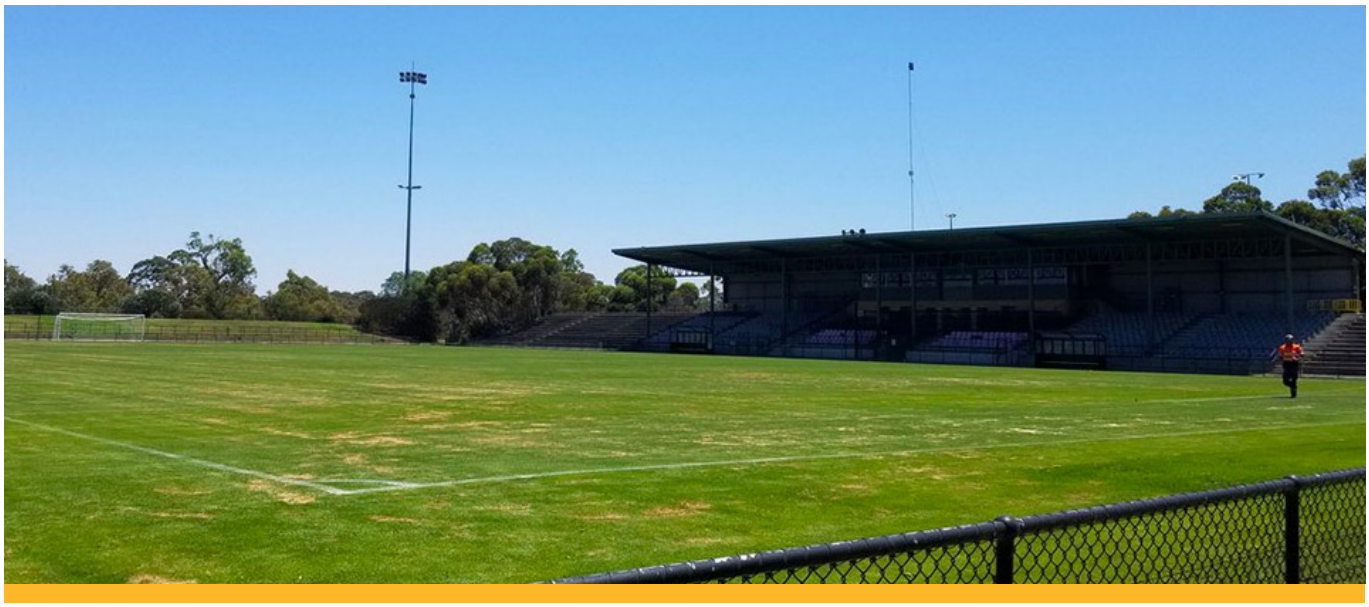
The table below provides a rough guide to the cost for various maintenance activities in sports field management. Importantly it is interesting to see the relative cost of each and relate this to managing surface damage. It is clear that you should spend more on a detailed maintenance program to reduce the amount of returfing and topdressing required in Spring.

| ACTIVITY | COST / 100SQ.M. | TIME UNTIL AVAILABLE FOR PLAY |
|---|---|---|
| Fertilising (applied) | $7 - $10 | One day |
| Amendments (from soil test) | $4 - $9 | One day |
| Aeration | $10 - $12 | Immediately |
| Oversowing program | $35 - $50 | Two weeks |
| Topdressing | $40 - $55 | Two to three days |
| Returfing | $700 - $1000 | Two weeks |
| Pre emergent herbicide | $0.50 - $20 | Follow label directions |
| Insecticide | $1 - $10 | Follow label directions |

| SPORTS FIELD RANK | APPLIED NITROGEN (KG N/HA/YEAR) | EXPENDITURE* ($ '000/HA/YEAR) |
|---|---|---|
| 1st grade or priority school | 2.8 - 5.0 | 20 - 25 |
| 2nd Division | 1.5 - 2.6 | 13 - 17 |
| All purpose Council priority sports field | 1.0 - 2.0 | 5 - 7 |
| Amenity park for informal sports use | 0.5 - 0.9 | 1 - 3 |

**fertiliser, pesticide, wetting agents, seed*

The table above provides a surface quality expectation for varying maintenance budgets.



# Basic maintenance program

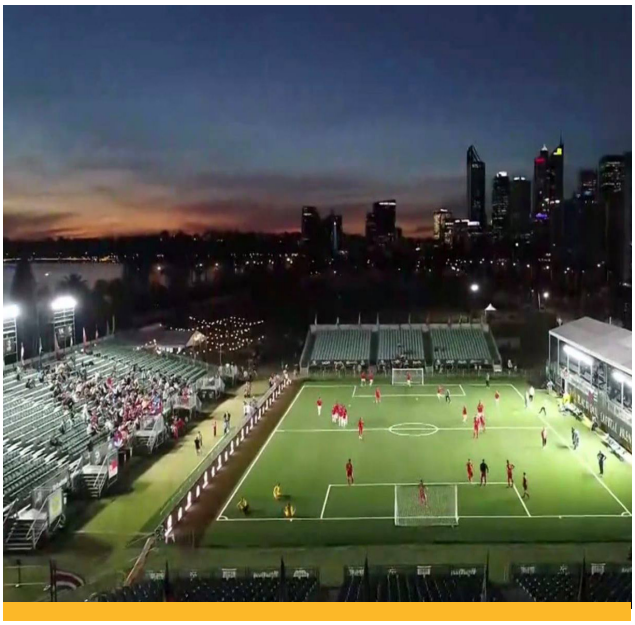
This is an example of a 12 month plan that covers most of the basic activities in maintaining a mid level local government sports field of 8000sq.m. Clearly each site is different in regard soil type, drainage, irrigation capacity, maintenance budget etc. Additional expenditure would see more aeration and fertilizer applications while a program to oversow ryegrass will cost approximately $5,000 / ha. Expert advice should be sought to ensure the right plan is constructed for your particular site.

| WEEK MONTH | DESCRIPTION | COMMENTS | N | P | K | Mg | S | Fe | KG's REQ | UNIT SIZE | UNITS REQ | RATE / 100 M2 | N/100 | UNIT PRICE | APPL' COST |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| July | SOIL TEST | Check soil chemistry and recommend possible amendments | | | | | | | | | 1 | | | $130 | $130 |
| August | Broadleaf weed control | Clover, bindii etc | | | | | | | 5 | 10 | 0.5 | 0.0500 | | $190 | $95 |
| | Pre emergent grass weed control | Summer grass and crabgrass | | | | | | | 2 | 5 | 0.4 | 0.0200 | | $250 | $100 |
| September | Renovation / aeration | Vertidrain | | | | | | | | | | | | | |
| | Magprill / Calciprill | as per soil test recommendations | | | | | | | 1000 | 20 | 50.0 | 10.0 | | $18 | $900 |
| | Uflexx | Low burn, controlled release Nitrogen fertiliser | 46 | 0 | 0 | | | | 100 | 22.7 | 4.4 | 1.00 | 0.46 | $65 | $286 |
| | Returf as required | | | | | | | | | | | | | | |
| | MP Terramaxx | Under new turf for quick establishment | | | | | | | | | | | | | |
| Early October | Acelepryn | Systemic insecticide application for control of scarab grub populations, applied with wetting agent to aid penetration and extend longevity of dry patch control | | | | | | | 1.5 | 0.75 | 2.0 | 0.015 | | $425 | $850 |
| | Tricure AD | | | | | | | | 15.0 | 10 | 1.5 | 0.15 | | $320 | $480 |
| October | Couchmaster | Low burn, controlled release Nitrogen fertiliser | 23 | 1 | 12 | | | | 250 | 22.7 | 11.0 | 2.50 | 0.58 | $55 | $606 |
| December | Granular wetting agent | Maintain soil moisture and allow percolation of rainfall | | | | | | | 200 | 20 | 10.0 | 2.00 | 0.00 | $90 | $900 |
| Christmas | Primo Maxx | Growth management | | | | | | | 2.5 | 5 | 0.5 | 0.0250 | | $265 | $133 |
| February | Couchmaxx | Controlled release fertiliser with 2% iron for immediate colour response - supplied and applied. | 24 | 1 | 8 | 1.0 | 5.0 | 1.5 | 200 | 22.7 | 8.8 | 2.00 | 0.48 | $85 | $749 |
| | Primo Maxx | Growth management and turf density | | | | | | | 2.5 | 5 | 0.5 | 0.0250 | | $265 | $133 |
| March | Primo Maxx | Growth management and turf density | | | | | | | 2.5 | 5 | 0.5 | 0.0250 | | $265 | $133 |
| March | Oversowing Caravelle ryegrass and Starter fertiliser | | | | | | | | 700 | 25 | 28 | 7 | 0.50 | $130 | $3,640 |
| | Subdue Maxx | Pythium protection for rye seedlings | | | | | | | 4 | 1 | 3.5 | 0.035 | | $255 | $893 |
| | Meridian | Seeding enhancement | | | | | | | 1 | 1 | 0.8 | 0.008 | | $70 | $56 |
| | MP Roots | Apply over the top of the rye seed for seedling nutrition | 5 | 5 | 3 | | | | 60 | 20 | 3.0 | 0.6 | | $160 | $480 |
| April | NX Gold | | 29 | 0 | 8 | | | | 180 | 22.7 | 8 | 1.8 | 0.52 | $42 | $333 |
| | | | | | | | | | | | | | | **Totals:** | **$10,895** |

## Carrying capacity

This term relates to the amount of usage a field can sustain before initial damage occurs and when irreparable damage follows. There has been considerable research into calculating effective hours of use and relating this standard calculation to field condition. Local government have been provided detailed reports which assist in predicting playing field condition. Carrying capacity varies by field depending on the surface quality. In very simple terms though we can say that when usage exceeds 25 hours per week by 20-30 adults over one hectare on kikuyu and 35 hours per week on couch the playing surface will be damaged to the extent that major renovation and probably returfing will be required. There appears to be something of a tipping point in the cost of maintenance when surface damage requires returfing and topdressing.





# Key Australian Contacts

| | |
|---|---|
| **Football West**<br>Jamie Harnwell<br>Chief Football Officer<br>Building 14, Former PMH Site, Subiaco, WA, 6008<br>Mobile: 0404 178 067<br>Phone: (08) 6323 8419 | **Football NSW**<br>Daniel Ristic<br>Manager - Government Relations, Funding and Infrastructure<br>235-257 Meurants Lane, Glenwood NSW 2153<br>Mobile: 0402 511 777<br>Phone: (02) 8814 4451<br>danielr@footballfacilities.com.au<br>www.footballnsw.com.au |
| **Living Turf**<br>David Worrad B.Sc.Agr<br>Turf Agronomist<br>P: 0407 800 100<br>dworrad@livingturf.com<br>www.livingturf.com | |

To provide Clubs and Associations with opportunities to obtain further information and advice on the matters addressed in this Guide, Football West has identified the above suggested contacts. These are, however, suggested contacts only and their inclusion in this Guide should not be taken to suggest that Football West endorses or recommends any specific organisation.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