



2/28/11

Jeff Gault  
Operations Division Manager  
City Of San Ramon  
5000 Crow Canyon Rd  
San Ramon, CA 94582

RE: PRZ Sports Field Overview Assessment  
Athlan Downs, San Ramon Sports Park & Central Park Sports Fields

Jeff:

Thank you for choosing our PRZ Sports Field Assessment for these facilities. We have designed this system to help you achieve sustainable turf on your sports fields. Using this tool will help you and PRZ to fine-tune your prescribed program and solve problems from season to season.

You have experienced what every major city and school district in the United States has experienced in the past 12-15 years-the explosion of soccer! Nationally, soccer play has grown 60% faster than the population in most areas. It is the reason that every baseball field outfield is a soccer field and why every park with open spaces has become a soccer field and none of your fields were ever designed to take this kind of wear.

**There is a direct correlation between sports field wear and sports field maintenance!** During this same 12-15 years that usage has grown this much, most fields were still being maintained at the level they were when fields were dedicated fields (one sport and when that season was over, the field was rested or allowed to mend). In many cases during this same period budgets and maintenance crews have been reduced while the acreage of turf has grown.

This difference between wear and maintenance equals unsustainable turf. **Also the specification that is still being used to build your new fields today is 50 years old and will guarantee failure on a multipurpose field in 2 years or less!**

This report is for only 3 sites and the recommendations that we are making here are if you just use them for these 3 sites. If you were to expand this report to all of your sites, the recommendations can change dramatically from site to site but you would know exactly what to do field by field, site by site and citywide.

Here is what we found at these sites:

1. You have high wear over all but because of your very good maintenance practices, particularly top dressing and aeration you do not have the poor field grades or compaction levels we see in nearly all assessments we do.
2. Your maintenance- there is a direct correlation between your wear level on your fields and your maintenance level. Your wear level on these fields is an average of 4.38 on a scale of 1-5, 5 being the highest wear. Your maintenance level on these fields is an average of 3.64, 5 being the highest. **Although your maintenance level is a very good compared to most cities that we do these assessments for (maintenance level 1 or less is the norm)** this difference between your wear level and your maintenance level has created sustainability problems on some of the highest wear areas of the fields.

3. You have reclaimed water that was rated by the lab as “Poor Quality Irrigation Water” because of the high chlorides, bicarbonates, alkalinity, sodium and dissolved solids. When this water is applied to heavy clay soils such as you have at San Ramon Sports Park and Athan Downs, the clay holds onto the sodium and it accumulates in the soil until little water can penetrate it thus killing the turf.
4. We found wet squishy and saturated root-zones on nearly all fields except the two sand based fields at Central Park and the sand channel drained field at Athan Downs. We found these conditions in January during your down time for play but if these conditions continue when play resumes in March, these fields will be damaged.
5. We found that your water costs are high and in some cases usage was high also but one thing stands out is the number of man-hours you are to having spend maintaining your irrigation systems. Your irrigation systems at all of these sites have good coverage and this is unusual compared to what we normally see in our assessments so there is probably a direct correlation between the number of hours you are spending and the good coverage of your irrigation systems.

We are recommending that you:

1. Slightly increase your maintenance level. This would mean changing to a fertigation program to increase wear-ability & save water and adding additional maintenance tasks. We are also recommending the monthly application of a Primo growth regulator type product that will cut your mowing in half yet give you faster mending turf.
2. Consider renovating lighted Central Park Soccer field #1 which is a poor wear tolerant sports field to a high wear tolerant amended turf with a high-tech drain system in it at a savings of \$800,000 to \$1,000,000 over an artificial turf field.
3. Consider adding a slit drain system to the high clay fields at these sites to protect them from the saturated soils during play on the fields. The Koro system runs approximately \$1.10 per square foot and perhaps the savings from the artificial turf in recommendation #2 could be used to accomplish this.
4. Make sure that all new fields are “**Designed from a Maintenance Point of View**”- our invention and one of our specialties. PRZ stands for Prescription Root Zone and this would mean that each field is engineered for the stabilization, percolation, soil chemistry and soil microbiology that will be required for a field to tolerate the wear you say you will be putting on it under your growing conditions (weather, soils etc).
5. Over-seed with a newer proven variety mix of Hybrid Kentucky Blue grasses and Texas Hybrid Blue grasses that will dramatically increase the wear tolerance of these fields, end up saving you 1/3<sup>rd</sup> on your water usage, germinate very quickly for quick re-establishment, and tolerate some shade (marine layer) better than your current varieties.
6. Purchase some new pieces or larger equipment that will either fill in a gap in your maintenance program or make your employees more productive.
7. You must continue to schedule time off on the fields for *Major Annual Turf Renovation* but this needs to occur during the best recovery time for your grasses. The ideal time for your microclimate for this resting and renovation time would be from 5/1-7/30 as these are warmer months and the turf can heal faster. It is important to use these words rather than turf maintenance to insure that the user groups understand the importance of this time and are not allowed to infringe on it for any reason! This should be placed on everybody’s calendar a year in advance including City council and the Park board so this infringement can’t happen. *Major Annual Turf Renovation* equals sustainable turf is how this should be presented.

8. We just walked and evaluated some sports fields in Australia that have had the KISSSS subsurface irrigation system in them for up to 12 years under very similar wear and soil conditions to what we see in our assessments in the US. The savings in water usage, irrigation parts and manpower was amazing and when we plugged in this system to your sites, discovered that installing this system in these fields would save you approximately \$60,000 annually in water cost, \$318,000 in manpower costs, \$6,000 in irrigation parts and 33% on the recommended fertilization costs. We will have more details later in this report. This would mean a less than 8 year payback while dramatically reducing your costs.

**These recommendations can be expensive but the following report will also detail ideas that can offset the increased costs. We will show you how to get the biggest bang for your maintenance buck!**

This report is only the beginning. We are here to help implement any plans that we all develop together. We will help you implement the maintenance recommendations with your maintenance crews.

Our initial fees cover us through the finishing of this report. If some of these recommendations become goals, we would need to write a specification that would be combined with your Sports Field Landscape Architect's to allow you to bid out the renovation costs. This would involve our Sports Field Design Services and we can give you a quote for this service. Any further conference calls or changes or questions that need to be answered concerning this report, are covered in our initial fees through 2011. Any trips for presenting to boards, committees or users groups or for implementing maintenance ideas with the crews would be at our site visit rate.

After your review and comments, we will make any needed changes to this report, and send a hard copy along with the laminated copies of the maintenance calendars.

The following report identifies in detail the issues we found and how to address them.

Sincerely,



Larry Musser  
President

## Field Overview Assessment City of San Ramon Sports Fields

The following is an evaluation of these Sports Fields as of January, 2011. It discusses the current condition of these fields and explains why they are in these conditions. It will then go over a plan of action that can help to remedy any problems and cover the maintenance steps, needed equipment, and costs of maintaining these fields to prevent them from returning to their original condition. This document will then show the level of wear on the fields and how many hours of play per week each field can sustain and still have viable turf.

### Current Conditions of the fields

You, Glenn and I walked and evaluated the designated fields. To have sustainable turf long term, you need 8"-10" of roots and as indicated in the chart below, nearly all of yours are shallower than this. You have some bare and worn areas which result directly in low spots as well. There are several things that stand out in this survey. First is the lack of compaction (the #1 problem in turf management) and secondly the "Good" level for irrigation and field grade. These are very unusual and indicate that your maintenance is well above average. All of these fields had experienced heavy rain for weeks prior to our visiting them. We found saturated, squishy root-zones on most of the clay fields but the sand based fields at Central Park and the sand channel drained field at Athan Downs all were very stable.

INITIAL SITE SURVEY

SITE	Root	Field	% Bare	%	Compacted	Irrigation	% Worn	High/Low	Wet/Dry
	Depth	Grade	Spots	Weeds	Areas %	System	Areas	Spots	Spots
CP Soccer #1	2.00	Good	10%	X		Good	5%		
CP Soccer #2	2.00	Good	10%			Good	5%		
CP Soccer #3,#4	5.00	Good	10%			Good	10%		
CP Baseball #5	7.00	Good	2%			Good	5%		X
Lucky A's Field #1	3.50	Good				Good			
Athan Downs Fields #2,3, 4	3.50	Good	8%	POA		Good	2%	X	X
Athan Downs Field #1	3.50	Good	3%	POA		Good	3%		
San Ramon Sports Park	4.00	Good	1%			Good	1%	Goal Mouths	Goal Mouths

### The Causes of the Current Conditions

1. **Wear** has led to most of the current problems on these fields. Your wear is the greatest contributor to compacted soils and the resulting damage to your turf. The Wear Index In Hours Per Week table on the next page shows that these fields have an average of **64.6** activity-weighted hours of play per week. This is a category average **4.38** wear level. The amount of play is scaled into levels 1-5, 5 being the highest and there is a direct correlation between wear and maintenance.

## WEAR INDEX IN HOURS PER WEEK

SITE	Sq. Ft	Weeks	Activity	Maint.
			#	Weighted
			Hours/ Wk	Category
CP Soccer #1	80000	36	74.5	5.00
CP Soccer #2	80000	36	58.8	4.00
CP Soccer #3,#4	244000	36	81.0	5.00
CP Baseball #5	41720	36	56.5	4.00
Lucky A's Field #1	77000	36	60.8	4.50
Athan Downs Fields #2,3, 4	355600	36	59.9	4.00
Athan Downs Field #1	80000	36	56.4	4.00
San Ramon Sports Park	217800	36	69.3	4.50
<b>Totals/ Averages</b>	1176120	36	64.6	4.38

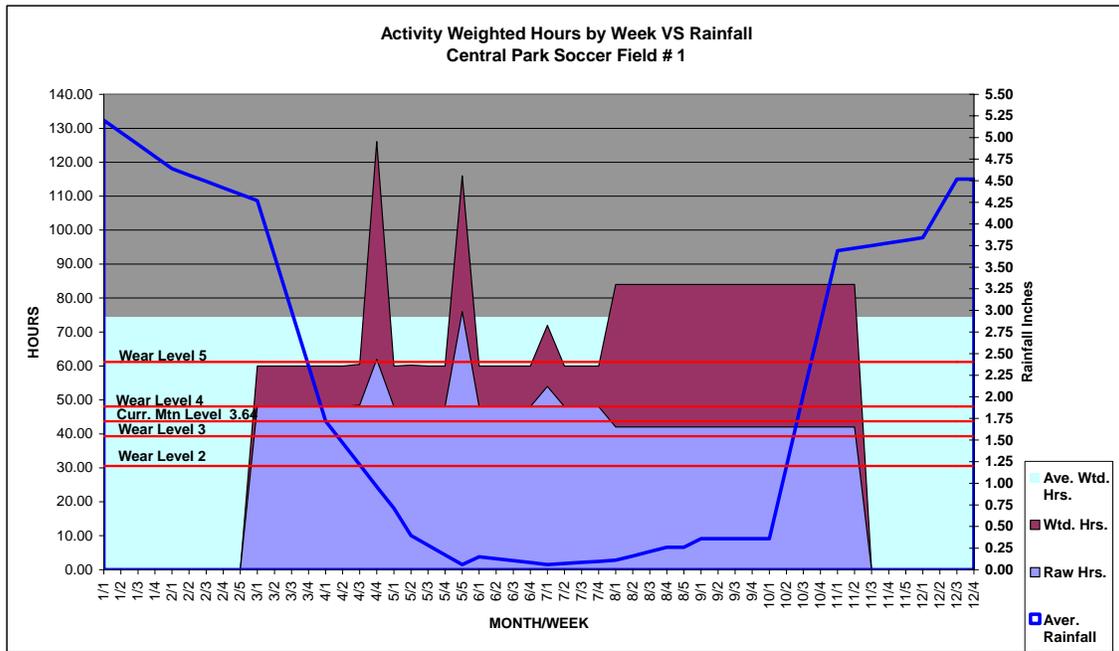
The following Activity Weighting Scale chart below shows the wear effect of each of the different sports and common activities that take place on sports fields. As you can see walking across a field is 1 and soccer practices are 2, meaning 1 hour of soccer practice is equivalent to 2 hours of walking or standing on the field. Also note that any sports clinics carry a 2.5 rating which helps to explain the damage that can result from a weekend clinic.

### Activity Weighting Scale

<b>Walking on field/Softball</b>	<b>1.00</b>
<b>Baseball</b>	<b>1.25</b>
<b>PE</b>	<b>1.50</b>
<b>Parked Cars</b>	<b>1.50</b>
<b>Marching Band</b>	<b>1.75</b>
<b>Soccer Games</b>	<b>1.85</b>
<b>Football Games</b>	<b>1.85</b>
<b>Soccer &amp; Football Practices</b>	<b>2.00</b>
<b>Adult Soccer &amp; Football Games</b>	<b>2.13</b>
<b>Adult Soccer &amp; Football Practice</b>	<b>2.25</b>
<b>Lacrosse &amp; Field Hockey</b>	<b>2.25</b>
<b>Rugby</b>	<b>2.50</b>
<b>Sports Clinics</b>	<b>2.50</b>

Note the chart below titled Activity Weighted Hours by Week for Central Park Soccer Field #1. The light blue area indicates actual hours on the field. The magenta area represents the activity weighted hours on this field and the light green area represents the average activity weighted hours for the year. The heaviest wear on this field takes place in April and again in May (approximately 110-120 activity weighted hours per week). The dark blue line represents rainfall and your highest rainfall occurs just outside your heavier wear periods from November through March.

The play that occurs during these rainier months causes the most compaction and thus damaged turf. It will be critical that we insure that we have the proper drainage and strive to reduce play in these peak rainfall times (field shut down for so many hours after the rain has subsided so they are not playing on saturated root zone) to insure sustainability. At various times during the year, the wear level fluctuates and the maintenance functions must also follow these fluctuations.



**2. The Current Maintenance Level of the Fields**

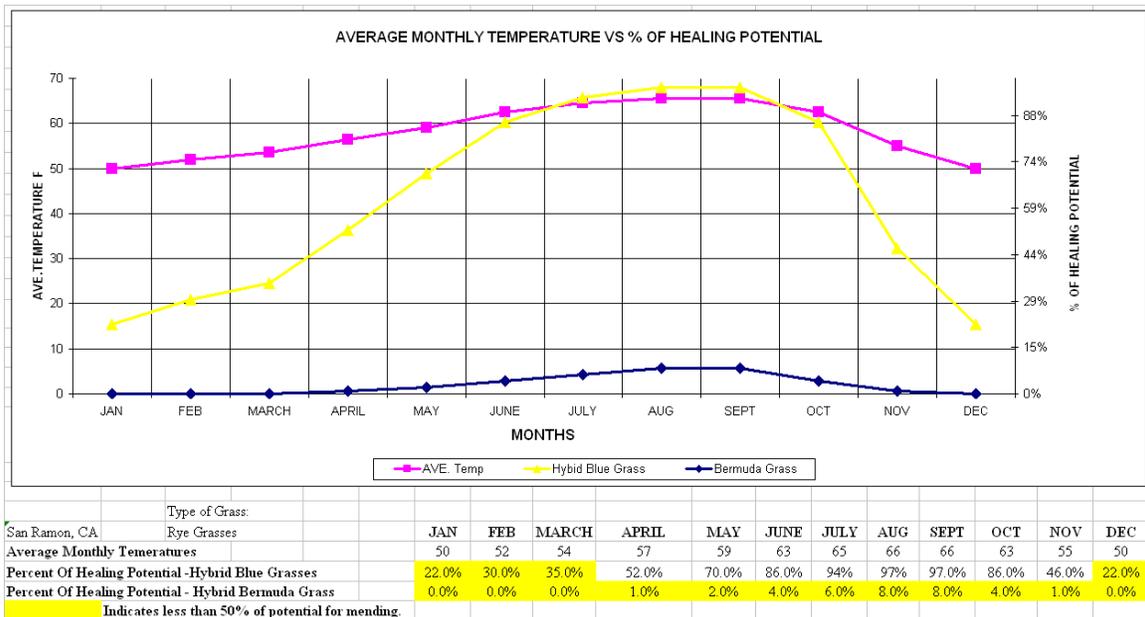
The Wear Index below shows that all turf fields at these sites combined have an average category **4.38** wear and your current maintenance level is an average **3.64**. **There is a direct correlation between maintenance and wear!** This difference, though much less than most cities, is enough to be responsible for your current conditions of your fields and can equal unsustainable turf on your high wear areas over time.

# WEAR INDEX IN HOURS PER WEEK

SITE	Sq. Ft	Activity # Weeks	Activity	Maint.	Current
			Weighted Hours/ Wk	Level Needed	Maint. Level
CP Soccer #1	80000	36	74.5	5.00	3.64
CP Soccer #2	80000	36	58.8	4.00	3.64
CP Soccer #3,#4	244000	36	81.0	5.00	3.64
CP Baseball #5	41720	36	56.5	4.00	3.64
Lucky A's Field #1	77000	36	60.8	4.50	3.64
Athan Downs Fields #2,3, 4	355600	36	59.9	4.00	3.64
Athan Downs Field #1	80000	36	56.4	4.00	3.64
San Ramon Sports Park	217800	36	69.3	4.50	3.64
<b>Totals/ Averages</b>	<b>1176120</b>	<b>36</b>	<b>64.6</b>	<b>4.38</b>	<b>3.64</b>

### 3. The Growing Season and weather patterns:

Please note the Average Monthly Temperature Chart below. When the monthly average temperature is less than 60 degrees, warm weather grasses are dormant or going dormant. This chart also shows the percent of healing potential that your grass has at your average monthly temperatures. Months where there is a yellow box around the percentage of potential healing are those where the percentage drops below 50% and healing potential slows down dramatically.

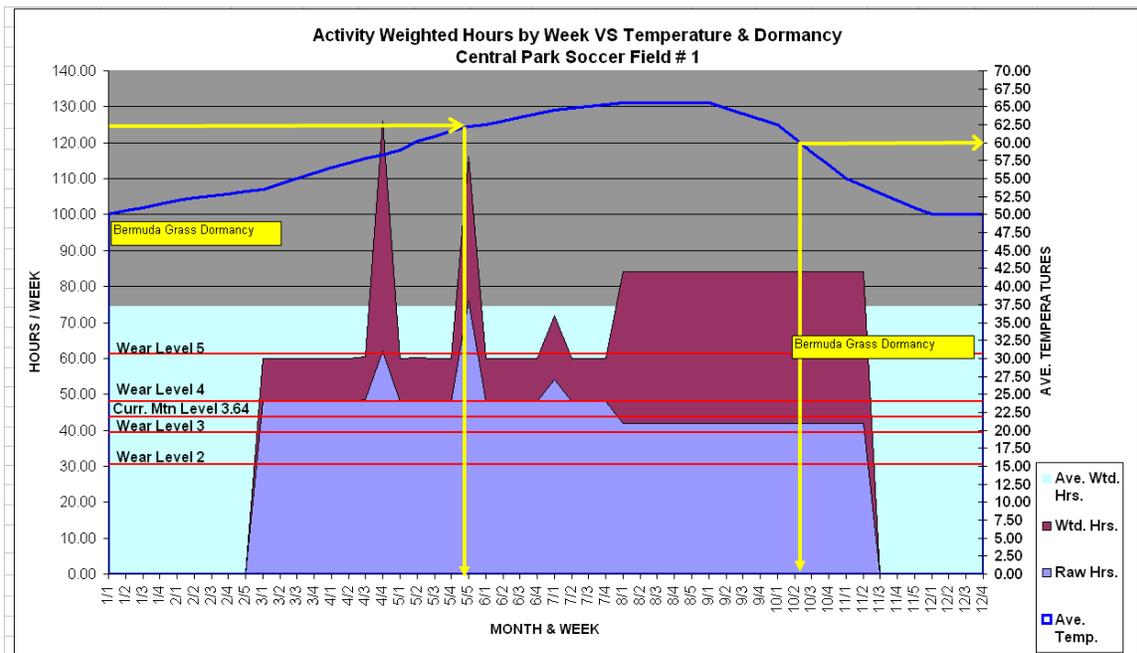


This chart shows the average monthly temperatures for San Ramon over the past 30 years. Note that this shows why cool weather grasses are much more affective here than Bermuda grasses. From April through November the cool weather grasses are nearly able to heal at their maximum potential but from December through March they have diminished or much less healing potential. Also you can see at your temperatures

Bermuda grasses never get above 8% of their healing potential and this vividly shows why these grasses would not work at your sites.

The chart below is like the first one above (Activity Weighted Hours by Week) but these numbers are compared to your 30 average temperatures. The chart also indicates when Bermuda grasses go into dormancy and come out of dormancy. (62-63 degrees coming out of dormancy and 60 degrees going into dormancy). You can see that for you this is coming out by the fourth week in May and going into dormancy by the second week of October.

At your location, your cool weather grasses do not go dormant but the wear ability of these grasses is reduced from November through March. Your wear that takes place during cooler months can severely damage the turf. It is very important that you vigorously protect the turf during this time by not allowing any more play to take place and reducing some of the play that you already have if possible.



#### 4. The Soil Analysis:

The following soil analyses of the root zones of these fields vary significantly but because of your good fertilization program over time it will be possible to fertilize them the same for the time being. Any maintenance plan must be customized for each site based on the all of the conditions mentioned. It shows that the root zone soil content of these fields ranges from an approximately 38% - 96% sand and 4% to 62% silt and clay. These silt and clay particles are the fine materials that when combined with high moisture and heavy play, can still allow these soils to be compacted. The sites with reclaimed water also have heavy clay soils and this is a bad combination. We will be addressing this and other issues in the maintenance recommendations for each site.

## SOIL ANALYSIS COMPARISON

RECOMMENDED LEVE S.LOAM																	3%+	50 PPM		212 PPM	15 PPM	1300 PPM	200 PPM	35 PPM	3 PPM	25 PPM	3 PPM	>1 %	14-16
<b>CP Soccer #1</b>				Sand%	96.0%	Silt%	3.0%	Clay%	1.0%	% Passing #200 Screen			4.0%																
pH	Salt	Lime	Texture	Organ	Nit.	Phos.	Potas.	Sulf	Calc.	Magn.	Sod.	Zinc	Iron	Mang.	CEC														
mmmos	%			%	N ppm	P ppm	K ppm	S ppm	Ca ppm	Mg ppm	Na ppm	Zn ppm	Fe ppm	Mn ppm	%NA														
5.4	0.2	No	Sand	2.5	5	92	178	28	552	113	27	6	326	26	2.75%	4.3													
<b>CP Soccer #2</b>				Sand%	96.0%	Silt%	3.0%	Clay%	1.0%	% Passing #200 Screen			4.0%																
pH	Salt	Lime	Texture	Organ	Nit.	Phos.	Potas.	Sulf	Calc.	Magn.	Sod.	Zinc	Iron	Mang.	CEC														
mmmos	%			%	N ppm	P ppm	K ppm	S ppm	Ca ppm	Mg ppm	Na ppm	Zn ppm	Fe ppm	Mn ppm	%NA														
5.4	0.2	No	Sand	2.5	5	92	178	28	552	113	27	6	326	26	2.75%	4.3													
<b>CP Soccer #3,#4</b>				Sand%	46.0%	Silt%	34.0%	Clay%	20.0%	% Passing #200 Screen			54.0%																
pH	Salt	Lime	Texture	Organ	Nit.	Phos.	Potas.	Sulf	Calc.	Magn.	Sod.	Zinc	Iron	Mang.	CEC														
mmmos	%			%	N ppm	P ppm	K ppm	S ppm	Ca ppm	Mg ppm	Na ppm	Zn ppm	Fe ppm	Mn ppm	%NA														
6.3	0.5	No	Loam	5.9	15.00	140	527	169	3903	761	126	8	189	19	1.91%	28.8													
<b>CP Baseball #5</b>				Sand%	46.0%	Silt%	34.0%	Clay%	20.0%	% Passing #200 Screen			54.0%																
pH	Salt	Lime	Texture	Organ	Nit.	Phos.	Potas.	Sulf	Calc.	Magn.	Sod.	Zinc	Iron	Mang.	CEC														
mmmos	%			%	N ppm	P ppm	K ppm	S ppm	Ca ppm	Mg ppm	Na ppm	Zn ppm	Fe ppm	Mn ppm	%NA														
6.3	0.5	No	Loam	5.9	15	140	527	169	3903	761	126	8	189	19	1.97%	27.8													
<b>Lucky A's Field #1</b>				Sand%	38.0%	Silt%	37.0%	Clay%	25.0%	% Passing #200 Screen			62.0%																
pH	Salt	Lime	Texture	Organ	Nit.	Phos.	Potas.	Sulf	Calc.	Magn.	Sod.	Zinc	Iron	Mang.	CEC														
mmmos	%			%	N ppm	P ppm	K ppm	S ppm	Ca ppm	Mg ppm	Na ppm	Zn ppm	Fe ppm	Mn ppm	%NA														
7.3	2.8	No	Loam	6.1	21	56	372	2240	6377	1180	830	3	67	15	7.63%	47.3													
<b>Athan Downs Fields #2,3,4</b>				Sand%	50.0%	Silt%	32.0%	Clay%	18.0%	% Passing #200 Screen			50.0%																
pH	Salt	Lime	Texture	Organ	Nit.	Phos.	Potas.	Sulf	Calc.	Magn.	Sod.	Zinc	Iron	Mang.	CEC														
mmmos	%			%	N ppm	P ppm	K ppm	S ppm	Ca ppm	Mg ppm	Na ppm	Zn ppm	Fe ppm	Mn ppm	%NA														
7.3	0.8	No	Loam	6.5	9	88	499	55	3202	822	549	6	106	5	9.00%	26.5													
<b>Athan Downs Field #1</b>				Sand%	78.0%	Silt%	14.0%	Clay%	8.0%	% Passing #200 Screen			22.0%																
pH	Salt	Lime	Texture	Organ	Nit.	Phos.	Potas.	Sulf	Calc.	Magn.	Sod.	Zinc	Iron	Mang.	CEC														
mmmos	%			%	N ppm	P ppm	K ppm	S ppm	Ca ppm	Mg ppm	Na ppm	Zn ppm	Fe ppm	Mn ppm	%NA														
7.4	0.4	No	oamy San	5.5	10	84	312	18	1691	458	291	4	69	4	8.82%	14.3													
RECOMMENDED LEVE S.LOAM																	3%+	50 PPM		200.00	12 PPM	1300 PPM	135 PPM	35 PPM	.5 PPM	15 PPM	2 PPM	.4 PPM	14-16
<b>San Ramon Sports Park</b>				Sand%	38.0%	Silt%	36.0%	Clay%	26.0%	% Passing #200 Screen			62.0%																
pH	Salt	Lime	Texture	Organ	Nit.	Phos.	Potas.	Sulf	Calc.	Magn.	Sod.	Zinc	Iron	Mang.	CEC														
mmmos	%			%	N ppm	P ppm	K ppm	S ppm	Ca ppm	Mg ppm	Na ppm	Zn ppm	Fe ppm	Mn ppm	%NA														
8.0	1.4	HI	Loam	0.8	1	12	320	91	6527	732	689	0	25	15	7.04%	42.6													

5. **Irrigation Water**

The irrigation water analysis below compares side by side your reclaimed water analysis on Athan Downs and San Ramon Sports Park with the potable water and well water at Central Park. Both reclaimed water samples are very high in chlorides, electrical conductivity and TDS and the AD sample is described by the lab as “Poor Quality Irrigation Water” and the SRSP sample is described as “Fair Quality Irrigation Water. Both samples carry a salinity hazard and a permeability hazard warning for use on fine clay soils, which these sites are. Clay has a negative charge and sodium has a positive charge so the clay attracts and accumulates the sodium over time. As the sodium accumulates in the soil it slows down the percolation rate through the soil to the point that there is little oxygen getting down deep and the end result is shallow rooted turf that can’t defend itself. This is happening on Athan Downs and the Sports Park.

City of San Ramone		IRRIGATION WATER ANALYSIS COMPARISON						
Analysis	Units	Normal Levels	Soil ,Root & Leaf Toxicity	Athan Downs Reclaimed Water	CP EBMUD Pottable Water	Central Park Well Water	SRSP-DSRSD Reclaimed Water	
<b>Total Nitrogen N03-N</b>	mg/l	5-50		1	0.12	<1	<1	
<b>Chloride Cl</b>	mg/l	0-70	>100	180	6.3	66	170	
<b>Sulfate S04</b>	mg/l	30-90		81	1.2	23	81	
<b>Sulfate-Sulfur S04-S</b>	mg/l			27	0.41	7.6	27	
<b>Bicarbonate HC03</b>	mg/l	0-90	>500	390	39	490	390	
<b>Carbonate C03</b>	mg/l			<10	<10	<10	<10	
<b>Hydroxide, OH</b>	mg/l	<10		<10	<10	<10	<10	
<b>Total Alkalinity CaC03</b>	mg/l			320	32	400	320	
<b>Hardness CaC03</b>	mg/l			230	16	320	230	
<b>Hardness Grains</b>	gr./gl	0-200	>200	13	1	19	13	
<b>Total Calcium Ca</b>	mg/l	20-60		44	5	91	45	
<b>Total Magnesium Mg</b>	mg/l	10-25		29	<1	22	28	
<b>Total Potassium K</b>	mg/l	5-20		14	<1	2	14	
<b>Total Sodium Na</b>	mg/l	0-70	>210	130	5	82	130	
<b>Sodium Absorption Ratio SAR</b>		<6	>9	3.7	0.5	2	3.7	
<b>Adjusted SAR SARa</b>				8.4	0.2	5	8.4	
<b>Sodium, % of Cations</b>				53.4	39.6	35.8	53.5	
<b>Boron B</b>	mg/l	<7	>3	0.64	0.02	0.27	0.61	
<b>Total Iron, Fe</b>	mg/l			0.05	0.07	0.69	0.16	
<b>Total Manganese, Mn</b>				0.031	<.005	0.18	0.038	
<b>Phosphorus PO4</b>	mg/l	.3-1.21	>1.21	2.763	<.307	0.307	2.149	
<b>Orthophosphate OPO4</b>	mg/l			0.9				
<b>Electrical Conductivity mmho/cm EC</b>		70	>900	1280	61.7	911	1260	
<b>Total Dissolved Solids</b>	mg/l	<450	>450	819	39	583	806	
<b>Water pH</b>				7.6	8.7	7.5	7.7	
<b>Water pHc</b>				7.2	9.1	6.9	7.2	

## Your Potential Solutions

### 1. You must increase your maintenance level

You have an average maintenance level of 3.64 which is way above average (average is 1) and wear level 4.38. The chart below shows how many of each task you are currently doing and how many you should be for your wear level for sports turf sustainability.

### MAINTENANCE FREQUENCY

Category	Mowings		Aerations		Top-Dress		Overseed		Fertilize			
	Level	Per Year	Level	Per Year	Level	Per Year	Level	Per Year	Level	Per Year		
	Curr. Level	New Level	Curr. Level	New Level	Curr. Level	New Level	Curr. Level	New Level	Curr. Level	New Level		
CP Soccer #1	3.64	5.00	44	101	10	10	1	1	1	1	5	6
CP Soccer #2	3.64	4.00	44	108	10	10	1	1	1	1	5	6
CP Soccer #3,#4	3.64	5.00	44	116	10	10	1	1	1	1	5	6
CP Baseball #5	3.64	4.00	44	94	10	10	1	1	1	1	5	6
Lucky A's Field #1	3.64	4.50	44	79	10	10	1	1	1	1	5	6
Athan Downs Fields #2,3, 4	3.64	4.00	44	106	10	10	1	1	1	1	5	6
Athan Downs Field #1	3.64	4.00	44	100	10	10	1	1	1	1	5	6
San Ramon Sports Park	3.64	4.50	44	108	10	10	1	1	1	1	5	6
<b>AVERAGES</b>	<b>3.64</b>	<b>4.38</b>	<b>44.0</b>	<b>101.3</b>	<b>10</b>	<b>10.0</b>			<b>1</b>	<b>1</b>	<b>5</b>	<b>6</b>

The major increase is in the number of fertilizations and mowings. This chart shows how many of each task you should be doing to maintain these fields with the same equipment you currently own. This report makes recommendations that will allow these numbers to be reduced and dramatically change the sustainability of your turf. Category 4.38 level of maintenance includes:

- **Deep-tine or shatter-tine aeration at least once annually to relieve and prevent deep compaction.**
- **Annual Top dressing to re-level the field and to replace used up organics to the soil.**
- **Monthly applications of fertilizer or continuous fertigation to grow grass as fast as it is being worn off.**
- **Mowing 2-3 times a week during periods of high use because of the higher growth rate.**
- **Knife aeration at least monthly.**

#### A. **You should consider implementing a set aside time each year during the peak recuperative times from June through October for healing damaged turf.**

You are already doing this from November through February but this is a slow recovery time because of the temperatures. May through June would be the ideal time because of the warmer temperatures. This should become an edict from the park board and City council to prevent user groups from getting around any maintenance plan for recovery during the down time.

#### B. **Fertigation is the best and cheapest way to increase wear-ability while decreasing manpower and fertilizer costs.**

Fertigation allows you to grow-in, mend and renovate the wear areas of your fields the very quickest way possible. It also controls the mowing rate and maintains the beautiful dark green

color throughout the growing season. When the fertilizer is delivered to the tanks by an outside contractor, there is a tremendous savings in manpower. We have found that CPS (Crop Production Services) will make up a liquid product for these fields that is customized by our computer to add as many things as we possibly can through the fertigation system. The price is \$4.32 per gallon compared to the \$6-\$7 of that we normally see and they will deliver it to your tank for you for this price. There are limits and we must still add some extra dry and liquid products the first year of this maintenance plan.

**C. You may want to consider adding a Slit-Drain System to the fields that become saturated during your rainy season.**

Our walk through in January was during your down time on the fields so there was no play to damage the fields while they are saturated. If these fields are played on in November or in March under these conditions, the turf will be compromised. The Koro Drain system can be installed by machine on current fields and will allow that field to drain at 4" per hour beginning the next rain. This system runs approximately \$1.15 per square foot installed. It is ready to play on in about 4-6 weeks.

**D. We recommend that you over-seed with a very aggressive Kentucky Blue grass and Texas Blue grass seed blend.**

1. These seed varieties in the mix have:
  - A. Quick germination (8-9 days)
  - B. Quick Establishment (15 Weeks)
  - C. Remarkable wear tolerance
  - D. Shade tolerance
  - E. Fine leaf texture
  - F. Disease resistance
  - G. Dark green color
  - H. 1/3<sup>rd</sup> less water requirement than regular blue grasses
  - I. Extensive rhizomes & extensive lateral movement for quick repair

By over-seeding with this product, you will see it take over your fields and allow you to use less water. Also the faster germination allows it to reestablish more quickly on damaged fields.

**E. The use of growth control products (Primo) will greatly enhance your maintenance program.**

This type of product takes the energy produced by fertilization and mowing and causes the turf to mend much more quickly and to send roots down deep. It will normally cut mowing in half however in most cases you would need to add one or two mowing per week to keep up with the wear. You should be able to maintain these sites with 1.5-2 mowings per week but have substantially deeper roots and quick mending turf. Another very good side affect was discovered; the turf that was treated with this material has been coming out of dormancy at least 30 days earlier in the spring! You don't have dormancy here but hopefully, this product would make your turf more wear tolerant earlier in the spring.

**2. Purchase some special and larger pieces of multi use equipment that will save you man-hours on your sports fields.**

In the maintenance manual part of this assessment we will discuss specific advantages of the recommended equipment and the approximate costs. We can then help you to write a tight specification to insure that you get the correct equipment on your bid.

- A. We recommend that you purchase the Aerway aerator. This machine has a 100 gallon ballast tank on top for weight, a greens roller at the back to smooth down turf that might be rough after

it passes, a 7” fracturing tine that can fracture as deep as 10” under the right conditions and a 6’ turf tine that should be used at least monthly to maintain soil percolation in high wear areas.

- B. Having the contractor use a 16’ rotary mower instead of the 5’ mowers they are currently using would save them 629 hours per year annually which they should rebate to you. Since we are calling for more mowings, this can help offset the increased manpower costs.

### 3. Reclaimed Irrigation water

- A. **Sodium Blocker**  
Sodium blocker moves the sodium in the reclaimed water and in the soil out of the root zone so it can’t affect the turf. It can be put in the fertigation tank with the regular fertilizer and applied at the appropriate rate. The pictures below are before and after pictures of a golf course in Utah with cool weather grasses. The reclaimed water over time had turned the fairway into the picture on the left. The picture on the right shows the fairway after two seasons with sodium blocker applied through the fertigation system along with the fertilizer. This would particularly help with sodium problems on the Lucky A’s Field.



### B. **Sulfur Burner**

A sulfur burner lowers the pH of your high pH, high in bicarbonate reclaimed water to 6.5. When it reaches the soil it is further converted to an acid and ties up and moves out the sodium in the soil. It has the affect of changing your 40” a year of poor irrigation water to 40” of rain fall. This unit puts off no fumes and annual cost of the sulfur for your two sites we are recommending would be about \$1,000-\$1,200 per year combined.



We are suggesting that you add one of these at Athan Downs and at San Ramon Sports Park.

**4. No-Till renovation of athletic fields**

If any of the fields at any of these sites or any of your other sites develop bad grades and will need to be renovated you should consider the new to the US but 10 year old process from Europe called no-till renovation. It is the equivalent of spreading amendments, roto-tilling and re-sodding but for 1/3<sup>rd</sup> to 1/2 the price but is ready to play in 8 weeks from seed. Our PRZ Design services can layout all of the proper steps, the costs and with the help of your Sports Field Landscape Architect, write the bid ready specifications.

**5. We are recommending renovating City Park Soccer field # 1**

This field is currently getting more wear than it can tolerate as a sand-based soccer field. It is a lighted field so it would be the best one in the park to renovate into a high wear-tolerant field. Artificial turf will cost you \$14-\$16 per square foot or \$1,120,000-\$1,280,000 to convert. We are suggesting a modification of your sand based field utilizing our specification for the additional soil chemistry, microbiology and high tech drain system. This will give you a very wear tolerant field for approximately \$3-\$3.50 per square foot for a savings of \$880,000 to \$1,000,000 which could be used to renovate other fields that have needs. Our Sports Field Design Service can write the specification which would be combined with your Landscape Architect's for this site for \$2,500.

**6. Sub Surface Irrigation**

After a recent visit to Australia to see heavy wear athletic fields that have had subsurface irrigation for as long as 12 years, we feel this would be a tremendous system for all but two of your fields.



**7. We are recommending that you form a Sports Users Committee for these sites or better yet Citywide**

We have found from doing these assessments for cities, the user groups believe that the reason that the fields look bad is because either the city employees don't know what their doing as far as sports field maintenance or they don't care. When we present this assessment to the user groups, we start by saying here is what we found at this site or at these sites and they are all agreeing on how bad the fields are. Then we explain how the fields got that way and you could hear a pin drop in the room. They are dumbfounded to discover that they are part of the problem (wear on the fields and when they want to

use them). Once they realize this, they understand now that this is not just the city's problem but our problem (theirs and yours) and they are very willing to try to help.

We usually recommend a committee be made up of 1 member from each sport (even if soccer has 4 leagues and 1 has 3,000 kids) and each member has 1 vote. Also on this committee are 1 or 2 voting people from park Maintenance (director and 1 who maintains the site), 1 from recreation and possibly 1 from finance.

This committee makes decisions about the fields- no play immediately after the rain, no play if frost on the ground, set aside time for renovation etc. It is a tremendous tool for getting them to take ownership (no longer a rent-a field which has someone else fixing it if they break it).

We have also found that once they realize with the help of this assessment that because of growth nationally of soccer and now Lacrosse the wear level on all fields has gone off the chart in the past 15 years and the maintenance level has remained close to the same. This is unsustainable turf and there no city in the US that can afford to step up their maintenance from level 1 or 2 to level 5 on a large number of fields in a short period of time. This is when we suggest that if they are willing to help, we can have them pay an additional head charge per person that will go into a fund that will be used only for maintaining the fields (man power, materials, new equipment or even building new fields etc). The value of this type of a charge is that the head count goes up every year. We base the head charge on the amount of damage each sport does to the turf based on the Activity Weighted Scale.

## Costs of Solving Your Problems

### 1. Manpower

The wear index chart below indicates that by increasing your maintenance level from 3.64 to your wear level of 4.38, you will add 1554 additional annual man-hours or approximately \$119,641 annually in maintenance costs at this site based on your current wages & benefits. Approximately 629 of these hours are for your contractor to mow the additional times needed. By implementing the recommendations in this assessment, this figure can be substantially reduced. This figure doesn't include the additional materials such as fertilizer, seed, and topdressing.

WEAR INDEX IN HOURS PER WEEK											
SITE	Sq. Ft	# Weeks	Activity	Maint.	Current	Current	Needed	Addit.	Current	New	
			# Weighted	Level Needed	Maint.	Ann. Mtn.	Ann. Mtn.	Ann. Mtn.	Approx.	Approx.	\$
			Hours/ Wk	Category	Level	Hours	Hours	Hours	Mtn.Cost	Mtn.Cost	Increase
CP Soccer #1	80000	36	74.5	5.00	3.64	171	270	99	\$13,152	\$20,778	\$7,626
CP Soccer #2	80000	36	58.8	4.00	3.64	362	462	100	\$27,867	\$35,546	\$7,679
CP Soccer #3,#4	244000	36	81.0	5.00	3.64	1106	1440	335	\$85,152	\$110,914	\$25,761
CP Baseball #5	41720	36	56.5	4.00	3.64	217	257	40	\$16,728	\$19,776	\$3,048
Lucky A's Field #1	77000	36	60.8	4.50	3.64	402	453	51	\$30,948	\$34,858	\$3,910
Athan Downs Fields #2,3,4	355600	36	59.9	4.00	3.64	1872	2326	454	\$144,121	\$179,070	\$34,948
Athan Downs Field #1	80000	36	56.4	4.00	3.64	400	509	109	\$30,803	\$39,181	\$8,378
San Ramon Sports Park	217800	36	69.3	4.50	3.64	1228	1595	367	\$94,528	\$122,818	\$28,290
<b>Totals/ Averages</b>	<b>1176120</b>	<b>36</b>	<b>64.6</b>	<b>4.38</b>	<b>3.64</b>	<b>5757</b>	<b>7311</b>	<b>1554</b>	<b>\$443,299</b>	<b>\$562,940</b>	<b>\$119,641</b>

### 3. Annual Maintenance Costs-

In the chart below, Scenario #1 below shows your current maintenance level and the \$613,797 it cost you in 2010 to maintain the fields at these sites. This is \$22,733 per acre per year. Scenario #2 shows the \$789,908 in costs which is \$176,111 more in additional manpower and materials for stepping up your maintenance from level 3.64 to level 4.38. This is \$29,256 per acre per year. Scenario #3 shows your annual costs of \$864,660 which includes the one time purchase of the new equipment that is needed. The cost per acre that year would be \$32,024 per acre per year. Scenario #4 shows the \$690,698 in annual costs

of maintaining these fields after the purchase of this new equipment. This would average about \$25,581 per acre per year. Scenario # 5 includes the cost of converting your above ground irrigation systems to sub-surface irrigation for all but 2 fields which will save approximately 50% in water costs 70% in labor costs repairing & maintaining irrigation systems and a 33% savings in fertilizer costs. This would be \$63,652 per acre for that year. Scenario # 6 shows that your annual costs after implementing all of the recommendations in this report would be \$294,012 or \$10,889 per acre which is 52% lower than your current annual costs and is in the low to mid range for high wear fields in your climate.

**COMPOSITE SCENARIO COST ANALYSIS**

		Scenario #1	Scenario #2	Scenario #3	Scenario #4	Scenario #5	Scenario #6
		2010	2011	2011	2012	2013	2014
		Current	Current	Current	Current	Current	Current
		Wear	Wear	Wear	Wear	Wear	Wear
City of San Ramon		Mtn Level	Mtn Level	Mtn Level	Mtn Level	Mtn Level	Mtn Level
Composite of CP, AD, SRSP Fields		3.64	4.38	4.38	4.38	4.38	4.38
		No New Equipment	No New Equipment	Purchase New Equipment	After New Equipment	Purchase Sub Surface Irrigation	After All Improvements and Beyond
	\$/acre/yr	\$22,733	\$29,256	\$32,024	\$25,581	\$63,652	\$10,889
	Square Feet	1,176,120	1,176,120	1,176,120	1,176,120	1,176,120	1,176,120
	Natural Turf	1,176,120	1,176,120	1,176,120	1,176,120	1,176,120	1,176,120
<b>ANNUAL TOTALS:</b>		\$613,797	\$789,908	\$864,660	\$690,698	\$1,718,606	\$294,012
<b>Top dressing</b>		\$5,265	\$21,000	\$21,000	\$10,500	\$10,500	\$5,250
<b>Spread top dressing-Contractor</b>		\$0	\$0	\$0	\$0	\$0	\$0
<b>Grass Seed</b>		\$2,522	\$16,660	\$16,660	\$9,163	\$9,163	\$9,163
<b>Slit Seed- Contractor</b>		\$0	\$0	\$0	\$0	\$0	
<b>Fertilizer</b>		\$13,760	\$40,359	\$32,962	\$32,962	\$22,084	\$22,084
<b>Deeptine aeration- Contractor</b>		\$0	\$0	\$0	\$0	\$0	
<b>Contractor Mobilization</b>		\$0	\$0	\$0	\$0	\$0	
<b>Manpower</b>		\$462,699	\$582,339	\$582,339	\$494,336	\$180,684	\$180,684
<b>Water</b>		\$118,224	\$118,224	\$118,224	\$118,224	\$58,117	\$58,117
<b>Irrigation repair</b>		\$6,800	\$6,800	\$6,800	\$6,800	\$0	\$0
<b>Primo</b>		\$0	\$0	\$14,187	\$14,187	\$14,187	\$14,187
<b>Field Striping</b>		\$0	\$0	\$0	\$0	\$0	\$0
<b>Infield Materials</b>		\$4,527	\$4,527	\$4,527	\$4,527	\$4,527	\$4,527
<b>Field Renovation</b>		\$0	\$0	\$0	\$0	\$200,000	\$0
<b>Purchase New Equipment</b>							
1 90" Aerway Aerator				\$15,600			
4 Fertigation System installed				\$17,362			
2 Sulfur Burner Units				\$35,000			
Subsurface Irrigation						\$1,219,344	
<b>New Equipment Costs</b>	<b>\$67,962</b>						

**Sports Field Management System Manual**

Below is the Composite Sports Field Management System Annual Calendar for The City Park Soccer Field #1 that lays out every aspect of maintenance for the year. This calendar is customized for this site only. The operator in the field has a plastic laminated version of this. This particular calendar is based on fertigation. The product on the far left (32-0-0) is added through the fertigation system. There are also 2 granular

fertilizer products and 2 liquid spray products shown in this first year. Down the left side are the dates that each fertilizer item and task should occur.

DATE: SQ.FT: 80000

CP Soccer Fields 1 & 2

02/23/11

Quantities are for each field

APPLICATION SCHEDULE City of San Ramon

WEEK C	32-0-0 Gallons	11-52-0 LBS	0-0-50 LBS	Composter Galons	Growth Med. Lbs	Lime Lbs	Primo GALS	Mows/ Week W/O Primo	Mows/Week With Primo	Shatter Tine	Knife Aerate	Plug Aerate	Over Seed	Top Dress
01/01/11	0	0	0	0	0	0	0.00	0.5	0.5					
01/08/11								0.5	0.5					
01/15/11								0.5	0.5					
01/22/11								0.5	0.5					
01/29/11	0	0	0	0	0	0	0.00	0.5	0.5		X			
02/05/11								0.5	0.5					
02/12/11								0.5	0.5					
02/19/11								0.5	0.5					
02/26/11	20	0	0	26	0	1469	0.63	3	1.5		X			
03/05/11								3	1.5					
03/12/11								3	1.5					
03/19/11								3	1.5					
03/26/11	0	0	0	0	735	0	0.63	3	1.5		X			
04/02/11								3	1.5					
04/09/11								3	1.5					
04/16/11								3	1.5					
04/23/11	20	0	0	0	0	0	0.63	3	1.5		X			
04/30/11								2	1.0					
05/07/11								2	1.0					
05/14/11								2	1.0					
05/21/11								2	1.0					
05/28/11	0	0	0	0	0	0	0.63	2	1.0		X			
06/04/11								2	1.0					
06/11/11								2	1.0					
06/18/11								2	1.0					
06/25/11	20	0	0	0	0	0	0.63	2	1.0		X			
07/02/11								2	1.0					
07/09/11								2	1.0					
07/16/11								2	1.0					
07/23/11								2	1.0					
07/30/11	0	0	0	0	0	0	0.63	3	1.5		X			
08/06/11								3	1.5					
08/13/11								3	1.5					
08/20/11								3	1.5					
08/27/11	20	0	0	0	0	0	0.63	3	1.5		X			
09/03/11								3	1.5					
09/10/11								3	1.5					
09/17/11								3	1.5					
09/24/11	0	0	0	0	0	0	0.63	3	1.5		X			
10/01/11								3	1.5					
10/08/11								3	1.5					
10/15/11								3	1.5					
10/22/11	20	0	0	0	0	0	0.00	3	1.5		X			
10/29/11								0.5	0.5		X		X	X
11/05/11								0.5	0.5					
11/12/11								0.5	0.5					
11/19/11								0.5	0.5					
11/26/11	0	0	0	0	0	0	0	0.5	0.5					
12/03/11								0.5	0.5					
12/10/11								0.5	0.5					
12/17/11								0.5	0.5					
12/24/11	20	0	0	0	0	0	0	0.5	0.5					

UAN 32 32-0-0 122 Gls Lime 1469 Lbs .5 Mowings per week= Mowing every 14 days  
 11-52-C 0 Lbs Primo 5.05 Gls 1 Mowing per week= Mowing every 7 days  
 0-0-50 0 Lbs 1.5 Mowings per week = Mowing every 5 days  
 Composter 26 Gls 2 mowings per week= Mowing every 4 days  
 Growth Mediur 735 Lbs 2.5 Mowings per week= Mowing every 3 days

## MANAGING SPORTS FIELD WEAR

The Field Usage/Availability Analysis chart below is customized chart for the City Park Soccer Field #1. This chart shows exactly how many Activity Weighted hours per week these fields can handle for each month of the year. Since fields can be different from the others, a composite chart averaging the available hours for the fields would not be meaningful for your current conditions.

Note that at your current maintenance level of 3.64 (the yellow bar across the chart) you currently have an excess hours of annual usage of 1082 activity weighted hours. Since there is soccer on this site with a rating of 2, this is an excess of 541 (1082 / 2) actual hours per year more than the turf can tolerate. Even when you step up your maintenance level 3.64 to level 5, you will still have 453 activity weighted hours or 226 more hours annually than this turf can tolerate over time. This is the lighted field that we are suggesting that you renovate by amending properly and adding a drain system that will make it a very high wear tolerant field.

City of San Ramon		<b>FIELD USAGE / AVAILABILITY ANALYSIS</b>														
CP Soccer #1		Square Ft.	80000	Total												
Type of Grass:	Weeks/ YR	36	Hours	Aver.	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
K BLUE GRASS	Weeks/ mo				4	5	4	4	5	4	4	5	4	4	4	4
<b>Field Availability (Numbers represent activity-weighted hours per week)</b>																
<b>Current Maint. Level 3.64</b>	Hours Allowed	1573	31	11	15	18	26	35	43	47	49	49	43	23	11	
	Hours Available			11	15											11
	Excess hours of usage	1082	30			43	51	36	17	16	36	36	41	19		
<b>Maint. Level 2.00</b>	Hours Allowed	1101	21	8	11	12	18	25	30	33	34	34	30	16	8	
	Hours Available			8	11										8	
	Excess hours of usage	1554	43			48	58	47	30	30	50	50	54	26		
<b>Maint. Level 3.00</b>	Hours Allowed	1415	28	10	14	16	23	32	39	42	44	44	39	21	10	
	Hours Available			10	14										10	
	Excess hours of usage	1240	34			44	53	40	21	21	40	40	45	21		
<b>Maint. Level 4.00</b>	Hours Allowed	1730	34	12	17	19	29	39	47	52	53	53	47	25	12	
	Hours Available			12	17										12	
	Excess hours of usage	925				41	48	33	13	11	31	31	37	17		
<b>Maint. Level 5.00</b>	Hours Allowed	2202	43	15	21	25	36	49	60	66	68	68	60	32	15	
	Hours Available			15	21				0	3					15	
	Excess hours of usage	453				36	40	22			16	16	24	10		
<b>Maintenance Frequencies-Annual Requirement</b>		<b>Current</b>	<b>Needed</b>		<b>Activity Weighting Scale</b>											
<b>Maint. Level</b>	<b>3.64</b>			5.0	<b>Determining Field Availability</b>											
Mowings/ Yr	44		101		Walking on field/Softball	1.00	Use the following steps to evaluate requests for additional field time:									
Aerations/Yr	10		8		Baseball	1.25	1. Determine the actual hours of additional use requested.									
Top Dress/Yr	1		1		PE	1.50	2. Multiply the total hours of proposed use by the appropriate activity weight.									
Over Seed/Yr	1		1		Parked Cars	1.50	3. Locate the column for the month when the proposed additional use would occur.									
Fertilization/Yr	5		6		Marching Band	1.75	4. Determine if there are available hours at the current maintenance level. If there are, you can schedule the activity.									
Sweeping	0		0		Soccer Games	1.85	5. If not, see if sufficient hours can be made available by increasing the maint. Level.									
Deep Tine/Yr	1		1		Football Games	1.85	6. If sufficient hours can be made available, and you can afford the additional mtn., you can schedule the activity.									
Verticuttings/yr	1		1		Soccer & FB Practices	2.00										
Annual Costs	\$23,053		\$34,302		Adult Soccer & FB Games	2.13										
Ann. Increase			\$11,249		Adult Soccer & FB Prac.	2.25										
Cost/month	\$2,771		\$4,124		Lacrosse	2.25										
Cost/week	\$693		\$1,031		Rugby	2.50										
					Sports Clinics	2.50										
					<b>Current Wear Level</b>	<b>5.00</b>										
					<b>Current Maintenance Level</b>	<b>3.64</b>										
					<b>Needed Maint. Level-Weather Adjusted</b>	<b>5.0</b>										

When you find as you have that your maintenance level overall on the fields is lower than the wear level, you have choices that need to be made. **What are some viable options?**

- You can raise your maintenance level to your wear level.**  
As this assessment has pointed out this is expensive!

2. **You can lower your wear level to your maintenance level.**  
This is very hard to do without a user group committee that understands your dilemma and is willing to bite the bullet with you. This assessment can be very helpful in gaining this cooperation once these groups understand that they also are part of the problem and are willing to take ownership (not just a rent-a-field that someone else gets to pay for if they damage it)!
3. **You can add new fields to spread your wear over a larger area.**  
This is also very expensive in an area of high land prices and many times by the time they are built, they are already at full capacity.
4. **You can add artificial turf on lighted high wear fields.**  
This is very expensive at approximately \$14-16 per square foot currently but it does double the amount of wear you can put on a field and you don't have to purchase new land.
5. **You can do a combination of these things.**

This concludes the Executive Summary for this report. The next step is for you to determine how many of these recommendations you wish to do. We will then put these steps into the maintenance manuals for each of these sites.

# 2011 Maintenance Instructions

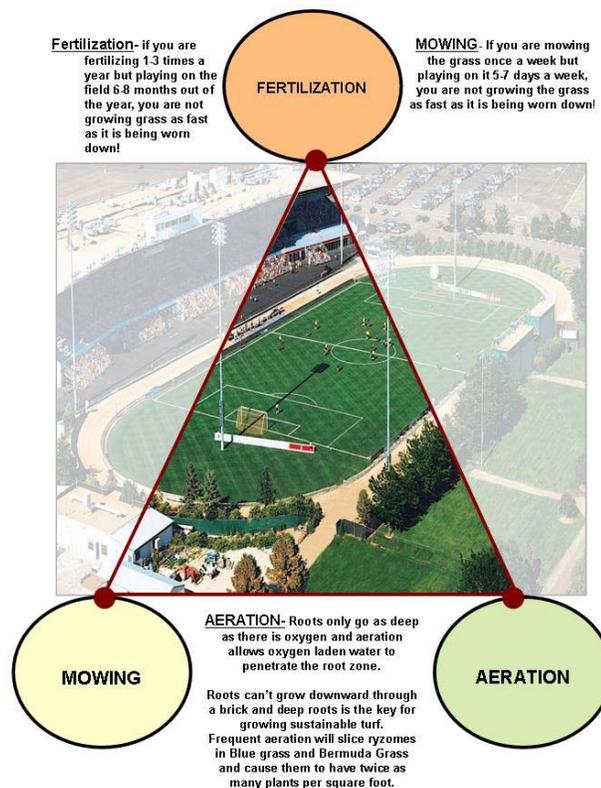
1. Our maintenance calendars to follow call for:

A. **The Sports Field Maintenance Trifecta!**

The Trifecta of turf maintenance as you can see below is increased:

1. fertilization,
2. mowing
3. aeration.

As you will read below, this combination is what you must do for turf that is under heavy wear to for it to be sustainable. This combination will give you 10” of roots which is what is required for turf to tolerate the most wear!



B. **Subsurface Irrigation** although expensive to install initially would be a tremendous savings in water, man power, irrigation repair parts and fertilizer. In your case this would pay for itself in 7.5 years.

C. **Increased fertilization.** The turfgrass has to have approximately 3% nitrogen in the leaf for it to defend itself against wear. For cool weather grasses this would normally be 5-6 lbs of Nitrogen per year per 1,000 sq. ft and 8 lbs/ 1,000 square feet on sand based fields. In 2010 you added 6 lbs per 1,000 square feet per year. Subsurface irrigation would lower this to 4 lbs per 1,000 sq. ft per year for a 33% savings.

- D. **Fertigation** allows us to get approximately 20% of the nutrients through the leaf (foliar) and the rest going through the soil. This is especially affective during drought or water rationing. Our maintenance calendar calls for insuring that every drop of water that is applied to the turf, will have a trace of nitrogen in it. I have found a supplier in your area that will custom blend for your fields per our computerized recommendation that is customized for this site and can be changed as often as necessary. They will deliver to your tank for \$4.32 per gallon which is 2/3<sup>rd</sup> of what you would pay through a golf course supply company and you would have to transfer it to the tank yourself. You will still need to spread some concentrated granular nutrients as well. Fertigation can be applied through subsurface irrigation also with a savings of 33% on fertilizer costs annually.
- E. **Additional mowings.** The maintenance calendars to follow call for 2-3 mowings per week during the high wear periods because when you fertilize more, the easiest thing for the plant to do is make leaf. All that you have accomplished with continued 1 or 2 mowings per week is a 2" clipping instead of a 1" clipping. By mowing an additional time the plant uses this energy by trying to push the roots down and the bluegrass ryzomes sideways (this how bluegrass mends itself and fills in) but it can't do either if the plant is growing in a brick (compacted soil). Cool weather grasses, bluegrass, fescue and rye should be cut at 2.5 inches minimum or shorter cutting will actually pull the roots up closer to the surface. The new hybrid Kentucky Blue grasses and hybrid Texas blue grasses we are recommending are finer bladed than these others and thrive at being cut at 2".
- F. **More aeration.** By aerating monthly in the wear areas, you relieve the compaction which allows oxygen laden water to move downward and allowing roots to follow and ryzomes to spread sideways choking out weeds as well. Also slice aeration slices these ryzomes causing them to grow more plants per square foot thus a denser, tighter turf. The Aerway slice aerator we are recommending you purchase will allow you to play on the field immediately after aeration since it has a roller that smoothes the surface and it leaves no plugs behind to disrupt the direction of the soccer ball or baseball. It also has a 7" fracturing tine that fractures as deep as 10" under ideal conditions and can leave a hole big enough to top dress into without pulling plugs.
- G. **Primo Growth regulator.** The monthly application of Primo Max or Primo like growth regulator will allow you to mow ½ as much, so many times the one mowing per week you were doing would now be two to three times a week but with the application of Primo you can mow once a week or 1.5 times per week (every 5 days). The plant uses this energy to push roots down and ryzomes sideways.
- H. **Annual top dressing** on all high wear fields. With the wear you have, you get compacted areas that become low spots. This means you have lost the grade on the field and it no longer drains properly. Top dressing fills in the low spots and reestablishes the grade on the fields. The top dressing should include compost and sand with an **80% sand 20% compost mix**. The compost is very high in microbes and helps to control funguses and diseases. They also help prevent compaction and when you slice aerate monthly, you slice the organics and sand into the root zone 6" deep and actually increase percolation in the root zone over time. **Be sure that you use topdressing that has no bark, fir or red wood in it.** These will create many problems for you over time by taking the nitrogen that you apply for the turf, away from the turf to break down the wood. We are recommending that initially you use ¼" of **top dressing** to insure that you have enough material to fill in the low spots and to fill as many of the aeration holes as possible to create permanent avenues for water and oxygen to move freely downward. The results of the grade survey we discussed may increase this amount.
- I. We are recommending that you over-seed with Seed Research Company's Texas and Kentucky Blue grass Hybrids. The mixture will include 30% Bandera, 30% Spitfire, 25% Touche' and 15% Emblem. These will give you 1/3<sup>rd</sup> less water usage, tolerate some shade and a lot of wear, are fine bladed, they germinate in 8-9 days, are dark green in color and have

the extensive roots and ryzomes that will knit sod and repair quickly to tolerate your wear. The same CPS company that will custom make your liquid fertilizer and deliver it to your tank, also can have these seed varieties custom blended for you by Seed Research of Oregon based on our recommendations.

## Irrigation

Deep roots (10") allow the turf grass to heal itself much quicker thus enable it to stand up to heavy wear. Roots only grow as deep as the oxygen goes and percolating water carries oxygen. Therefore until we achieve deep roots, we must maintain this downward percolating irrigation water through lighter more frequent watering rather than in-frequent heavy watering that tends to leave the soil wet and cause compaction. **Again this is only until we achieve deeper roots!**

The best way to decide how much water to put on is using a soil probe to check soil moisture in the root zone. We want the soil moist or damp but not wet evenly to at least 1" below the deepest roots. As the temperatures rise you will notice that it will be dryer near the surface than at the lower depths. This will mean adding extra minutes to each zone to keep the soil moisture correct. As the temperature continues to raise it may be necessary to go to an additional watering per day, one in the late evening and one in the early morning with a possible syringing in the heat of the day. When you first do this, use your probe to determine if you need to back off again on the minutes per zone keeping in mind again that you don't want the soil to be wet in the morning.

Also use your probe regularly after rainfall to see how quickly it dries out. This will give you a good idea of how long you should keep play off the fields after a heavy rain. As compaction takes place from heavy wear, the time it takes to dry out after the rain will get longer. This is why it is necessary to knife aerate at least monthly during the heaviest of play.

## Mowing Instructions

Your turf-grass on this field will be a Kentucky Blue Grass and Perennial Rye-grass, mix that you should **mow at 2."** each time. The slice aeration will cause the bluegrass ryzomes to start new plants closer to the parent plant thus creating more plants per square foot and denser turf thus making the 2" height play as if it were cut shorter. At this height you should not have to pickup the clippings except after heavier rainfall and the quick growth that can follow. The analysis of the leaf from your clippings on the next page reads like the analysis of a bag of fertilizer. The plant takes these nutrients out of the soil and uses them to maintain the plant. By throwing away these clippings you would actually be throwing away reusable fertilizer.

Total % N	Phos. %P	Pott. % K	Calcium % Ca	Magnes. %Mg	Sulfur %S
4.77	0.62	3.14	0.27	0.21	0.39

Mulching mowers prevent the need for picking up clippings.

Please note the **PRZ Turf Maintenance Calendar**. Your wear changes throughout your growing season and your mowing schedule follows the wear at **1-3 mowings per week or 1 to 1.5 mowings per week with Primo applications.**

## Aeration

You have some very heavy clay soils in some of these fields and you have been aerating regularly enough to keep the compaction manageable. Aeration is our best tool to relieve compaction. We have three types

of aeration you will need to do on this field annually to relieve compaction. The Aerway aerator we are recommending can be used in the afternoon and the field played on immediately. It does not leave behind any plugs and the roller on the back of it smoothes down any rough spots it may have created.

1. **Shatter-tine aeration** with the Aerway fracture tine machine in the most aggressive mode which should make a hole big enough to top dress into. This should be done once a year during the *Major Annual Turf Renovation* to relieve any compaction that might have taken place since last year.
2. **Core or plug pulling aeration** pushes a spoon or circular tube into the soil and pulls and slings or discards the soil and root plug onto the surface. This is the best type of aeration because it leaves a 1/2"-3/4" by 2.5"-4" hole in the soil and should also be done annually during the *Major Annual Renovation just before top dressing*. Because of the clay you would need to collect the plugs before topdressing. The fracturing tine on the Aerway can be set to be more aggressive and can make holes big enough to top dress into without pulling plugs.
3. **Knife aeration** is the only aeration that is done regularly throughout the growing season because it temporarily relieves compaction without disturbing the surface or leaving plugs that could deflect the ball. Because of the sandy soil on this site, you will only have to do this *monthly* with a 6" turf slicing knife during the growing season. Do not go two directions with knife aerating because you can make an X with two slits that could be caught by a soccer cleat and ripped up. You can go in more than one direction during the Annual Renovation because these slits will mend before play resumes.
4. If you install subsurface irrigation, you will be able to reduce your aeration from monthly to twice a year on these fields. This may also impact the need for shatter-tine annually and even topdressing.

## Material Suppliers and Contractors

The following materials are important to the maintainability of your fields. The specifications for each of these have been customized for this site and should not be altered by suppliers who might indicate that their products are equal to or better than those specified.

1. Top Dressing material shall be a 80% sand, 20% compost mixture.
  - A. Sand specifications are for a washed USGA sand with 100% passing a #12 screen and no more than 1% passing a #200 screen.
  - B. Sand Supplier- Pre- approved suppliers or equal-Granite Construction- Dale Evans-916-825-5111, TMT-Matt Moore-408-432-9040, West Coast Sand & Gravel- JR-916-386-8177. The last two are capable of mixing compost and sand and delivering them to you that way.
  - C. Compost needs to be screened to 1/8" minus, have a carbon to nitrogen ratio of under 20/1, and have a ph less than 8.5 and a dry organic % above 30%. Supplier – TMT-Matt Moore-408-432-9040, West Coast Sand & Gravel- JR-916-386-8177, Allied Waste-Glenn-408-945-2836 or 408-687-1928, , Greenway's Environmental-Kevin-949-380-8301
  - C. Quantities of mixture 1/4" the first year. or .775 cubic yards /1,000 sq. ft. of the above mixture.
2. Texas Bluegrass and Kentucky Blue grass mix with 4 varieties 30% Spit Fire Hybrid Blue grass, 30% Bandera hybrid Blue grass, 25% Touche' Mid Atlantic type Blue grass and 15% Emblem a High Density type Blue grass all from Seed Research of Oregon.
  - A. Suppler shall be CPS-Dave Fagundes-510-453-5545
  - B. Quantities are, 1.75lbs/1,000 sq. ft initially.
  - C. Shall be seeded at .875lbs per 1,000 square feet in each of two directions.

3. Fertilizers: Both granule and liquid fertigation products:

**TURF NUTRIENTS REQUIRED FOR 2011 Fertigation / Granule**

Nutrient	Nitrogen	Phosphorus	Potassium	Sodium	Composter	Lime	Org.Growth	Primo	
Product	UAN			Blocker	Liquid		Medium		
Formulation	32-0-0	11-52-0	0-0-50				50Lbs./Bag		
Form	Gallons	Lbs.	Lbs	Gallons	Gallons	Lbs.	lbs./bags	Gallons	
All Fields	1927	771	2774	139	388	7176	10800	45	
Cost Each	4.32	0.42	0.42	20.18	30.00	0.16	0.70	316.85	
Total Cost	\$8,323	\$324	\$1,165	\$2,815	\$11,644	\$1,132	\$7,560	\$14,187	\$47,149

- A. Nitrogen- UN32, Phosphorus- 11-52-0, Potassium 0-0-50, Lime
- B. Primo Max substitute- Provair PGR or T-Nex 1 AQ, Active ingredient 11.3% Trinexapac-ethyl-
- C. Supplier shall be CPS- Dave Fagundes-510-453-5545
- D. Sodium Blocker (moves sodium out of the root-zone, reduces soil pH, increases soil percolation, reduces sodium EC %, allows reclaimed water to be used on salt intolerant blue grasses)- Supplier-Turf Feeding Systems-Michael Chaplinsky-713-504-0750
- E. Liquid Composter (seed germinator, bio-stimulant, root growth hormone), very important for jump starting new seed quickly, Concentrated Organic growth medium- dry, long term root-zone microbe bio-stimulant, (26% organic matter, N-.39%, P-.37%, K-.12% , Ca- 10%, Mg-2.17%,Fe- 2.5% )  
Supplier is – CPS –Mike Ravel-831-595-6504

4. Contractors

- A. Deep Tine aeration, top dressing, over seeding, fertilization, Koro Recycle Dresser that makes topdressing from your root-zone while fracturing every square inch of root-zone 8” deep while leaving it in place, Baseball field lip removal (see pictures on next page), and Koro Kwik Drain- 4” an hour drainage system installed entirely by machine through the top-Green One Industries Co- Leroy 888-567-6872,





B. Soil testing, Servitech Labs (620) 227-7123.

## Equipment Recommendations

### 1. Aerway Aerator

- A. Shall have 100 gallon ballast tank
- B. Shall have Greens roller at the back
- C. Shall be 3 point hitch
- D. Shall have 7" Shattering tine roller on 7.5" spacing
- E. Shall have 6" sports tine slicing tine roller 7.5" spacing
- F. See sizing chart on the next page. The higher horsepower number would be required to pull that machine through heavy clay. The smaller number would work for the sandy soils at this site.
- G. Supplier shall be Bubco Inc- Ag& Turf-Lodi-209-367-3885



Models Available in case you wish to size it larger for productivity city wide:

Width	Cost	Hp Required	Acres/ Hour
1. 45"	\$7,000	20-30	2.19
2. 60"	\$12,300	25-40	2.92
3. 75"	\$14,119	30-45	3.65
4. 90"	\$15,603	40-65	4.37 * We used this size for estimating manpower costs
5. 12' Batwing	\$28,644	60-90	7.05
6. 15' Batwing	\$30,898	80-120	8.75

2. Fertigation Systems- Supplier-Turf Feeding Systems-Michael Chaplinsky-713-504-0750



3. Sulfur Burner Systems- Harmon Systems International-Terry Gong-925250-4559



4. KISS Subsurface Irrigation System-John Ossa-800-376-7161-415-378-8404



## Field Overview Assessment Central Park Fields

The following is an evaluation of the Central Park fields as of January, 2011. It discusses the current condition of these fields and explains why they are in this condition. It will then go over a plan of action that can help to remedy the problems and cover the maintenance steps, needed equipment, and costs of maintaining these fields to prevent them from returning to there original condition. This document will then show the level of wear on the fields and how many hours of play per week these fields can sustain and still have viable turf.

### Current Conditions of the fields

As we discussed in the Executive Summary, the root depth on these fields is too shallow to allow the turf to stand up to the wear they are currently receiving and this is shown in the worn areas and bare spots on some of the fields. The irrigation systems and field grades are very good.

SITE	INITIAL SITE SURVEY								
	Root	Field	% Bare	%	Compacted	Irrigation	% Worn	High/Low	Wet/Dry
	Depth	Grade	Spots	Weeds	Areas %	System	Areas	Spots	Spots
CP Soccer #1	2.00	Good	10%	X		Good	5%		
CP Soccer #2	2.00	Good	10%			Good	5%		
CP Soccer #3,#4	5.00	Good	10%			Good	10%		
CP Baseball #5	7.00	Good	2%			Good	5%		X
Lucky A's Field #1	3.50	Good				Good			

### The Causes of the Current Conditions

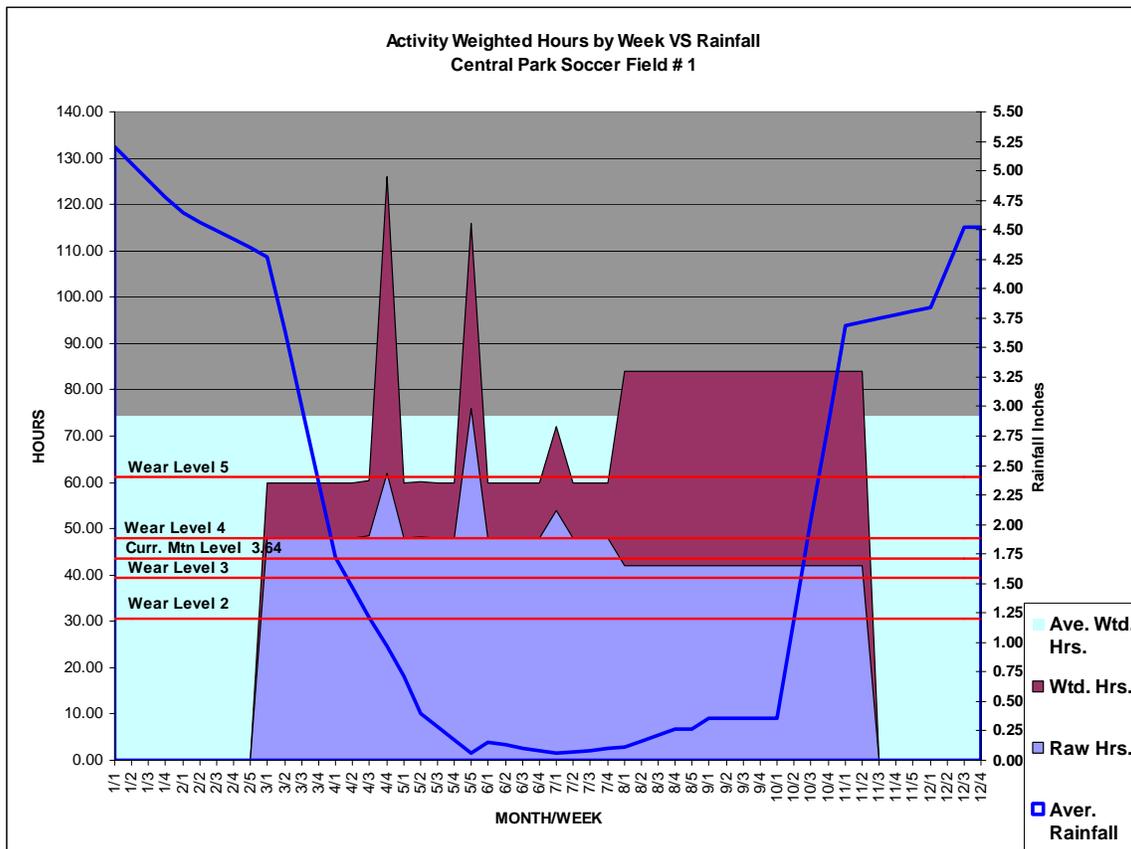
**1. Wear** has caused most of the current problems on these fields.

Your wear is probably the greatest contributor to compacted soils and the resulting damage to your turf. The Wear Index In Hours Per Week table below shows that this field has **66.3** activity-weighted hours of play per week. This is a category **4.5** wear level. The amount of play is scaled into levels 1-5, 5 being the highest and there is a direct correlation between wear and maintenance. Your current maintenance level is 3.64 and has allowed this field to deteriorate.

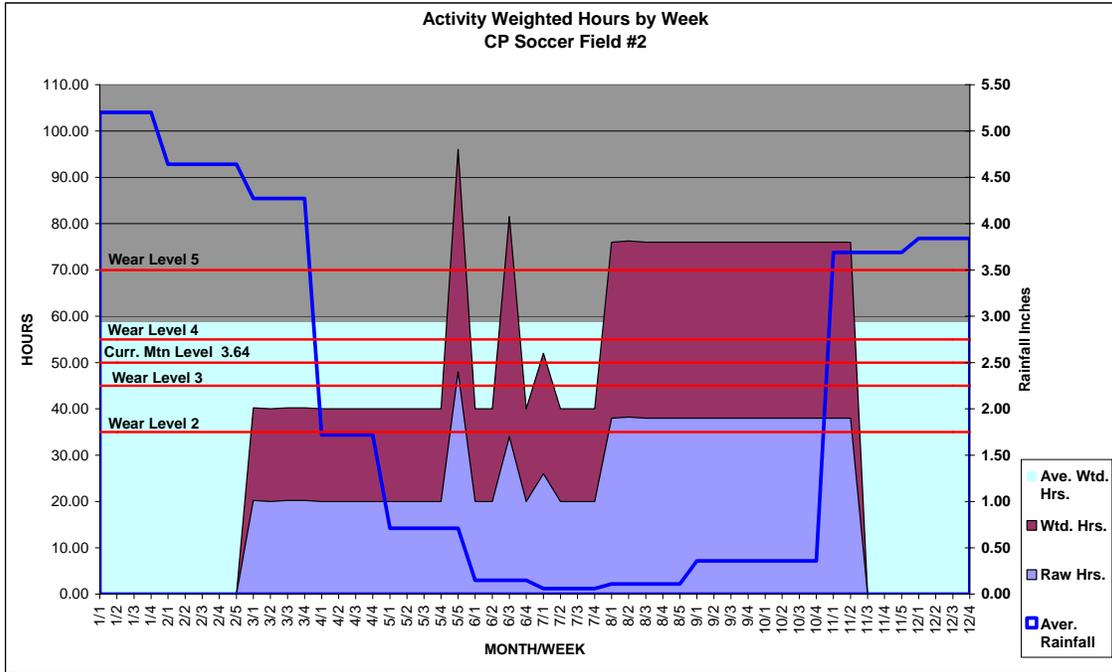
## WEAR INDEX IN HOURS PER WEEK

SITE	Sq. Ft	Weeks	Activity	Maint.	Current
			#	Weighted	Level Needed
			Hours/ Wk	Category	Level
CP Soccer #1	80000	36	74.5	5.00	3.64
CP Soccer #2	80000	36	58.8	4.00	3.64
CP Soccer #3,#4	244000	36	81.0	5.00	3.64
CP Baseball #5	41720	36	56.5	4.00	3.64
Lucky A's Field #1	77000	36	60.8	4.50	3.64
<b>Totals/ Averages</b>	<b>522720</b>	<b>36</b>	<b>66.3</b>	<b>4.50</b>	<b>3.64</b>

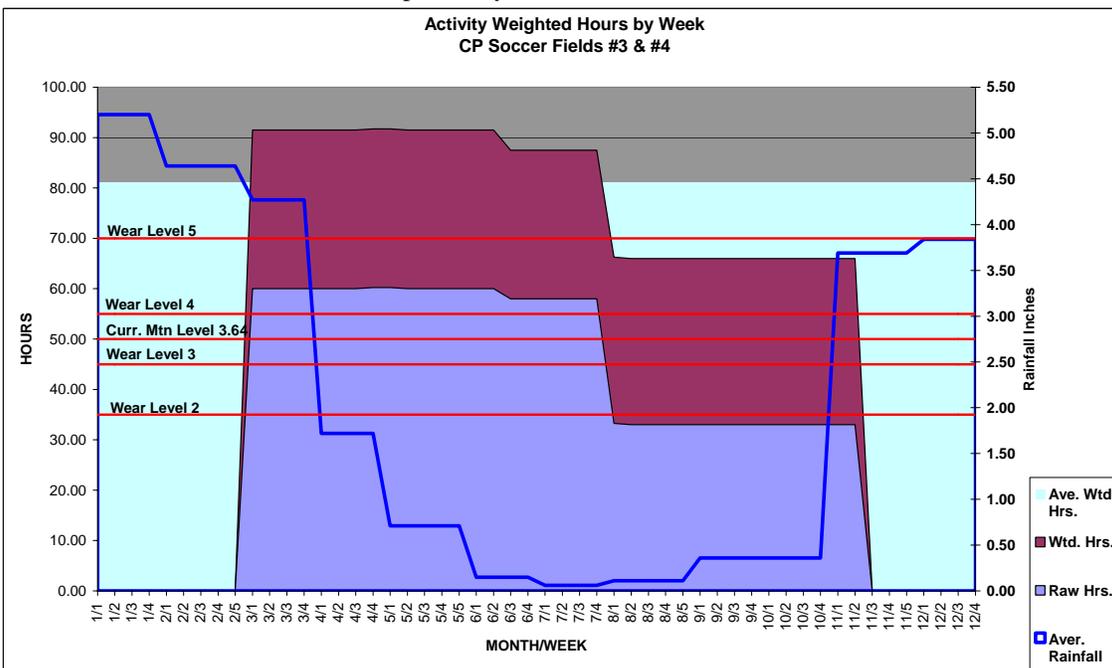
Note the chart below titled Activity Weighted Hours by Week VS Rainfall for Soccer field #1. Some of your heaviest play occurs during October –Mid November which is also some of your heaviest rainfall. This is a sand based field which drains well as we discovered in our site visit however this type of field does not tolerate heavy wear. This lighted field would be a perfect candidate for either artificial turf or the amended sand based field we discussed in the executive summary that would cost 1/4<sup>th</sup> as much as the artificial turf and tolerate an exceptional amount of wear.



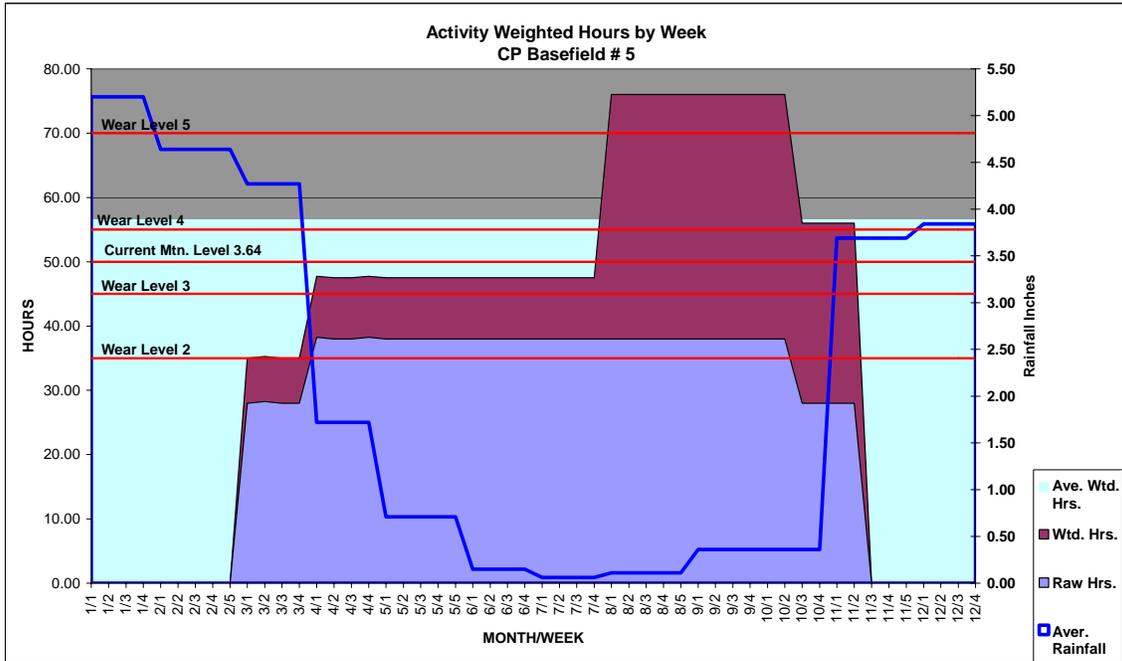
Soccer Field # 2 does not get quite as much play as #1 possibly because of the lights on #1. It is also a sand based field and drains well but again does not tolerate a lot of wear.



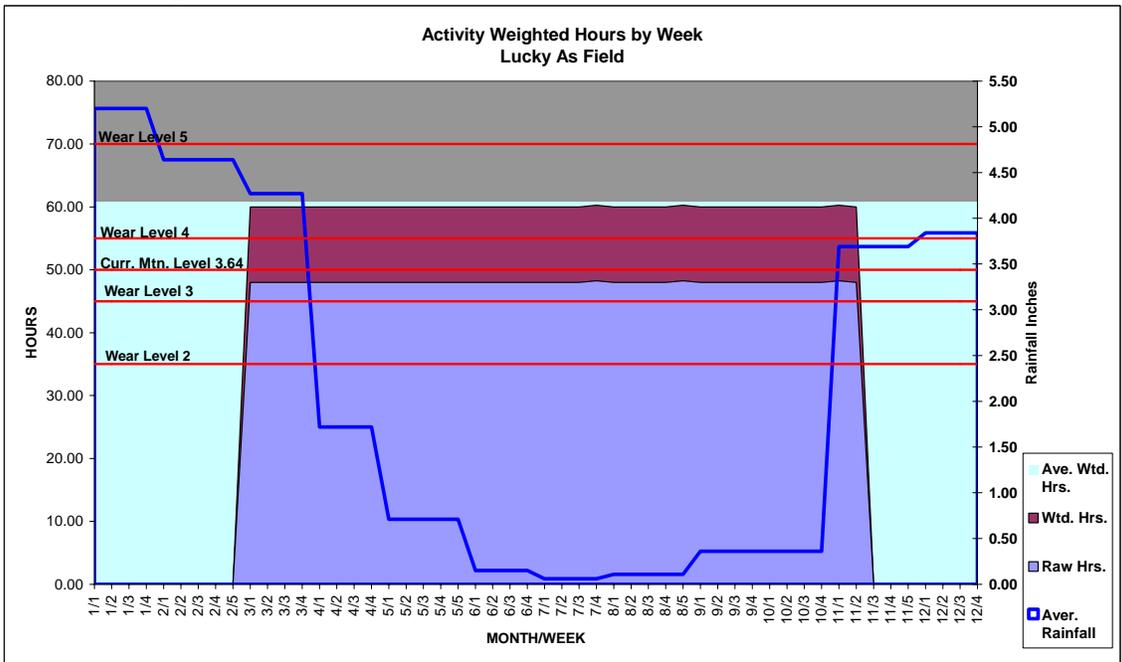
Soccer fields #3 & #4 get a lot more play than field # 2 but definitely get mushy when saturated because of the clay content. They would be good candidates for the slit drain system which has already worked for you on Athan Downs but is a much improved system.



Baseball field #5 doesn't get as much wear as the soccer fields but it too was mushy and saturated on our site visit. This might also be a good candidate for the slit drain system.



This field has lots of wear and is consistently heavy during the spring rains. It is also dealing with bad water from the well and should begin receiving the sodium blocker product through fertigation as discussed in the Executive Summary. It would tie up the sodium in the water and move it out of the root-zone where it is accumulating.



**2. The Current Maintenance Level of the Fields**

The Wear Index shows that these fields have a category **4.5** wear and your current maintenance level is 3.64. Note that the Maintenance Frequency chart below shows the tasks necessary for your turf to be sustainable under your current conditions of wear, soils and growing conditions. The major increase is in the number of aerations, fertilizations and mowings. The mowings would be cut in half if you follow our recommendations for using a Primo type growth regulator that uses the energy from the additional fertilizations to mend and drive roots down.

**MAINTENANCE FREQUENCY**

Category	Mowings		Aerations		Top-Dress		Overseed		Fertilize			
	Level	Per Year	Per Year	Per Year								
	Curr. Level	New Level	Curr. Level	New Level	Curr. Level	New Level	Curr. Level	New Level	Curr. Level	New Level		
CP Soccer #1	3.64	5.00	44	101	10	10	1	1	1	1	5	6
CP Soccer #2	3.64	4.00	44	108	10	10	1	1	1	1	5	6
CP Soccer #3,#4	3.64	5.00	44	116	10	10	1	1	1	1	5	6
CP Baseball #5	3.64	4.00	44	94	10	10	1	1	1	1	5	6
Lucky A's Field #1	3.64	4.50	44	79	10	10	1	1	1	1	5	6
<b>AVERAGES</b>	<b>3.64</b>	<b>4.50</b>	<b>44.0</b>	<b>99.4</b>	<b>10</b>	<b>10.0</b>			<b>1</b>	<b>1</b>	<b>5</b>	<b>6</b>

**3. The Soil Analysis:**

Below is a comparison of the potable irrigation water, the soil analysis and the leaf analysis for Central Park fields 1 & 2. The water is excellent quality irrigation water even though it is very high in pH. The soils on these fields are very low pH and low in calcium & magnesium. The leaf analysis gives us a true picture of the nutrient utilization of the turf plants growing in this root-zone. In this case the leaf analysis also shows low in calcium & magnesium. The lime we are recommending contains calcium and magnesium. Also nutrients leach through sand based root-zones quickly so the fertigation system we are recommending for this site and the nutrients we are recommending in the calendar will insure that this turf does not under perform because of a lack of nutrients.

Irrigation Water Analysis	Total % N	Phos. % P	Pott. % K	Calcium % Ca	Magnes. % Mg	Sulfur % S	Zinc Zn ppm	Iron Fe ppm	Mang. Mn ppm	Copper Cu ppm	Boron B ppm	Sodium ppm Na	pH	EC	TDS	Cl ppm	SAR	Na%
Central Park Soccer #1 & #2	5-50	3-1.21	5-20	20-60	10-25	10-30		0			<7	<50	7	<700	<450	0-70	<6	<50
Potable Water 12/7/2010	0.12	<.307	<1	5.00	<1	0.41		0.07	<.005		0.02	5.00	8.70	62	39	6.30	0.50	39.60
Soil Analysis Comparison	ppm N	ppm P	ppm K	ppm Ca	ppm Mg	ppm S	ppm Zn	ppm Fe	ppm Mn	ppm Cu	ppm B	ppm Na	pH	EC	% Organ	ppm Cl	CEC	Na%
Central Park Soccer #1 & #2 12/7/2010	5.00	50.00	89.73	704.41	137.50	15.00	3.00	15.00	2.00	1.50	0.75	17.65	7.00	<2	2.00%	<200	>10	<1%
	8	92	178	552	113	28	6.2	326	26	1.5	0.1	27	5.4	0.16	2.5	30	5	2
				Low	Low						Low		Low					
Leaf Analysis Comparison	Total % N	Phos. % P	Pott. % K	Calcium % Ca	Magnes. % Mg	Sulfur % S	Zinc Zn ppm	Iron Fe ppm	Mang. Mn ppm	Copper Cu ppm	Boron B ppm	Sodium % Na						
Central Park Soccer #1 & #2 Needed	3.4-4.5	0.35-0.8	3-4%	0.4-1.25	0.25-0.6	0.25-0.6	20-65	80-250	50-200	9-20	0-50	0.01-.250						
12/7/2010	4.64	0.53	3.32	0.19	0.19	0.54	55	252	135	4	5	0.081						

On the next page is a comparison of the potable irrigation water, the soil analysis and the leaf analysis for Central Park soccer fields 3 & 4. The water is excellent quality irrigation water even though it is very high in pH. The soils on these fields are high pH and low in calcium & magnesium. The leaf analysis gives us a true picture of the nutrient utilization of the turf plants growing in this root-zone. In this case the leaf analysis also shows low in calcium & magnesium. The fertigation system we are recommending for this

site and the nutrients we are recommending in the calendar will insure that this turf does not under perform because of a lack of nutrients.

Irrigation Water Analysis		Phos.	Pott.	Calcium	Magnes.	Sulfur	Zinc	Iron	Mang.	Copper	Boron	Sodium	pH	EC	TDS	Cl ppm	SAR	Na%
Total % N	% P	% K	% Ca	% Mg	% S	Zn ppm	Fe ppm	Mn ppm	Cu ppm	B ppm	ppm Na							
Central Park Soccer #3-4-5,	5-50	3-1.21	5-20	20-60	10-25	10-30		0	0	0	<7	<50	7	<700	<450	0-70	<6	<50
Potable 12/7/2010	0.12	<.307	<1	5	<1	0.41	0	0.07	<.005	0	0.02	5	8.7	61.7	39	6.3	0.5	39.6
Soil Analysis Comparison																		
ppm N	ppm P	ppm K	ppm Ca	ppm Mg	ppm S	ppm Zn	ppm Fe	ppm Mn	ppm Cu	ppm B	ppm Na	pH	EC	% Organi	ppm Cl	CEC	Na%	
Central Park Soccer #3-4-5,	5.00	50.00	502	3920	770	15.00	3.00	15.00	2.00	1.50	99	7.00	<2	2.00%	<200	>10	1.50%	
Minimum																		
12/7/2010	15	140	527	3903	761	169	8.4	189	1	2.2	0.67	126	8.30	0.51	5.90	30.00	28.00	2.00
Leaf Analysis Comparison																		
Total % N	Phos. % P	Pott. % K	Calcium % Ca	Magnes. % Mg	Sulfur % S	Zinc Zn ppm	Iron Fe ppm	Mang. Mn ppm	Copper Cu ppm	Boron B ppm	Sodium % Na							
Central Park Soccer #3-4-5,	3.4-4.5	0.35-0.8	3-4%	0.4-1.25	0.25-0.6	20-65	80-250	50-200	9-20	0-50	0.01-.250							
Needed																		
12/7/2010	4.43	0.51	3.07	0.33	0.23	0.34	53	1230	111	7	5	0.049						

Below is a comparison of the potable irrigation water, the soil analysis and the leaf analysis for Central Park Lucky A's fields. The water is acceptable quality irrigation water. The soil on this field is and low in potassium & calcium. The leaf analysis gives us a true picture of the nutrient utilization of the turf plants growing in this root-zone. In this case the leaf analysis also shows low in potassium, calcium & magnesium however the high sodium level in the soil is binding up the Cations or positive ions (potassium, calcium & magnesium) to the extent that these Cations are not being taken up by the leaf as they should be. The fertigation system we are recommending for this field and the nutrients we are recommending in the calendar will insure that this turf does not under perform because of a lack of nutrients.

Irrigation Water Analysis		Phos.	Pott.	Calcium	Magnes.	Sulfur	Zinc	Iron	Mang.	Copper	Boron	Sodium	pH	EC	TDS	Cl ppm	SAR	Na%
Total % N	% P	% K	% Ca	% Mg	% S	Zn ppm	Fe ppm	Mn ppm	Cu ppm	B ppm	ppm Na							
Central Park Lucky A's Field	5-50	3-1.21	5-20	20-60	10-25	10-30		0	0	0	<7	<50	7	<700	<450	0-70	<6	<50
Well Water 12/7/2010	<1	<.307	2	91	22	7.6	0	0.69	0.18	0	0.27	35.8	7.5	911	583	66	2	35.8
Soil Analysis Comparison																		
ppm N	ppm P	ppm K	ppm Ca	ppm Mg	ppm S	ppm Zn	ppm Fe	ppm Mn	ppm Cu	ppm B	ppm Na	pH	EC	% Organi	ppm Cl	CEC	Na%	
Central Park Lucky A's Field	5.00	50.00	1265	6440	825	15.00	3.00	15.00	2.00	1.50	162	7.00	<2	2.00%	<200	>10	1.50%	
Minimum																		
12/7/2010	21	56	372	6377	1180	224	3.20	67	15	2.42	830	7.30	2.80	6.10	400	46.0	8	
Leaf Analysis Comparison																		
Total % N	Phos. % P	Pott. % K	Calcium % Ca	Magnes. % Mg	Sulfur % S	Zinc Zn ppm	Iron Fe ppm	Mang. Mn ppm	Copper Cu ppm	Boron B ppm	Sodium % Na							
Central Park Lucky A's Field	3.4-4.5	0.35-0.8	3-4%	0.4-1.25	0.25-0.6	20-65	80-250	50-200	9-20	0-50	0.01-.250							
Needed																		
12/7/2010	3.17	0.4	2.02	0.36	0.19	0.25	41	864	84	9	0.406							

## Costs of Solving Your Problems

### 1. Manpower

The wear index chart below indicates that by increasing your maintenance level from 3.64 to your wear level of 4.5, you would need to add 624 additional annual man-hours or approximately \$48,024 annually in maintenance costs on these fields based on your current wages & benefits. This figure doesn't include the additional materials such as fertilizer, seed, and topdressing.

## WEAR INDEX IN HOURS PER WEEK

SITE	Sq. Ft	Weeks	Activity	Maint.	Current	Current	Needed	Addit.	Current	New	\$
			#	Weighted	Level Needed	Maint.	Ann. Mtn.	Ann. Mtn.	Ann. Mtn.	Approx.	
			Hours/ Wk	Category	Level	Hours	Hours	Hours	Mtn.Cost	Mtn.Cost	Increase
CP Soccer #1	80000	36	74.5	5.00	3.64	171	270	99	\$13,152	\$20,778	\$7,626
CP Soccer #2	80000	36	58.8	4.00	3.64	362	462	100	\$27,867	\$35,546	\$7,679
CP Soccer #3,#4	244000	36	81.0	5.00	3.64	1106	1440	335	\$85,152	\$110,914	\$25,761
CP Baseball #5	41720	36	56.5	4.00	3.64	217	257	40	\$16,728	\$19,776	\$3,048
Lucky A's Field #1	77000	36	60.8	4.50	3.64	402	453	51	\$30,948	\$34,858	\$3,910
Totals/ Averages	522720	36	66.3	4.50	3.64	2258	2881	624	\$173,847	\$221,871	\$48,024

### 2. Fertilizer Costs

The fertilizer costs below reflect the recommended liquid fertigation program which utilizes 6lbs per 1,000 sq ft of N required by high wear hybrid blue grass fields.

#### TURF NUTRIENTS REQUIRED FOR 2011 Fertigation / Granule

Nutrient	Nitrogen	Potassium	Sodium	Composter	Lime	Org.Growth	Primo	
Product	UAN		Blocker	Liquid		Medium		
Formulation	32-0-0	0-0-50				50Lbs./Bag		
Form	Gallons	Lbs	Gallons	Gallons	Lbs.	lbs./bags	Gallons	
All Fields	909	2774	15	172	7176	4800	22	
Cost Each	4.32	0.42	20.18	30.00	0.16	0.70	316.85	
Total Cost	\$3,925	\$1,165	\$297	\$5,175	\$1,132	\$3,360	\$7,122	\$22,176

### 4. Annual Maintenance Costs-

Scenario #1 below shows your current maintenance level and the \$237,585 it costs you annually to maintain these fields. This is \$19,799 per acre per year. Scenario #2 shows the \$310,933 in costs which is \$73,348 more in additional manpower and materials for stepping up your maintenance from level 3.64 to level 4.5. This would be \$25,911 per acre per year. Scenario #3 shows your annual cost including the one time charge for new equipment that is needed or \$331,308. This would be \$27,609 per acre for this year. Scenario #4 shows the \$262,484 in annual costs of maintaining your fields after the purchase of the new equipment. This is \$21,874 per acre per year which is in the very high range for high wear fields in your climate. These prices do not reflect the savings and costs of adding Sub surface irrigation to these fields. The two sand based fields would not be good candidates for subsurface irrigation however if we convert field # 1 to amended sand based, it would also be a good candidate for this.

### COMPOSITE SCENARIO COST ANALYSIS

		Scenario #1	Scenario #2	Scenario #3	Scenario #4
		2010	2011	2011	2012
		Current	Current	Current	Current
		Wear	Wear	Wear	Wear
		Mtn Level	Mtn Level	Mtn Level	Mtn Level
<b>City of San Ramon</b>					
<b>Composite of CP Sports Fields</b>		3.64	4.50	4.50	4.50
		No New	No New	Purchase	After
		Equipment	Equipment	New	New
				Equipment	Equipment
	\$/acre/yr	\$19,799	\$25,911	\$27,609	\$21,874
	Square Feet				
	Natural Turf	522,720	522,720	522,720	522,720
<b>ANNUAL TOTALS:</b>		\$237,585	\$310,933	\$331,308	\$262,484
<b>Top dressing</b>		\$2,299	\$9,530	\$9,530	\$4,765
<b>Spread top dressing-Contractor</b>		\$0	\$0	\$0	\$0
<b>Grass Seed</b>		\$900	\$6,179	\$6,179	\$6,179
<b>Slit Seed- Contractor</b>		\$0	\$0	\$0	\$0
<b>Fertilizer</b>		\$6,133	\$18,947	\$11,694	\$11,694
<b>Deeptine aeration- Contractor</b>		\$0	\$0	\$0	\$0
<b>Contractor Mobilization</b>		\$0	\$0	\$0	\$0
<b>Manpower</b>		\$175,617	\$223,641	\$185,047	\$185,047
<b>Water</b>		\$49,589	\$49,589	\$49,589	\$44,630
<b>Irrigation repair</b>		\$1,700	\$1,700	\$1,700	\$1,700
<b>Primo</b>		\$0	\$0	\$7,122	\$7,122
<b>Field Striping</b>		\$0	\$0	\$0	\$0
<b>Infield Materials</b>		\$1,347	\$1,347	\$1,347	\$1,347
<b>Field Renovation</b>		\$0	\$0	\$0	\$0
<b>Purchase New Equipment</b>					
1 90" Aerway Aerator				\$15,600	
2 Fertigation System installed				\$8,500	

## **Sports Field Management System Manual**

Below is the Sports Field Management System Annual Calendar that lays out every aspect of maintenance for each field at this site. Each calendar is customized for each site. The operator in the field should have a plastic laminated version of this.

This calendar below is the preliminary one for the recommended maintenance plan. Once you decide what recommendations you will be able to implement for the 2011 maintenance year, this will be changed to reflect your capabilities. It currently calls for a fertigation/granular program however if you won't be able to get fertigation this season we can redo these calendars for a granule program. It also calls for spraying the Primo product monthly during the growing season. This product cuts your mowing approximately in half but would need to be applied monthly to get the benefit from it.

The Maintenance calendars on the following pages show the tasks that need to occur in a one year period and the quantities of each fertilizer or amendment that is needed and the dates they are to be applied. These calendars are for fertigation and you would need two fertigation pumps for Central Park fields. You would need one for the Lucky A's field because it is on well water and will require sodium blocker to protect the turf from the high sodium and bicarbonate levels in the well water. You would need a second pump for the rest of the fields and since they are on good potable water, they will not need the sodium blocker added to the tank.

DATE: SQ.FT: 80000

CP Soccer Fields 1 & 2

02/09/11

Quantities are for each field

APPLICATION SCHEDULE City of San Ramon

WEEK	32-0-0 Gallons	0-45-0 LBS	0-0-50 LBS	Composter Galons	Growth Med. Lbs	Lime Lbs	Primo GALS	Mows/ Week W/O Primo	Mows/Week With Primo	Shatter Tine	Knife Aerate	Plug Aerate	Over Seed	Top Dress
01/01/11	0	0	0	0	0	0	0.00	0.5	0.5					
01/08/11								0.5	0.5					
01/15/11								0.5	0.5					
01/22/11								0.5	0.5					
01/29/11	0	0	0	0	0	0	0.00	0.5	0.5		X			
02/05/11								0.5	0.5					
02/12/11								0.5	0.5					
02/19/11								0.5	0.5					
02/26/11	20	0	0	26	0	1469	0.63	3	1.5		X			
03/05/11								3	1.5					
03/12/11								3	1.5					
03/19/11								3	1.5					
03/26/11	0	0	0	0	735	0	0.63	3	1.5		X			
04/02/11								3	1.5					
04/09/11								3	1.5					
04/16/11								3	1.5					
04/23/11	20	0	0	0	0	0	0.63	3	1.5		X			
04/30/11								2	1.0					
05/07/11								2	1.0					
05/14/11								2	1.0					
05/21/11								2	1.0					
05/28/11	0	0	0	0	0	0	0.63	2	1.0		X			
06/04/11								2	1.0					
06/11/11								2	1.0					
06/18/11								2	1.0					
06/25/11	20	0	0	0	0	0	0.63	2	1.0		X			
07/02/11								2	1.0					
07/09/11								2	1.0					
07/16/11								2	1.0					
07/23/11								2	1.0					
07/30/11	0	0	0	0	0	0	0.63	3	1.5		X			
08/06/11								3	1.5					
08/13/11								3	1.5					
08/20/11								3	1.5					
08/27/11	20	0	0	0	0	0	0.63	3	1.5		X			
09/03/11								3	1.5					
09/10/11								3	1.5					
09/17/11								3	1.5					
09/24/11	0	0	0	0	0	0	0.63	3	1.5		X			
10/01/11								3	1.5					
10/08/11								3	1.5					
10/15/11								3	1.5					
10/22/11	20	0	0	0	0	0	0.00	3	1.5		X			
10/29/11								0.5	0.5	X		X	X	X
11/05/11								0.5	0.5					
11/12/11								0.5	0.5					
11/19/11								0.5	0.5					
11/26/11	0	0	0	0	0	0	0	0.5	0.5					
12/03/11								0.5	0.5					
12/10/11								0.5	0.5					
12/17/11								0.5	0.5					
12/24/11	20	0	0	0	0	0	0	0.5	0.5					

UAN 32 32-0-0 122 Gls Lime 1469 Lbs .5 Mowings per week= Mowing every 14 days  
 0-45-0 0 Lbs Primo 5.05 Gls 1 Mowing per week= Mowing every 7 days  
 0-0-50 0 Lbs 1.5 Mowings per week = Mowing every 5 days  
 Composter 26 Gls 2 mowings per week= Mowing every 4 days  
 Growth Mediu 735 Lbs 2.5 Mowings per week= Mowing every 3 days

DATE: SQ.FT: 244000

CP Soccer #3,#4

02/21/11

Quantities are for all fields

APPLICATION SCHEDULE: City of San Ramon

WEEK OF	32-0-0 LBS.	Lime LBS	0-0-50 LBS	Composter LBS	Growth Med. LBS	Primo GALS	Mows/ Week W/O Primo	Mows/Week With Primo	Shatter Tine	Knife Aerate	PLUG Aerate	OVER SEED	TOP DRESS
01/01/11	0	0	0	0	0	0	0.5	0.5					
01/08/11							0.5	0.5					
01/15/11							0.5	0.5					
01/22/11							0.5	0.5					
01/29/11	90	0	488	0	0	0.00	0.5	0.5		X			
02/05/11							0.5	0.5					
02/12/11							0.5	0.5					
02/19/11							0.5	0.5					
02/26/11	0	0	0	81	2241	1.04	3	1.5		X			
03/05/11							3	1.5					
03/12/11							3	1.5					
03/19/11							3	1.5					
03/26/11	90	3619	488	0	0	1.04	3	1.5		X			
04/02/11							3	1.5					
04/09/11							3	1.5					
04/16/11							3	1.5					
04/23/11	0	0	0	0	0	1.04	3	1.5		X			
04/30/11							3	1.5					
05/07/11							3	1.5					
05/14/11							3	1.5					
05/21/11							3	1.5					
05/28/11	90	0	488	0	0	1.04	3	1.5		X			
06/04/11							3	1.5					
06/11/11							3	1.5					
06/18/11							3	1.5					
06/25/11	0	0	0	0	0	1.04	3	1.5		X			
07/02/11							3	1.5					
07/09/11							3	1.5					
07/16/11							3	1.5					
07/23/11							3	1.5					
07/30/11	90	0	488	0	0	1.04	3	1.5		X			
08/06/11							3	1.5					
08/13/11							3	1.5					
08/20/11							3	1.5					
08/27/11	0	0	0	0	0	1.04	3	1.5		X			
09/03/11							3	1.5					
09/10/11							3	1.5					
09/17/11							3	1.5					
09/24/11	90	0	488	0	0	1.04	3	1.5		X			
10/01/11							3	1.5					
10/08/11							3	1.5					
10/15/11							3	1.5					
10/22/11	0	0	0	0	0	0.00	3	1.5		X			
10/29/11							3	1.5	X		X	X	X
11/05/11							0.5	0.5					
11/12/11							0.5	0.5					
11/19/11							0.5	0.5					
11/26/11	0	0	0	0	0	0.00	0.5	0.5					
12/03/11							0.5	0.5					
12/10/11							0.5	0.5					
12/17/11							0.5	0.5					
12/24/11							0.5	0.5					

Nitrogen 32-0-0 448 gls  
 Lime 3619 lbs  
 0-0-50 2440 lbs  
 Primo 8.33 gls  
 Composter Liquid 81 lbs  
 Org. Grow.Medium 2241 lbs  
 .5 Mowings / week= Mowing every 14 days  
 1 Mowing / week= Mowing every 7 days  
 1.5 Mowings / week = Mowing every 5 days  
 2 mowings / week= Mowing every 4 days  
 2.5 Mowings / week= Mowing every 3 days

DATE: SQ.FT: 41720

CP Baseball #5

02/21/11

APPLICATION SCHEDULE: City of San Ramon

WEEK OF	32-0-0 GALS	Lime LBS	0-0-50 LBS	Composter LBS	Growth Med. LBS	Primo GALS	Mows/ Week W/O Primo	Mows/Week With Primo	Fracture Tine	Knife Aerate	Plug Aerate	Over Seed	Top Dress
01/01/11	0	0	0	0	0		0.5	0.5					
01/08/11							0.5	0.5					
01/15/11							0.5	0.5					
01/22/11							0.5	0.5					
01/29/11	15	0	83	0	0	0.00	0.5	0.5		X			
02/05/11							0.5	0.5					
02/12/11							0.5	0.5					
02/19/11							0.5	0.5					
02/26/11	0	206	0	14	383	0.18	2	1.0		X			
03/05/11							2	1.0					
03/12/11							2	1.0					
03/19/11							2	1.0					
03/26/11	15	0	83	0	0	0.18	2	1.0		X			
04/02/11							2	1.0					
04/09/11							2	1.0					
04/16/11							2	1.0					
04/23/11	0	206	0	0	0	0.18	2	1.0		X			
04/30/11							2	1.0					
05/07/11							2	1.0					
05/14/11							2	1.0					
05/21/11							2	1.0					
05/28/11	15	0	83	0	0	0.18	2	1.0		X			
06/04/11							2	1.0					
06/11/11							2	1.0					
06/18/11							2	1.0					
06/25/11	0	206	0	0	0	0.18	2	1.0		X			
07/02/11							2	1.0					
07/09/11							2	1.0					
07/16/11							2	1.0					
07/23/11							2	1.0					
07/30/11	15	0	83	0	0	0.18	3	1.5		X			
08/06/11							3	1.5					
08/13/11							3	1.5					
08/20/11							3	1.5					
08/27/11	0	0	0	0	0	0.18	3	1.5		X			
09/03/11							3	1.5					
09/10/11							3	1.5					
09/17/11							3	1.5					
09/24/11	15	0	0	0	0	0.18	3	1.5		X			
10/01/11							3	1.5					
10/08/11							3	1.5					
10/15/11							3	1.5					
10/22/11	0	0	0	0	0	0	3	1.5		X			
10/29/11							3	1.5	X		X	X	X
11/05/11							0.5	0.5					
11/12/11							0.5	0.5					
11/19/11							0.5	0.5					
11/26/11	0	0	0	0	0	0	0.5	0.5					
12/03/11							0.5	0.5					
12/10/11							0.5	0.5					
12/17/11							0.5	0.5					
12/24/11							0.5	0.5					

Nitrogen 32-0-0 77 gls  
 Lime 619 lbs  
 0-0-50 334 lbs  
 Primo 1.42 gls  
 Composter 14 Lbs  
 Growth Med. 383 lbs  
 .5 Mowings / week= Mowing every 14 days  
 1 Mowing / week= Mowing every 7 days  
 1.5 Mowings / week = Mowing every 5 days  
 2 mowings / week= Mowing every 4 days  
 2.5 Mowings / week= Mowing every 3 days

DATE: SQ.FT: 77000

Lucky A's Field #1

02/09/11

APPLICATION SCHEDULE: City of San Ramon

WEEK OF	32-0-0 GALS	0-45-0 LBS	0-0-50 LBS	S Blocker GALS	Composter LBS	Growth Med. LBS	Primo GALS	Mows/ Week W/O Primo	Mows/Week With Primo	Fracture Tine	Knife Aeration	Plug Aerate	Over Seed	Top Dress
01/01/11	0	0	0	0	0	0	0	0.5	0.5					
01/08/11								0.5	0.5					
01/15/11								0.5	0.5					
01/22/11								0.5	0.5					
01/29/11	28	0	0	3	0	0	0	0.5	0.5		X			
02/05/11								0.5	0.5					
02/12/11								0.5	0.5					
02/19/11								0.5	0.5					
02/26/11	0	0	0	0	25	707	0.33	2	1.0		X			
03/05/11								2	1.0					
03/12/11								2	1.0					
03/19/11								2	1.0					
03/26/11	28	0	0	3	0	0	0.33	2	1.0		X			
04/02/11								2	1.0					
04/09/11								2	1.0					
04/16/11								2	1.0					
04/23/11	0	0	0	0	0	0	0.33	2	1.0		X			
04/30/11								2	1.0					
05/07/11								2	1.0					
05/14/11								2	1.0					
05/21/11								2	1.0					
05/28/11	28	0	0	3	0	0	0.33	2	1.0		X			
06/04/11								2	1.0					
06/11/11								2	1.0					
06/18/11								2	1.0					
06/25/11	0	0	0	0	0	0	0.33	2	1.0		X			
07/02/11								2	1.0					
07/09/11								2	1.0					
07/16/11								2	1.0					
07/23/11								2	1.0					
07/30/11	28	0	0	3	25	0	0.33	2	1.0		X			
08/06/11								2	1.0					
08/13/11								2	1.0					
08/20/11								2	1.0					
08/27/11	0	0	0	0	0	0	0.33	2	1.0		X			
09/03/11								2	1.0					
09/10/11								2	1.0					
09/17/11								2	1.0					
09/24/11	28	0	0	3	0	0	0.33	2	1.0		X			
10/01/11								2	1.0					
10/08/11								2	1.0					
10/15/11								2	1.0					
10/22/11	0	0	0	0	0	0	0	2	1.0		X			
10/29/11								0.5	0.5	X		X	X	X
11/05/11								0.5	0.5					
11/12/11								0.5	0.5					
11/19/11								0.5	0.5					
11/26/11	0	0	0	0	0	0	0	0.5	0.5					
12/03/11								0.5	0.5					
12/10/11								0.5	0.5					
12/17/11								0.5	0.5					
12/24/11								0.5	0.5					

Nitrogen 32-0-0 141 gls  
 0-45-0 0 lbs  
 0-0-50 0 lbs  
 Sodium Blocker 14.70 gls  
 Primo 2.63 gls  
 Composter 51 gls  
 Growth Med. 707 lbs  
 .5 Mowings per week= Mowing every 14 days  
 1 Mowing per week= Mowing every 7 days  
 1.5 Mowings per week = Mowing every 5 days  
 2 mowings per week= Mowing every 4 days  
 2.5 Mowings per week= Mowing every 3 days

# MANAGING SPORTS FIELD WEAR

Note that on the chart below for the sand based soccer field #1, that at your current maintenance level of 3.64 (the yellow bar across the chart) you currently have an excess hours of annual usage of 1082 activity weighted hours. Since there is soccer on this site with a rating of 2, this is an excess of 541 (1082 / 2) actual hours per year more than the turf can tolerate. When you step up your maintenance level 3.64 to level 4.5, you will still have 453 more activity weighted hours per year or 272 actual hours of play annually more than your turf can tolerate however we can sustain your turf at this level if all of the maintenance tasks are performed annually. As mentioned before, this field would be a prime candidate for renovation into a modified sand based system that would allow it to tolerate all of this wear and cost less to maintain.

## FIELD USAGE / AVAILABILITY ANALYSIS

City of San Ramon

CP Soccer #1 Square Ft. 80000 Total

Type of Grass: K BLUE GRASS Weeks/ YR 36 Hours Aver. Jan. Feb. Marct April May June July Aug. Sept. Oct. Nov. Dec.  
 Weeks/ mo 4 5 4 4 5 4 4 5 4 4 4 4

Field Availability		(Numbers represent activity-weighted hours per week)													
Current Maint. Level 3.64	Hours Allowed	1573	31	11	15	18	26	35	43	47	49	49	43	23	11
	Hours Available			11	15										11
	Excess hours of usage	1082	30			43	51	36	17	16	36	36	41	19	
Maint. Level 2.00	Hours Allowed	1101	21	8	11	12	18	25	30	33	34	34	30	16	8
	Hours Available			8	11										8
	Excess hours of usage	1554	43			48	58	47	30	30	50	50	54	26	
Maint. Level 3.00	Hours Allowed	1415	28	10	14	16	23	32	39	42	44	44	39	21	10
	Hours Available			10	14										10
	Excess hours of usage	1240	34			44	53	40	21	21	40	40	45	21	
Maint. Level 4.00	Hours Allowed	1730	34	12	17	19	29	39	47	52	53	53	47	25	12
	Hours Available			12	17										12
	Excess hours of usage	925				41	48	33	13	11	31	31	37	17	
Maint. Level 5.00	Hours Allowed	2202	43	15	21	25	36	49	60	66	68	68	60	32	15
	Hours Available			15	21				0	3					15
	Excess hours of usage	453				36	40	22			16	16	24	10	

Maintenance Frequencies-Annual Requirement			Activity Weighting Scale		Determining Field Availability
Maint. Level	Current 3.64	Needed 5.0	Walking on field/Softball	1.00	Use the following steps to evaluate requests for additional field time: 1. Determine the actual hours of additional use requested. 2. Multiply the total hours of proposed use by the appropriate activity weight. 3. Locate the column for the month when the proposed additional use would occur. 4. Determine if there are available hours at the current maintenance level. If there are, you can schedule the activity. 5. If not, see if sufficient hours can be made available by increasing the maint. Level. 6. If sufficient hours can be made available, and you can afford the additional mntn., you can schedule the activity.
Mowings/ Yr	44	101	Baseball	1.25	
Aerations/Yr	10	8	PE	1.50	
Top Dress/Yr	1	1	Parked Cars	1.50	
Over Seed/Yr	1	1	Marching Band	1.75	
Fertilization/Yr	5	6	Soccer Games	1.85	
Sweeping	0	0	Football Games	1.85	
Deep Tine/Yr	1	1	Soccer & FB Practices	2.00	
Verticuttings/yr	1	1	Adult Soccer & FB Games	2.13	
Annual Costs	\$23,053	\$34,302	Adult Soccer & FB Prac.	2.25	
Ann. Increase		\$11,249	Lacrosse	2.25	
Cost/month	\$2,771	\$4,124	Rugby	2.50	
Cost/week	\$693	\$1,031	Sports Clinics	2.50	
			Current Wear Level	5.00	
			Current Maintenance Level	3.64	
			Needed Maint. Level-Weather Adjustec	5.0	

The Field Usage / Availability Analysis chart below shows Central Park Soccer field # 2. Although it is also a sand based field, it does not get quite as much play as Field #1 above. In this case, at maintenance level 3.64, the field receives 291 Activity Weighted hours or 145+ (291/2) actual hours more play than it can tolerate per year. By increasing the maintenance on this field to level 5, you would actually have 431 additional activity weighted hours or 216 actual additional hours per year.

City of San Ramon		<b>FIELD USAGE / AVAILABILITY ANALYSIS</b>															
CP Soccer #2		Square Ft.	80000	Total													
Type of Grass:		Weeks/ YR	36	Hours Average	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
K BLUE GRASS		Weeks/ mo			4	5	4	4	5	4	4	5	4	4	4	4	
<b>Field Availability (Numbers represent activity-weighted hours per week)</b>																	
<b>Current Maint. Level 3.64</b>	Hours Allowed	1800	31	11	15	18	26	35	43	47	49	49	43	23	11		
	Hours Available			11	15					4							
	Excess hours of usage	291	8			23	14	16	7	28	28	33	15				
<b>Maint. Level 2.00</b>	Hours Allowed	1800	21	8	11	12	18	25	30	33	34	34	30	16	8		
	Hours Available			8	11												
	Excess hours of usage	291	8			28	22	27	20	10	42	42	46	22			
<b>Maint. Level 3.00</b>	Hours Allowed	1620	28	10	14	16	23	32	39	42	44	44	39	21	10		
	Hours Available			10	14												
	Excess hours of usage	471	13			24	17	20	12	1	32	32	37	17			
<b>Maint. Level 4.00</b>	Hours Allowed	1980	34	12	17	19	29	39	47	52	53	53	47	25	12		
	Hours Available			12	17					9							
	Excess hours of usage	111	3			21	11	13	3	23	23	29	13				
<b>Maint. Level 5.00</b>	Hours Allowed	2521	43	15	21	25	36	49	60	66	68	68	60	32	15		
	Hours Available	431	12	15	21			10	23								
	Excess hours of usage					16	4	2		8	8	16	6				
<b>Maintenance Frequencies-Annual Requirement</b>																	
	Current																Needed
<b>Maint. Level</b>	3.64																4.0
Mowings/ Yr	44																108
Aerations/Yr	10																10
Top Dress/Yr	1																1
Over Seed/Yr	1																1
Fertilization/Yr	5																8
Sweeping	0																0
Deep Tine/Yr	1																1
Verticuttings/yr	0																0
Annual Costs	\$37,186																\$47,063
Ann. Increase																	\$9,877
Cost/month	\$1,032																\$1,306
Cost/week	\$258																\$326
<b>Activity Weighting Scale</b>																	
Walking on field/Softball 1.00																	
Baseball 1.25																	
PE 1.50																	
Parked Cars 1.50																	
Marching Band 1.75																	
Soccer Games 1.85																	
Football Games 1.85																	
Soccer & FB Practices 2.00																	
Adult Soccer & FB Games 2.13																	
Adult Soccer & FB Practice 2.25																	
Lacrosse & Field Hockey 2.25																	
Rugby 2.50																	
Sports Clinics 2.50																	
Current Wear Level 4.00																	
Current Maintenance Level 3.64																	
Needed Maint. Level-Weather Adjusted 4.0																	
<b>Determining Field Availability</b>																	
Use the following steps to evaluate requests for additional field time:																	
1. Determine the actual hours of additional use requested.																	
2. Multiply the total hours of proposed use by the appropriate activity weight.																	
3. Locate the column for the month when the proposed additional use would occur.																	
4. Determine if there are available hours at the current maintenance level. If there are, you can schedule the activity.																	
5. If not, see if sufficient hours can be made available by increasing the maintenance level.																	
6. If sufficient hours can be made available, and you can handle and afford the additional maintenance, you can schedule the activity.																	

Note that on the chart on the next page for CPS Soccer fields #3 & #4, that at your current maintenance level of 3.64 (the yellow bar across the chart) you currently have an excess hours of annual usage of 1316 activity weighted hours. Since there is soccer on this site with a rating of 2, this is an excess of 658 (1316 / 2) actual hours per year more than the turf can tolerate. When you step up your maintenance level 3.64 to level 5, you will still have 687 more activity weighted hours per year or 343+ actual hours of play annually more than this turf can tolerate however we can sustain your turf at this level if all of the maintenance tasks are performed annually.

City of San Ramon

## FIELD USAGE / AVAILABILITY ANALYSIS

CP Soccer #3,#4

Square Ft. 244000 **Total**

Type of Grass: K BLUE GRASS

Weeks/YR 36

Hours Average Jan. Feb. March April May June July Aug. Sept. Oct. Nov. Dec.

Weeks/mo

4 5 4 4 5 4 4 5 4 4 4 4

Field Availability		(Numbers represent activity-weighted hours per week)													
<b>Current Maint. Level 3.64</b>	Hours Allowed	1573	31	11	15	18	26	35	43	47	49	49	43	23	11
	Hours Available			11	15										11
	Excess hours of usage	1316	37		74	66	57	47	41	18	18	23	10		
<b>Maint. Level 2.00</b>	Hours Allowed	1101	21	8	11	12	18	25	30	33	34	34	30	16	8
	Hours Available			8	11										8
	Excess hours of usage	1788	50		79	73	67	59	55	32	32	36	17		
<b>Maint. Level 3.00</b>	Hours Allowed	1415	28	10	14	16	23	32	39	42	44	44	39	21	10
	Hours Available			10	14										10
	Excess hours of usage	1473	41		76	68	60	51	45	22	22	27	12		
<b>Maint. Level 4.00</b>	Hours Allowed	1730	34	12	17	19	29	39	47	52	53	53	47	25	12
	Hours Available			12	17										12
	Excess hours of usage	1159			72	63	53	42	36	13	13	19	8		
<b>Maint. Level 5.00</b>	Hours Allowed	2202	43	15	21	25	36	49	60	66	68	68	60	32	15
	Hours Available			15	21					2	2				15
	Excess hours of usage	687			67	55	43	29	22				6	1	

Maintenance Frequencies-Annual Requirement			Activity Weighting Scale		Determining Field Availability	
<b>Maint. Level</b>	<b>Current</b>	<b>Needed</b>	Walking on field/Softball	1.00	Use the following steps to evaluate requests for additional field time: 1. Determine the actual hours of additional use requested. 2. Multiply the total hours of proposed use by the appropriate activity weight. 3. Locate the column for the month when the proposed additional use would occur. 4. Determine if there are available hours at the current maintenance level. If there are, you can schedule the activity. 5. If not, see if sufficient hours can be made available by increasing the maintenance level. 6. If sufficient hours can be made available, and you can handle and afford the additional maintenance, you can schedule the activity.	
	3.64	5.0	Baseball	1.25		
Mowings/ Yr	44	116	PE	1.50		
Aerations/Yr	10	6	Parked Cars	1.50		
Top Dress/Yr	1	1	Marching Band	1.75		
Over Seed/Yr	1	1	Soccer Games	1.85		
Fertilization/Yr	5	6	Football Games	1.85		
Sweeping	0	0	Soccer & FB Practices	2.00		
Deep Tine/Yr	1	1	Adult Soccer & FB Games	2.13		
Verticuttings/yr	0	0	Adult Soccer & FB Practice	2.25		
Annual Costs	\$112,874	\$143,369	Lacrosse & Field Hockey	2.25		
Ann. Increase		\$30,495	Rugby	2.50		
Cost/month	\$2,177	\$2,765	Sports Clinics	2.50		
Cost/week	\$544	\$691	<b>Current Wear Level</b>	<b>5.00</b>		
			<b>Current Maintenance Level</b>	<b>3.64</b>		
			<b>Needed Maint. Level-Weather Adjusted</b>	<b>5.0</b>		

Note that on the chart on the next page for CP Baseball field #5, that at your current maintenance level of 3.64 (the yellow bar across the chart) you currently have an excess hours of annual usage of 436 activity weighted hours. Since this is baseball with a rating of 1.25, this is an excess of 348+ (436/ 1.25) actual hours per year more wear than the turf can tolerate. By stepping up your maintenance to level to 5 you could have 193 more activity weighted hours per year or 154+ actual hours of play annually more on this turf.

City of San Ramon Square Ft. 41720 **FIELD USAGE / AVAILABILITY ANALYSIS**

CP Baseball #5 **Total**  
 Type of Grass: **Weeks/ YR 36** **Hours Average** **Jan.** **Feb.** **March** **April** **May** **June** **July** **Aug.** **Sept.** **Oct.** **Nov.** **Dec.**  
 K BLUE GRASS **Weeks/ mo** 4 5 4 4 5 4 4 5 4 4 4 4 4

<b>Field Availability (Numbers represent activity-weighted hours per week)</b>															
<b>Current Maint. Level 3.64</b>	Hours Allowed	1573	31	11	15	18	26	35	43	47	49	49	43	23	11
	Hours Available			11	15										11
	Excess hours of usage	436	12			18	22	13	5	1	28	28	23	5	
<b>Maint. Level 2.00</b>	Hours Allowed	1101	21	8	11	12	18	25	30	33	34	34	30	16	8
	Hours Available			8	11										8
	Excess hours of usage	908	25			23	29	23	17	15	42	42	36	12	
<b>Maint. Level 3.00</b>	Hours Allowed	1415	28	10	14	16	23	32	39	42	44	44	39	21	10
	Hours Available			10	14										10
	Excess hours of usage	593	16			19	24	16	9	5	32	32	27	7	
<b>Maint. Level 4.00</b>	Hours Allowed	1730	34	12	17	19	29	39	47	52	53	53	47	25	12
	Hours Available			12	17					4					12
	Excess hours of usage	279	8			16	19	9	0		23	23	19	3	
<b>Maint. Level 5.00</b>	Hours Allowed	2202	43	15	21	25	36	49	60	66	68	68	60	32	15
	Hours Available	193		15	21				2	13	18			4	15
	Excess hours of usage					11	11				8	8	6		

<b>Maintenance Frequencies-Annual Requirement</b>			<b>Activity Weighting Scale</b>		<b>Determining Field Availability</b>
	<b>Current</b>	<b>Needed</b>	<b>Walking on field/Softball</b>	<b>1.00</b>	Use the following steps to evaluate requests for additional field time: 1. Determine the actual hours of additional use requested. 2. Multiply the total hours of proposed use by the appropriate activity weight. 3. Locate the column for the month when the proposed additional use would occur. 4. Determine if there are available hours at the current maintenance level. If there are, you can schedule the activity. 5. If not, see if sufficient hours can be made available by increasing the maintenance level. 6. If sufficient hours can be made available, and you can handle and afford the additional maintenance, you can schedule the activity.
<b>Maint. Level</b>	3.64	4.0	<b>Baseball</b>	<b>1.25</b>	
Mowings/ Yr	44	94	<b>PE</b>	<b>1.50</b>	
Aerations/Yr	10	7	<b>Parked Cars</b>	<b>1.50</b>	
Top Dress/Yr	1	1	<b>Marching Band</b>	<b>1.75</b>	
Over Seed/Yr	1	1	<b>Soccer Games</b>	<b>1.85</b>	
Fertilization/Yr	5	6	<b>Football Games</b>	<b>1.85</b>	
Sweeping	0	0	<b>Soccer &amp; FB Practices</b>	<b>2.00</b>	
Deep Tine/Yr	1	1	<b>Adult Soccer &amp; FB Games</b>	<b>2.13</b>	
Fertilization/Yr	0	0	<b>Adult Soccer &amp; FB Practice</b>	<b>2.25</b>	
Annual Costs	\$22,353	\$27,485	<b>Lacrosse &amp; Field Hockey</b>	<b>2.25</b>	
Ann. Increase		\$5,132	<b>Rugby</b>	<b>2.50</b>	
Cost/month	\$620	\$763	<b>Sports Clinics</b>	<b>2.50</b>	
Cost/week	\$155	\$191	<b>Current Wear Level</b>	<b>4.50</b>	
			<b>Current Maintenance Level</b>	<b>3.64</b>	
			<b>Needed Maint. Level-Weather Adjusted</b>	<b>4.0</b>	

Note that on the chart on the next page for Lucky A's Baseball field, that at your current maintenance level of 3.64 (the yellow bar across the chart) you currently have an excess hours of annual usage of 588 activity weighted hours. Since this is baseball with a rating of 1.25, this is an excess of 470+ (588/ 1.25) actual hours per year more play than this turf can tolerate. By stepping up the maintenance level to 5, you could have 41 more activity weighted hours per year or 32+ actual hours of play annually more on this turf.

City of San Ramon Square Ft. 77000 **FIELD USAGE / AVAILABILITY ANALYSIS**  
 Lucky A's Field #1 **Total**  
**Type of Grass:** Weeks/ YR 36 **Hours Average** Jan. Feb. March April May June July Aug. Sept. Oct. Nov. Dec.  
 K BLUE GRASS Weeks/ mo 4 5 4 4 5 4 4 5 4 4 4

Field Availability (Numbers represent activity-weighted hours per week)															
<b>Current Maint.</b>	Hours Allowed	1573	31	11	15	18	26	35	43	47	49	49	43	23	11
<b>Level</b>	Hours Available			11	15										11
<b>3.64</b>	Excess hours of usage	588	16			43	34	25	17	13	12	12	17	7	
<b>Maint. Level</b>	Hours Allowed	1101	21	8	11	12	18	25	30	33	34	34	30	16	8
<b>2.00</b>	Hours Available			8	11										8
	Excess hours of usage	1060	29			48	42	36	30	27	26	26	30	14	
<b>Maint. Level</b>	Hours Allowed	1415	28	10	14	16	23	32	39	42	44	44	39	21	10
<b>3.00</b>	Hours Available			10	14										10
	Excess hours of usage	746	21			44	37	29	21	18	16	16	21	9	
<b>Maint. Level</b>	Hours Allowed	1730	34	12	17	19	29	39	47	52	53	53	47	25	12
<b>4.00</b>	Hours Available			12	17										12
	Excess hours of usage	431	12			41	31	22	13	8	7	7	13	5	
<b>Maint. Level</b>	Hours Allowed	2202	43	15	21	25	36	49	60	66	68	68	60	32	15
<b>5.00</b>	Hours Available	41		15	21				0	6	8	8	0	2	15
	Excess hours of usage					36	24	11							

Maintenance Frequencies-Annual Requirement			Activity Weighting Scale		Determining Field Availability
	Current	Needed	Walking on field/Softball	1.00	Use the following steps to evaluate requests for additional field time: 1. Determine the actual hours of additional use requested. 2. Multiply the total hours of proposed use by the appropriate activity weight. 3. Locate the column for the month when the proposed additional use would occur. 4. Determine if there are available hours at the current maintenance level. If there are, you can schedule the activity. 5. If not, see if sufficient hours can be made available by increasing the maintenance level. 6. If sufficient hours can be made available, and you can handle and afford the additional maintenance, you can schedule the activity.
<b>Maint. Level</b>	3.64	4.5	Baseball	1.25	
Mowings/ Yr	44	79	PE	1.50	
Aerations/Yr	10	0	Parked Cars	1.50	
Top Dress/Yr	1	1	Marching Band	1.75	
Over Seed/Yr	1	1	Soccer Games	1.85	
Fertilization/Yr	5	6	Football Games	1.85	
Sweeping	0	0	Soccer & FB Practices	2.00	
Deep Tine/Yr	1	1	Adult Soccer & FB Games	2.13	
Verticuttings/yr	0	0	Adult Soccer & FB Practice	2.25	
Annual Costs	\$33,082	\$40,661	Lacrosse & Field Hockey	2.25	
Ann. Increase		\$7,579	Rugby	2.50	
Cost/month	\$918	\$1,128	Sports Clinics	2.50	
Cost/week	\$229	\$282	Current Wear Level	4.50	
			Current Maintenance Level	3.64	
			Needed Maint. Level-Weather Adjusted	4.5	

## Field Overview Assessment Athan Downs Fields

The following is an evaluation of the Athan Downs fields as of January, 2011. It discusses the current condition of these fields and explains why they are in this condition. It will then go over a plan of action that can help to remedy the problems and cover the maintenance steps, needed equipment, and costs of maintaining these fields to prevent them from returning to there original condition. This document will then show the level of wear on the fields and how many hours of play per week these fields can sustain and still have viable turf.

### Current Conditions of the fields

As we discussed in the Executive Summary, the root depth on these fields is too shallow to allow the turf to stand up to the wear they are currently receiving and this is shown in the worn areas and bare spots on some of the fields. The irrigation systems and field grades are good. All of these fields except field #1 were saturated and squishy to walk on during our visit except Field #1 (has the sand channel drainage system in it.).

#### INITIAL SITE SURVEY

SITE	Root	Field	% Bare	%	Compacted	Irrigation	% Worn	High/Low	Wet/Dry
	Depth	Grade	Spots	Weeds	Areas %	System	Areas	Spots	Spots
Athan Downs Fields #2,3, 4	3.50	Good	8%	POA		Good	2%	X	X
Athan Downs Field #1	3.50	Good	3%	POA		Good	3%		

### The Causes of the Current Conditions

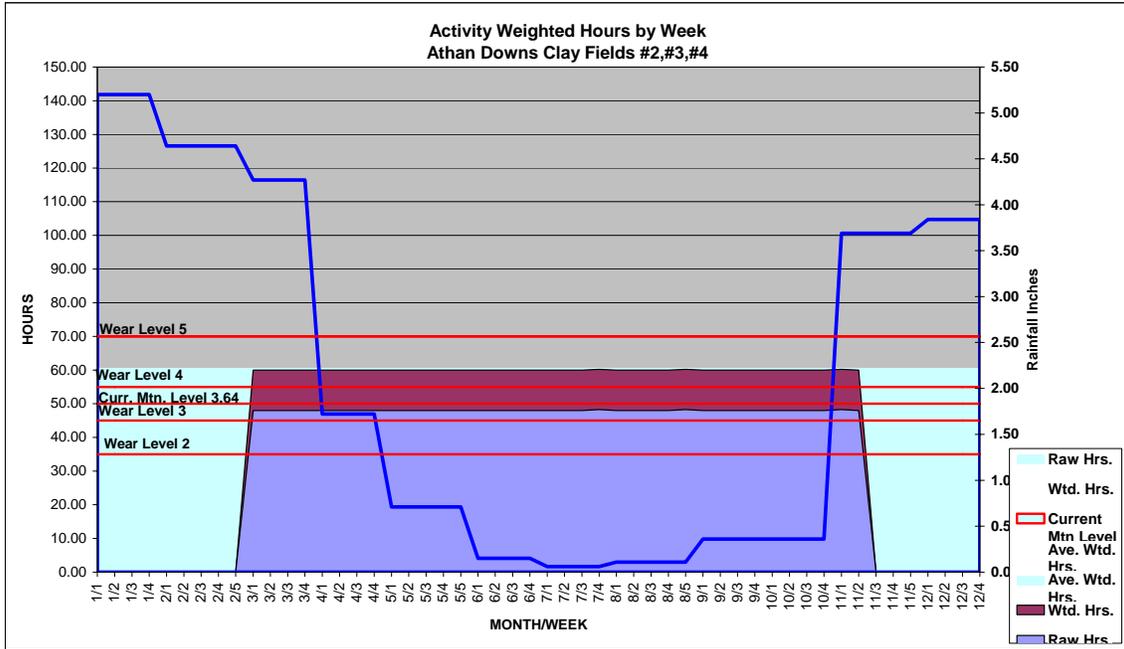
**1. Wear** has caused some of the current problems on these fields.

Your wear is probably the greatest contributor to compacted soils and the resulting damage to your turf. The Wear Index In Hours Per Week table below shows that this field has **58.2** activity-weighted hours of play per week. This is a category **4** wear level. The amount of play is scaled into levels 1-5, 5 being the highest and there is a direct correlation between wear and maintenance. Your current maintenance level is 3.64.

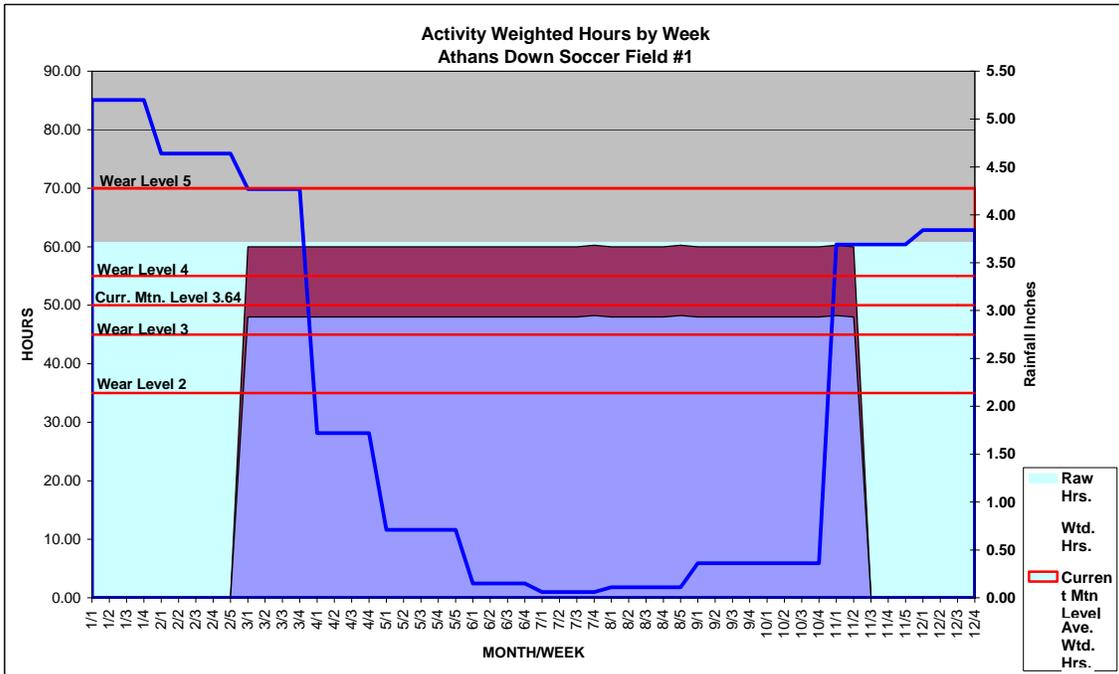
## WEAR INDEX IN HOURS PER WEEK

SITE	Sq. Ft	Weeks	Activity	Maint.	Current
			#	Weighted	Level Needed
			Hours/ Wk	Category	Level
Athan Downs Fields #2,3, 4	355600	36	59.9	4.00	3.64
Athan Downs Field #1	80000	36	56.4	4.00	3.64
<b>Totals/ Averages</b>	435600	36	58.2	4.00	3.64

Note the chart below titled Activity Weighted Hours by Week VS Rainfall for fields #2, #3 & #4. Some of your play occurs during October –Mid November and Mid February to April which is also some of your heaviest rainfall. These fields were all soft and mushy when we walked on them because of all the rain. These fields would be good candidates for a slit drain system as you have on field #1.



Soccer Field # 1 gets more play than #2, #3 & #4. It has a sand channel slit drain system in it and was the only field at this site that was not mushy and soft when we walked on it.



### 5. The Current Maintenance Level of the Fields

The Wear Index shows that these fields have a category 4 wear and your current maintenance level is 3.64. Note that the Maintenance Frequency chart below shows the tasks necessary for your turf to be sustainable under your current conditions of wear, soils and growing conditions. The major increase is in the number of fertilizations and mowings. The mowings would be cut in half if you follow our recommendations for using a Primo type growth regulator that uses the energy from the additional fertilizations to mend and drive roots down.

## MAINTENANCE FREQUENCY

Category	Mowings		Aerations		Top-Dress		Overseed		Fertilize			
	Level	Per Year										
Curr. Level	New Level	Curr Level	New Level	Curr Level	New Level	Curr Level	New Level	Curr Level	New Level	Curr Level	New Level	
Athan Downs Fields #2,3, 4	3.64	4.00	44	106	10	10	1	1	1	1	5	6
Athan Downs Field #1	3.64	4.00	44	100	10	10	1	1	1	1	5	6

### 3. The Soil Analysis:

Below is a comparison of the recycled irrigation water, the soil analysis and the leaf analysis for Athan Downs's fields #2, #3 & #4. The water is rated by the lab as poor quality recycled irrigation water. It is high in pH, chlorides, Electrical Conductivity (EC), Total Dissolved Solids (TDS) and Sodium Absorption Ratio (SAR). The soils on these fields are high in sodium and boron and low in calcium & potassium. The leaf analysis gives us a true picture of the nutrient utilization of the turf plants growing in this root-zone. In this case the leaf analysis also shows low in potassium however our experience tells us that the sodium level in the recycled water and in the soil is binding up the potassium and calcium making them less available to the plants. The fertigation system we are recommending for this site will add sodium blocker which is a proven method of lowering sodium in the soil and thus releasing the bound up nutrients. Also much of the nutrients will be added through the fertigation system as well.

Irrigation Water Analysis	Total % N	Phos. % P	Pott. % K	Calcium % Ca	Magnes. % Mg	Sulfur % S	Zinc Zn ppm	Iron Fe ppm	Mang. Mn ppm	Copper Cu ppm	Boron B ppm	Sodium ppm Na	pH	EC	TDS	Cl ppm	SAR	Na%
Athan Downs	5-50	3-1.21	5-20	20-60	10-25	10-30	0	0	0	<.7	<50	7	<700	<450	0-70	<6	<50	
Recycled 12/7/2010	1	2.763	14	44	29	27	0	0.05	0.031	0	0.64	130	7.6	1280	819	180	8.4	53.4
Soil Analysis Comparison	ppm N	ppm P	ppm K	ppm Ca	ppm Mg	ppm S	ppm Zn	ppm Fe	ppm Mn	ppm Cu	ppm B	ppm Na	pH	EC	% Organi	ppm Cl	CEC	Na%
Athan Downs Flds #2, #3, #4	5.00	50.00	743	3780	485	15.00	3.00	15.00	2.00	1.50	0.75	95.3	7.00	<2	2.00%	<200	>10	<1%
Minimum	9	88	499	3202	822	55	5.5	106	5.0	1.4	2.5	549	7.3	0.76	6.5	60	27	9
12/7/2010			Low	Low						High	High	High						High
Leaf Analysis Comparison	Total % N	Phos. % P	Pott. % K	Calcium % Ca	Magnes. % Mg	Sulfur % S	Zinc Zn ppm	Iron Fe ppm	Mang. Mn ppm	Copper Cu ppm	Boron B ppm	Sodium ppm Na						
Athan Downs	3.4-4.5	0.35-0.8	3-4%	0.4-1.25	0.25-0.6	0.25-0.6	20-65	80-250	50-200	9-20	0-50	0.01-250						
12/7/2010	5.33	0.53	2.54	0.43	0.26	0.38	53	1100	67	6	20	0.215						
			Low							Low								

On the next page is a comparison of the recycled irrigation water, the soil analysis and the leaf analysis for Athan Downs's field #1 with a sand channel slit drain system. The water is the same poor quality recycled irrigation water that is applied to Fields #2, #3, #4 and is high in all the same things. The soils on these fields are low in calcium & potassium. In this case the leaf analysis also shows low in potassium but again it is the sodium levels in the water and soils that are tying up the nutrients. The fertigation system mentioned above will apply the sodium blocker and nutrients to this field.

Irrigation Water Analysis		Phos.	Pott.	Calcium	Magnes.	Sulfur	Zinc	Iron	Mang.	Copper	Boron	Sodium	pH	EC	TDS	Cl ppm	SAR	Na%	
		Total % N	% P	% K	% Ca	% Mg	% S	Zn ppm	Fe ppm	Mn ppm	Cu ppm	B ppm	Na ppm						
Athan Downs		5.50	3.1.21	5.20	20.60	10.25	10.30	0	0	0	<.7	<.50	7	<.700	<.450	0.70	<.6	<.50	
Recycled 12/7/2010		1	2.763	14	44	29	27	0	0.05	0.031	0	0.64	130	7.6	1280	819	180	8.4	53.4
Soil Analysis Comparison																			
Athan Downs Sand Channel		ppm N	ppm P	ppm K	ppm Ca	ppm Mg	ppm S	ppm Zn	ppm Fe	ppm Mn	ppm Cu	ppm B	ppm Na	pH	EC	Organi	ppm Cl	CEC	Na%
Minimum		5.00	50.00	385	1860	251	15.00	3.00	15.00	2.00	1.50	0.75	49.4	7.00	<.2	2.00%	<.200	>.10	<.1%
12/7/2011		10	84	312	1691	458	18	4.0	69	4.0	0.8	1.7	291	7.4	0.43	5.5	40	14	9
Leaf Analysis Comparison																			
		Total % N	Phos. % P	Pott. % K	Calcium % Ca	Magnes. % Mg	Sulfur % S	Zinc Zn ppm	Iron Fe ppm	Mang. Mn ppm	Copper Cu ppm	Boron B ppm	Sodium % Na						
Athan Downs Sand Channel		3.4-4.5	0.35-0.8	3-4%	0.4-1.25	0.25-0.6	0.25-0.6	20-65	80-250	50-200	9-20	0-50	0.01-.250						
12/7/2010		5.33	0.53	Low	0.43	0.26	0.38	53	1100	67	6	20	0.215						

## Costs of Solving Your Problems

### 1. Manpower

The wear index chart below indicates that by increasing your maintenance level from 3.64 to your wear level of 4, you would need to add 563 additional annual man-hours or approximately \$43,326 annually in maintenance costs on these fields based on your current wages & benefits. This figure doesn't include the additional materials such as fertilizer, seed, and topdressing.

#### WEAR INDEX IN HOURS PER WEEK

SITE	Sq. Ft	Weeks	Hours/ Wk	Activity # Weighted	Maint. Level Needed	Current Maint. Level	Current Ann. Mtn. Hours	Needed Ann. Mtn. Hours	Addit. Ann. Mtn. Hours	Current Mtn. Cost	New Mtn. Cost	\$ Increase
Athan Downs Fields #2,3,4	355600	36	59.9	4.00	3.64	1872	2326	454	\$144,121	\$179,070	\$34,948	
Athan Downs Field #1	80000	36	56.4	4.00	3.64	400	509	109	\$30,803	\$39,181	\$8,378	
Totals/ Averages	435600	36	58.2	4.00	3.64	2272	2834	563	\$174,924	\$218,250	\$43,326	

### 2. Fertilizer Costs

The fertilizer costs below reflect the recommended liquid fertigation program which utilizes 6lbs per 1,000 sq ft of N required by high wear hybrid blue grass fields.

#### TURF NUTRIENTS REQUIRED FOR 2011 Fertigation / Granule

Nutrient	Nitrogen	Phosphorus	Sodium	Composter	Org. Growth	Primo	
Product	UAN		Blocker	Liquid	Medium		
Formulation	32-0-0	11-52-0			50Lbs./Bag		
Form	Gallons	Lbs.	Gallons	Gallons	lbs./bags	Gallons	
All AD Fields	687	0	83	144	4000	15	
Cost Each	4.32	0.42	20.18	30.00	0.70	316.85	
Total Cost	\$2,968	\$0	\$1,679	\$4,312	\$2,800	\$4,710	\$16,469

### 5. Annual Maintenance Costs-

Scenario #1 below shows your current maintenance level and the \$229,620 it costs you annually to maintain these fields. This is \$19,399 per acre per year. Scenario #2 shows the \$292,885 in costs which is \$63,265 more in additional manpower and materials for stepping up your maintenance from level 3.64 to level 4.25. This would be \$24,744 per acre per year. Scenario #3 shows your annual cost including the one time charge for new equipment that is needed or \$286,223. This would be \$24,181 per acre for this year. Scenario #4 shows the \$255,039 in annual costs of maintaining your fields after the purchase of the new equipment. This is \$21,547 per acre per year which is in the very high range for high wear fields in your climate. This chart does not reflect the savings and costs involved with the subsurface irrigation system discussed in the Executive Summary.

### COMPOSITE SCENARIO COST ANALYSIS

		Scenario #1	Scenario #2	Scenario #3	Scenario #4
		2010	2011	2011	2012
		Current	Current	Current	Current
		Wear	Wear	Wear	Wear
		Mtn Level	Mtn Level	Mtn Level	Mtn Level
<b>City of San Ramon</b>		<b>3.64</b>	<b>4.25</b>	<b>4.25</b>	<b>4.25</b>
<b>Composite of AD Sports Fields</b>		No New	No New	Purchase	After
		Equipment	Equipment	New	New
				Equipment	Equipment
	\$/acre/yr	\$19,399	\$24,744	\$24,181	\$21,547
	Square Feet	515,600	515,600	515,600	515,600
	Natural Turf	515,600	515,600	515,600	515,600
<b>ANNUAL TOTALS:</b>		\$229,620	\$292,885	\$286,223	\$255,039
<b>Top dressing</b>		\$2,850	\$7,647	\$7,647	\$3,823
<b>Spread top dressing-Contractor</b>		\$0	\$0	\$0	\$0
<b>Grass Seed</b>		\$1,622	\$6,987	\$6,987	\$6,987
<b>Slit Seed- Contractor</b>		\$0	\$0	\$0	\$0
<b>Fertilizer</b>		\$3,333	\$13,110	\$11,759	\$11,759
<b>Deeptine aeration- Contractor</b>		\$0	\$0	\$0	\$0
<b>Contractor Mobilization</b>		\$0	\$0	\$0	\$0
<b>Manpower</b>		\$174,924	\$218,250	\$184,730	\$184,730
<b>Water</b>		\$38,611	\$38,611	\$38,611	\$34,750
<b>Irrigation repair</b>		\$5,100	\$5,100	\$5,100	\$5,100
<b>Primo</b>		\$0	\$0	\$4,710	\$4,710
<b>Field Striping</b>		\$0	\$0	\$0	\$0
<b>Infield Materials</b>		\$3,180	\$3,180	\$3,180	\$3,180
<b>Field Renovation</b>		\$0	\$0	\$0	\$0
<b>Purchase New Equipment</b>					
<b>90" Aerway Aerator</b>					
<b>1 Fertigation System installed</b>				\$6,000	
<b>1 Sulfur Burner Units</b>				\$17,500	

## **Sports Field Management System Manual**

Below is the Sports Field Management System Annual Calendar that lays out every aspect of maintenance for each field at this site. Each calendar is customized for each site. The operator in the field should have a plastic laminated version of this.

This calendar below is the preliminary one for the recommended maintenance plan. Once you decide what recommendations you will be able to implement for the 2011 maintenance year, this will be changed to reflect your capabilities. It currently calls for a fertigation/granular program however if you won't be able to get fertigation this season we can redo these calendars for a granule program. It also calls for spraying the Primo product monthly during the growing season. This product cuts your mowing approximately in half but would need to be applied monthly to get the benefit from it.

The Maintenance calendars on the following pages show the tasks that need to occur in a one year period and the quantities of each fertilizer or amendment that is needed and the dates they are to be applied. These calendars are for fertigation and you would need one fertigation pump for Athan Downs fields and will require sodium blocker to protect the turf from the high sodium and bicarbonate levels in the recycled water.

DATE: SQ.FT: 355600

Athan Downs Fields #2,3,4

02/23/11

APPLICATION SCHEDULE: City of San Ramon

WEEK OF	32-0-0	S Blocker	Composter	Growth Med.	Primo	Mows/Week	Mows/Week	Shatter	KNIFE	PLUG	OVER	TOP
	GALS	GALS	GALS	LBS	GALS	W/O Primo	With Primo	TINE	Aerate	Aerate	SEED	DRESS
01/01/11	0	0	0	0	0	0.5	0.5					
01/08/11						0.5	0.5					
01/15/11						0.5	0.5					
01/22/11						0.5	0.5					
01/29/11	108	14	0	0	0	0.5	0.5					
02/05/11						0.5	0.5					
02/12/11						0.5	0.5					
02/19/11						0.5	0.5					
02/26/11	0	0	117	3265	1.52	3	1.5		X			
03/05/11						2	1.0					
03/12/11						2	1.0					
03/19/11						2	1.0					
03/26/11	108	14	0	0	1.52	2	1.0		X			
04/02/11						3	1.5					
04/09/11						3	1.5					
04/16/11						3	1.5					
04/23/11	0	0	0	0	1.52	3	1.5		X			
04/30/11						3	1.5					
05/07/11						3	1.5					
05/14/11						3	1.5					
05/21/11						3	1.5					
05/28/11	108	14	0	0	1.52	3	1.5		X			
06/04/11						3	1.5					
06/11/11						3	1.5					
06/18/11						3	1.5					
06/25/11	0	0	0	0	1.52	3	1.5		X			
07/02/11						3	1.5					
07/09/11						3	1.5					
07/16/11						3	1.5					
07/23/11						3	1.5					
07/30/11	108	14	0	0	1.52	3	1.5		X			
08/06/11						3	1.5					
08/13/11						3	1.5					
08/20/11						3	1.5					
08/27/11	0	0	0	0	1.52	3	1.5		X			
09/03/11						3	1.5					
09/10/11						3	1.5					
09/17/11						3	1.5					
09/24/11	108	14	0	0	1.52	3	1.5		X			
10/01/11						3	1.5					
10/08/11						3	1.5					
10/15/11						1	1.0					
10/22/11	0	0	0	0	0	1	1.0	X	X	X	X	X
10/29/11						1	1.0					
11/05/11						0.5	0.5		X			
11/12/11						0.5	0.5					
11/19/11						0.5	0.5					
11/26/11	0	0	0	0	0	0.5	0.5					
12/03/11						0.5	0.5					
12/10/11						0.5	0.5					
12/17/11						0.5	0.5					
12/24/11						0.5	0.5					

Nitrogen 32-0-0 540 gls

Primo 12.13 gls

Composter 117 lbs

Sodium Blocker 67.90 gls

Growth Med 3265 lbs

.5 Mowings per week= Mowing every 14 days

1 Mowing per week= Mowing every 7 days

1.5 Mowings per week = Mowing every 5 days

2 mowings per week= Mowing every 4 days

2.5 Mowings per week= Mowing every 3 days

DATE: SQ.FT 80000

Athan Downs Field #1

02/23/11

APPLICATION SCHEDULE: City of San Ramon

WEEK OF	32-0-0 LBS.	S Blocker GALS	Composter GALS	Growth Med. LBS	Primo GALS	Mows/ Week W/O Primo	Mows/Week With Primo	Shatter TINE	KNIFE Aerate	PLUG Aerate	OVER SEED	TOP DRESS
01/01/11	0	0	0	0	0	0.5	0.5					
01/08/11						0.5	0.5					
01/15/11						0.5	0.5					
01/22/11						0.5	0.5					
01/29/11	29	3		0	0.00	0.5	0.5		X			
02/05/11						0.5	0.5					
02/12/11						0.5	0.5					
02/19/11						0.5	0.5					
02/26/11	0	0	26	735	0.34	1	0.3		X			
03/05/11						1	0.5					
03/12/11						1	0.5					
03/19/11						1	0.5					
03/26/11	29	3	0	0	0.34	1	0.5		X			
04/02/11						3	1.5					
04/09/11						3	1.5					
04/16/11						3	1.5					
04/23/11	0	0	0	0	0.34	3	1.5		X			
04/30/11						3	1.5					
05/07/11						3	1.5					
05/14/11						3	1.5					
05/21/11						3	1.5					
05/28/11	29	3	0	0	0.34	3	1.5		X			
06/04/11						3	1.5					
06/11/11						3	1.5					
06/18/11						3	1.5					
06/25/11	0	0	0	0	0.34	3	1.5		X			
07/02/11						3	1.5					
07/09/11						3	1.5					
07/16/11						3	1.5					
07/23/11						3	1.5					
07/30/11	29	3	0	0	0.34	3	1.5		X			
08/06/11						3	1.5					
08/13/11						3	1.5					
08/20/11						3	1.5					
08/27/11	0	0	0	0	0.34	3	1.5		X			
09/03/11						3	1.5					
09/10/11						3	1.5					
09/17/11						3	1.5					
09/24/11	29	3	0	0	0.34	3	1.5		X			
10/01/11						3	1.5					
10/08/11						3	1.5					
10/15/11						1	0.5					
10/22/11	0	0	0	0	0.00	1	0.5	X	X	X	X	X
10/29/11						1	1.0					
11/05/11						1	1.0					
11/12/11						0.5	0.5					
11/19/11						0.5	0.5					
11/26/11	0	0	0	0	0	0.5	0.5					
12/03/11						0.5	0.5					
12/10/11						0.5	0.5					
12/17/11						0.5	0.5					
12/24/11						0.5	0.5					

Nitrogen 32-0-0 147 gls  
 Primo 2.73 gls  
 Composter 26 lbs  
 Growth Med. 735 lbs

.5 Mowings per week= Mowing every 14 days  
 1 Mowing per week= Mowing every 7 days  
 1.5 Mowings per week = Mowing every 5 days  
 2 mowings per week= Mowing every 4 days  
 2.5 Mowings per week= Mowing every 3 days

# MANAGING SPORTS FIELD WEAR

Note that on the chart below for Fields #2, #3, #4 that at your current maintenance level of 3.64 (the yellow bar across the chart) you currently have an excess hours of annual usage of 558 activity weighted hours. Since there is soccer on this site with a rating of 2, this is an excess of 279 (558 / 2) actual hours per year more than the turf can tolerate. When you step up your maintenance level 3.64 to level 5, you could have 71 more activity weighted hours per year or 35+ more actual hours of play annually.

City of San Ramon		Square Ft.	<b>FIELD USAGE / AVAILABILITY ANALYSIS</b>												
Athan Downs Fields #2,3, 4		355600	Total	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Type of Grass:	Weeks/ YR	36	Hours Average	4	5	4	4	5	4	4	5	4	4	4	4
K BLUE GRASS	Weeks/ mo														
Field Availability			(Numbers represent activity-weighted hours per week)												
<b>Current Maint. Level 3.64</b>	Hours Allowed	1573	31	11	15	18	26	35	43	47	49	49	43	23	11
	Hours Available			11	15										11
	Excess hours of usage	558						13	14	32	28			5	
<b>Maint. Level 2.00</b>	Hours Allowed	1101	21	8	11	12	18	25	30	33	34	34	30	16	8
	Hours Available			8	11										8
	Excess hours of usage	1030	29			23	29	23	27	46	42	42	26	12	
<b>Maint. Level 3.00</b>	Hours Allowed	1415	28	10	14	16	23	32	39	42	44	44	39	21	10
	Hours Available			10	14										10
	Excess hours of usage	716	20			19	24	16	18	36	32	32	17	7	
<b>Maint. Level 4.00</b>	Hours Allowed	1730	34	12	17	19	29	39	47	52	53	53	47	25	12
	Hours Available			12	17										12
	Excess hours of usage	401	11			16	19	9	10	27	23	23	9	3	
<b>Maint. Level 5.00</b>	Hours Allowed	2202	43	15	21	25	36	49	60	66	68	68	60	32	15
	Hours Available			15	21								4	4	15
	Excess hours of usage	71				11	11			13	8	8			
Maintenance Frequencies-Annual Requirement			Activity Weighting Scale				Determining Field Availability								
	Current		Needed	Walking on field/Softball 1.00				Use the following steps to evaluate requests for additional field time: 1. Determine the actual hours of additional use requested. 2. Multiply the total hours of proposed use by the appropriate activity weight. 3. Locate the column for the month when the proposed additional use would occur. 4. Determine if there are available hours at the current maintenance level. If there are, you can schedule the activity. 5. If not, see if sufficient hours can be made available by increasing the maintenance level. 6. If sufficient hours can be made available, and you can handle and afford the additional maintenance, you can schedule the activity.							
<b>Maint. Level 3.64</b>			4.0	Baseball 1.25											
Mowings/ Yr	44		106	PE 1.50											
Aerations/Yr	10		0	Parked Cars 1.50											
Top Dress/Yr	1		1	Marching Band 1.75											
Over Seed/Yr	1		1	Soccer Games 1.85											
Fertilization/Yr	5		6	Football Games 1.85											
Sweeping	0		0	Soccer & FB Practices 2.00											
Deep Tine/Yr	1		1	Adult Soccer & FB Games 2.13											
Verticuttings/yr	0		1	Adult Soccer & FB Practice 2.25											
Annual Costs	\$185,208		\$237,362	Lacrosse & Field Hockey 2.25											
Ann. Increase			\$52,154	Rugby 2.50											
Cost/month	\$5,138		\$6,585	Sports Clinics 2.50											
Cost/week	\$1,285		\$1,646	<b>Current Wear Level 4.00</b>											
				<b>Current Maintenance Level 3.64</b>											
				<b>Needed Maint. Level-Weather Adjusted 4.0</b>											

The Field Usage / Availability Analysis chart below shows Athan Downs Soccer field # You're your current maintenance level 3.64, the field receives 433 Activity Weighted hours or 216+ (433/2) actual hours more play than it can tolerate per year. By increasing the maintenance on this field to level 5, you would actually have 196 additional activity weighted hours or 98 actual additional hours per year.

City of San Ramon Square Ft. 80000  
 Athan Downs Field #1

## FIELD USAGE / AVAILABILITY ANALYSIS

**Type of Grass:** K BLUE GRASS **Weeks/ YR** 36 **Weeks/ mo** **Total** **Hours Average** **Jan.** **Feb.** **March** **April** **May** **June** **July** **Aug.** **Sept.** **Oct.** **Nov.** **Dec.**  
 4 5 4 4 5 4 4 5 4 4 4 4

Field Availability		(Numbers represent activity-weighted hours per week)													
<b>Current Maint. Level 3.64</b>	Hours Allowed	1573	31	11	15	18	26	35	43	47	49	49	43	23	11
	Hours Available			11	15										11
	Excess hours of usage	433						13	14	1	28			5	
<b>Maint. Level 2.00</b>	Hours Allowed	1101	21	8	11	12	18	25	30	33	34	34	30	16	8
	Hours Available			8	11										8
	Excess hours of usage	905	25			23	29	23	27	15	42	42	26	12	
<b>Maint. Level 3.00</b>	Hours Allowed	1415	28	10	14	16	23	32	39	42	44	44	39	21	10
	Hours Available			10	14										10
	Excess hours of usage	591	16			19	24	16	18	5	32	32	17	7	
<b>Maint. Level 4.00</b>	Hours Allowed	1730	34	12	17	19	29	39	47	52	53	53	47	25	12
	Hours Available			12	17					4					12
	Excess hours of usage	276	8			16	19	9	10		23	23	9	3	
<b>Maint. Level 5.00</b>	Hours Allowed	2202	43	15	21	25	36	49	60	66	68	68	60	32	15
	Hours Available	196		15	21			2	3	18			4	4	15
	Excess hours of usage					11	11				8	8			

Maintenance Frequencies-Annual Requirement			Activity Weighting Scale		Determining Field Availability	
	Current	Needed	Walking on field/Softball	1.00	Use the following steps to evaluate requests for additional field time: 1. Determine the actual hours of additional use requested. 2. Multiply the total hours of proposed use by the appropriate activity weight. 3. Locate the column for the month when the proposed additional use would occur. 4. Determine if there are available hours at the current maintenance level. If there are, you can schedule the activity. 5. If not, see if sufficient hours can be made available by increasing the maintenance level. 6. If sufficient hours can be made available, and you can handle and afford the additional maintenance, you can schedule the activity.	
<b>Maint. Level 3.64</b>		4.0	Baseball	1.25		
Mowings/ Yr	44	100	PE	1.50		
Aerations/Yr	10	0	Parked Cars	1.50		
Top Dress/Yr	1	1	Marching Band	1.75		
Over Seed/Yr	1	1	Soccer Games	1.85		
Fertilization/Yr	5	6	Football Games	1.85		
Sweeping	0	0	Soccer & FB Practices	2.00		
Deep Tine/Yr	1	1	Adult Soccer & FB Games	2.13		
Verticuttings/yr	0	0	Adult Soccer & FB Practice	2.25		
Annual Costs	\$41,101	\$50,879	Lacrosse & Field Hockey	2.25		
Ann. Increase		\$9,778	Rugby	2.50		
Cost/month	\$1,140	\$1,412	Sports Clinics	2.50		
Cost/week	\$285	\$353	<b>Current Wear Level</b>	<b>4.00</b>		
			<b>Current Maintenance Level</b>	<b>3.64</b>		
			<b>Needed Maint. Level-Weather Adjusted</b>	<b>4.0</b>		

## Field Overview Assessment San Ramon Sports Park Fields

### Current Conditions of the fields

The 4” root depth is too shallow to stand up to the wear they are currently receiving. This is causing low spots and wet spots in the goal mouths. The irrigation system and field grades are good. As with the other sites the soils were saturated and mushy to walk on.

#### INITIAL SITE SURVEY

SITE	Root	Field	% Bare	%	Compacted	Irrigation	% Worn	High/Low	Wet/Dry
	Depth	Grade	Spots	Weeds	Areas	System	Areas	Spots	Spots
San Ramon Sports Park	4.00	Good	1%			Good	1%	Goal Mouths	Goal Mouths

### The Causes of the Current Conditions

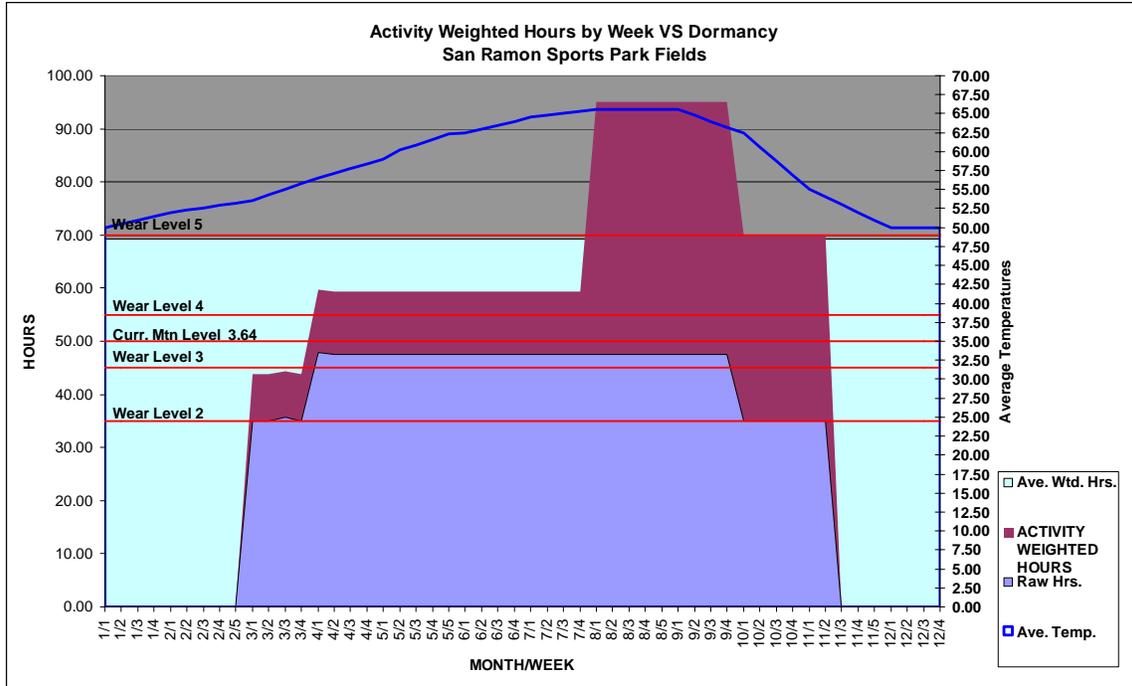
1. **Wear** has led to many of the current problems on these fields.

Your wear is probably the greatest contributor to compacted soils and the resulting damage to your turf. The Wear Index In Hours Per Week table below shows that these fields have **69.3** activity-weighted hours of play per week. This is wear level **4.5**. The amount of play is scaled into levels 1-5, 5 being the highest and there is a direct correlation between wear and maintenance. Your maintenance level is 3.64 and this difference between these two means that this turf is stressed under these conditions.

### WEAR INDEX IN HOURS PER WEEK

SITE	Sq. Ft	Weeks	Activity	Maint.	Current
			#	Weighted	Level Needed
			Hours/ Wk	Category	Level
San Ramon Sports Park	217800	36	69.3	4.50	3.64

Note on the following page the Activity Weighted Hours by Week Chart for this field. The heaviest wear on these fields takes place June through July (120 activity weighted hours per week). Because they don't go dormant at your microclimate, we are recommending the Hybrid Blue grasses for all of your sites.



**2. The Current Maintenance Level of these Fields**

The Wear Index shows that these fields have a category 4.5 wear and your current maintenance level is 3.64. Note that the Maintenance Frequency chart below shows the tasks necessary for your turf to be sustainable under your current conditions of wear, soils and growing conditions. The major increase is in the number of fertilizations and mowings. The mowings would be cut in half if you follow our recommendations for using a Primo type growth regulator that uses the energy from the additional fertilizations to mend and drive roots down.

**MAINTENANCE FREQUENCY**

Category		Mowings		Aerations		Top-Dress		Overseed		Fertilize	
Level		Per Year									
Curr. Level	New Level										
3.64	4.50	44	108	10	10	1	1	1	1	5	6

San Ramon Sports Park

**3. The Soil Analysis:**

The chart on the next page is a comparison of the recycled irrigation water, the soil analysis and the leaf analysis for the fields at this site. The water is rated by the lab as poor quality recycled irrigation water. It is high in pH, chlorides, Electrical Conductivity (EC), Total Dissolved Solids (TDS) Sodium and chlorides. The soils on these fields are high in sodium and boron and low in phosphorus, potassium & magnesium. The leaf analysis gives us a true picture of the nutrient utilization of the turf plants growing in this root-zone. In this case the leaf analysis also shows low in phosphorus, potassium, calcium, magnesium and copper however our experience tells us that the sodium level in the recycled water and in the soil is binding up the potassium, calcium & magnesium making them less available to the plants. The fertigation system

we are recommending for this site will add sodium blocker which is a proven method of lowering sodium in the soil and thus releasing the bound up nutrients. Also much of the nutrients will be added through the fertigation system as well.

Irrigation Water Analysis		Total % N	Phos. % P	Pott. % K	Calcium % Ca	Magnes. % Mg	Sulfur % S	Zinc Zn ppm	Iron Fe ppm	Mang. Mn ppm	Copper Cu ppm	Boron B ppm	Sodium ppm Na	pH	EC	TDS	Cl ppm	SAR	Na%
Sports Park		5-50	.3-1.21	5-20	20-60	10-25	10-30	0	0	0	0	<7	<50	7	<700	<450	0-70	<6	<50
Recycled 12/7/2010		<1	2.149	14	45	28	27	0	0.16	0.038	0	0.61	130	7.7	1260	806	170	3.7	53.5
Soil Analysis Comparison																			
Sports Park		ppm N	ppm P	ppm K	ppm Ca	ppm Mg	ppm S	ppm Zn	ppm Fe	ppm Mn	ppm Cu	ppm B	ppm Na	pH	EC	% Organic	ppm Cl	CEC	Na%
Minimum		5.00	50.00	172	5020	1183	15.00	3.00	15.00	2.00	1.50	0.75	152	7.00	<2	2.00%	<200	>10	1.50%
12/7/2010		1.00	12.00	320	6527	732	91.00	0.40	25.00	15.00	1.20	1.08	689	8.00	1.37	0.80	300.00	43.00	7.00
Leaf Analysis Comparison																			
Sports Park		Total % N	Phos. % P	Pott. % K	Calcium % Ca	Magnes. % Mg	Sulfur % S	Zinc Zn ppm	Iron Fe ppm	Mang. Mn ppm	Copper Cu ppm	Boron B ppm	Sodium % Na						
Needed		3.4-4.5	0.35-0.8	3-4%	0.4-1.25	0.25-0.6	0.25-0.6	20-65	80-250	50-200	9-20	0-50	0.01-.250						
12/7/2010		3.51	0.3	2.01	0.39	0.22	0.28	34	237	115	4	11	0.575						

## Costs of Solving Your Problems

### 1. Manpower

The wear index chart below indicates that by increasing your maintenance level from 3.64 to your wear level of 4.5, you will need to add 367 additional annual man-hours or approximately \$28,290 annually in maintenance costs at this site based on your current wages & benefits. This figure doesn't include the additional materials such as fertilizer, seed, and topdressing.

#### WEAR INDEX IN HOURS PER WEEK

SITE	Sq. Ft	Weeks	Hours/ Wk	Category	Level	Current Hours	Current Ann. Mtn. Hours	Needed Ann. Mtn. Hours	Addit. Ann. Mtn. Hours	Current Mtn. Cost	New Mtn. Cost	Increase
San Ramon Sports Park	217800	36	69.3	4.50	3.64	1228	1595	367	\$94,528	\$122,818	\$28,290	

### 2. Fertilizer Costs

The 2011 fertilizer costs below are for a granule and liquid program rather than our recommended fertigation program.

#### TURF NUTRIENTS FOR 2011 FERTIGATION PROGRAM

Nutrient	Nitrogen	Phosphorus	Sodium	Primo	Con. Organic	Composter	
Product	32-0-0	11-52-0	Blocker	NA	Growth Med.		
Formulation							
Form	Gallons	Lbs	Gallons	Gallons	LBS	Gallons	
San Ramon Sports Park	331	771	42	7	2000	72	
Cost Each	4.32	0.42	20.18	300.00	0.70	30.00	
Total Cost	\$1,430	\$324	\$839	\$2,230	\$1,400	\$2,156	\$8,378

### 6. Annual Maintenance Costs-

Scenario #1 below shows your current maintenance level and the \$129,345 it cost you in 2010 to maintain this site. This is \$25,869 per acre per year. Scenario #2 shows the \$168,258 in costs which is \$38,913 more in additional manpower and materials for stepping up your maintenance from level 3.64 to level 4.5. This is \$33,652 per acre per year. Scenario #3 shows your 1 time annual costs of \$176,099 which includes new equipment that is needed. This would be \$35,220 per acre for that year. Scenario #4 shows the \$144,686 in annual costs of maintaining your fields after the purchase of the new equipment. This is \$28,937 per acre per year which is in the very high range for high wear fields in your climate.

**SCENARIO COST ANALYSIS**

		<b>Scenario #1</b>	<b>Scenario #2</b>	<b>Scenario #3</b>	<b>Scenario #4</b>
		<b>2009</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>
		<b>Current</b>	<b>Current</b>	<b>Current</b>	<b>Current</b>
		<b>Wear</b>	<b>Wear</b>	<b>Wear</b>	<b>Wear</b>
		<b>Mtn Level</b>	<b>Mtn Level</b>	<b>Mtn Level</b>	<b>Mtn Level</b>
		<b>3.64</b>	<b>4.5</b>	<b>4.5</b>	<b>4.5</b>
		<b>No New</b>	<b>No New</b>	<b>Purchase</b>	
		<b>Equipment</b>	<b>Equipment</b>	<b>New</b>	
				<b>Equipment</b>	
		\$25,869	\$33,652	\$35,220	\$28,937
Square Feet		217,800	217,800	217,800	217,800
<b>ANNUAL TOTALS:</b>		<b>\$129,345</b>	<b>\$168,258</b>	<b>\$176,099</b>	<b>\$144,686</b>
<b>Top dressing</b>		\$633	\$3,823	\$3,823	\$1,912
<b>Spread top dressing-Contractor</b>		\$0	\$0	\$0	\$0
<b>Grass Seed</b>		\$541	\$3,494	\$3,494	\$1,747
<b>Slit Seed- Contractor</b>		\$0	\$0	\$0	
<b>Fertilizer</b>		\$1,920	\$6,399	\$6,149	\$6,149
<b>Deeptine aeration- Contractor</b>		\$0	\$0	\$0	\$0
<b>Contractor Mobilization</b>		\$0	\$0	\$0	\$0
<b>Manpower</b>		\$94,528	\$122,818	\$106,930	\$106,930
<b>Water Costs</b>		\$30,024	\$30,024	\$30,024	\$24,019
<b>Irrigation Parts</b>		\$1,700	\$1,700	\$1,700	\$1,700
<b>Primo</b>				\$2,230	\$2,230
<b>Irrigation Repair</b>					
<b>1 Fertigation System</b>				\$4,249	
<b>1 Sulfur Burner Unit</b>				\$17,500	

**Sports Field Management System Manual**

This calendar below is the preliminary one for the recommended maintenance plan. Once you decide what recommendations you will be able to implement for the 2011 maintenance year, this will be changed to reflect your capabilities. It currently calls for fertigation with concentrated nitrogen plus a granular phosphorus, a concentrated seed germinator / biostimulant and a concentrated Organic Growth Medium. It also calls for spraying the Primo product monthly during the growing season.

DATE: SQ.FT 217800

San Ramon Sports Park

02/23/11

APPLICATION SCHEDULE: City of San Ramon

WEEK OF	32-0-0	11-52-0	0-0-50	S Blocker	Composter	Growth Med.	Primo	Mow/ Week	Mow/Week	Shatter	KNIFE	PLUG	OVER	TOP
	GALS	LBS	LBS	GALS	GALS	LBS	GALS	W/O Primo	With Primo	TINE	Aerate	Aerate	SEED	DRESS
01/01/11	0	0	0	0	0	0	0	0.5	0.5					
01/08/11								0.5	0.5					
01/15/11								0.5	0.5					
01/22/11								0.5	0.5					
01/29/11	66	0	0	8	0	0	0.00	0.5	0.5		X			
02/05/11								0.5	0.5					
02/12/11								0.5	0.5					
02/19/11								0.5	0.5					
02/26/11	0	193	0	0	72	2000	0.93	0.5	0.5		X			
03/05/11								2	1.0					
03/12/11								2	1.0					
03/19/11								2	1.0					
03/26/11	66	0	0	8	0	0	0.93	2	1.0		X			
04/02/11								3	1.5					
04/09/11								3	1.5					
04/16/11								3	1.5					
04/23/11	0	193	0	0	0	0	0.93	3	1.5		X			
04/30/11								3	1.5					
05/07/11								3	1.5					
05/14/11								3	1.5					
05/21/11								3	1.5					
05/28/11	66	0	0	8	0	0	0.93	3	1.5		X			
06/04/11								3	1.5					
06/11/11								3	1.5					
06/18/11								3	1.5					
06/25/11	0	193	0	0	0	0	0.93	3	1.5		X			
07/02/11								3	1.5					
07/09/11								3	1.5					
07/16/11								3	1.5					
07/23/11								3	1.5					
07/30/11	66	0	0	8	0	0	0.93	3	1.5		X			
08/06/11								3	1.5					
08/13/11								3	1.5					
08/20/11								3	1.5					
08/27/11	0	193	0	0	0	0	0.93	3	1.5		X			
09/03/11								3	1.5					
09/10/11								3	1.5					
09/17/11								3	1.5					
09/24/11	66	0	0	8	0	0	0.93	3	1.5		X			
10/01/11								3	1.5					
10/08/11								3	1.5					
10/15/11								3	1.5					
10/22/11	0	0	0	0	0	0	0.00	3	1.5	X	X	X	X	X
10/29/11								1	1.0					
11/05/11								0.5	0.5					
11/12/11								0.5	0.5					
11/19/11								0.5	0.5					
11/26/11	0		0	0	0	0		0.5	0.5					
12/03/11								0.5	0.5					
12/10/11								0.5	0.5					
12/17/11								0.5	0.5					
12/24/11								0.5	0.5					

Nitrogen 32-0-0 331 gls  
 11-52-0 771 lbs  
 0-0-50 0 lbs  
 Sodium Blocker 41.59 gls  
 Primo 7.43 gls  
 Composter 72 lbs  
 Growth Me 2000 lbs  
 .5 Mowings per week= Mowing every 14 days  
 1 Mowing per week= Mowing every 7 days  
 1.5 Mowings per week = Mowing every 5 days  
 2 mowings per week= Mowing every 4 days  
 2.5 Mowings per week= Mowing every 3 days

# MANAGING SPORTS FIELD WEAR

The Field Usage/Availability Analysis chart below shows that at your current maintenance level of 3.64 (the yellow bar across the chart) you currently have an excess hours of annual usage of 888 activity weighted hours. Since this is soccer with a rating of 2, this is an excess of 444 (888/2) actual hours per year more wear than the turf can tolerate. When you step up your maintenance level 3.64 to level 5, you actually have 112 activity weighted hours per year or 56 extra actual hours of play annually to work with. On these fields

City of San Ramon		Square Ft. 217800		<b>FIELD USAGE / AVAILABILITY ANALYSIS</b>													
San Ramon Sports Park		Total															
Type of Grass:	Weeks/ YR	36	Hours	Average	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
K BLUE GRASS	Weeks/ mo				4	5	4	4	5	4	4	5	4	4	4	4	
Field Availability			(Numbers represent activity-weighted hours per week)														
Current Maint. Level 3.64	Hours Allowed	1573	31	11	15	18	26	35	43	47	49	49	43	23	11		
	Hours Available			11	15											11	
	Excess hours of usage	888						24	16	12	47				12		
Maint. Level 2.00	Hours Allowed	1101	21	8	11	12	18	25	30	33	34	34	30	16	8		
	Hours Available			8	11										8		
	Excess hours of usage	1360	38			32	41	35	29	26	61	61	40	19			
Maint. Level 3.00	Hours Allowed	1415	28	10	14	16	23	32	39	42	44	44	39	21	10		
	Hours Available			10	14										10		
	Excess hours of usage	1045	29			28	36	28	21	17	51	51	31	14			
Maint. Level 4.00	Hours Allowed	1730	34	12	17	19	29	39	47	52	53	53	47	25	12		
	Hours Available			12	17										12		
	Excess hours of usage	731	20			25	31	21	12	8	42	42	23	10			
Maint. Level 5.00	Hours Allowed	2202	43	15	21	25	36	49	60	66	68	68	60	32	15		
	Hours Available	112	3	15	21				1	6					15		
	Excess hours of usage					19	23	10			27	27	10	3			
Maintenance Frequencies-Annual Requirement		Current	Needed	Activity Weighting Scale												Determining Field Availability	
Maint. Level	3.64		4.5	Walking on field/Softball	1.00												Use the following steps to evaluate requests for additional field time: 1. Determine the actual hours of additional use requested. 2. Multiply the total hours of proposed use by the appropriate activity weight. 3. Locate the column for the month when the proposed additional use would occur. 4. Determine if there are available hours at the current maintenance level. If there are, you can schedule the activity. 5. If not, see if sufficient hours can be made available by increasing the maintenance level. 6. If sufficient hours can be made available, and you can handle and afford the additional maintenance, you can schedule the activity.
Mowings/ Yr	44		108	Baseball	1.25												
Aerations/Yr	10		0	PE	1.50												
Top Dress/Yr	1		1	Parked Cars	1.50												
Over Seed/Yr	1		1	Marching Band	1.75												
Fertilization/Yr	5		6	Soccer Games	1.85												
Sweeping	0		0	Football Games	1.85												
Deep Tine/Yr	1		1	Soccer & FB Practices	2.00												
Verticuttings/yr	0		0	Adult Soccer & FB Games	2.13												
Annual Costs	\$129,345		\$168,258	Adult Soccer & FB Practice	2.25												
Ann. Increase			\$38,913	Lacrosse & Field Hockey	2.25												
Cost/month	\$3,589		\$4,668	Rugby	2.50												
Cost/week	\$897		\$1,167	Sports Clinics	2.50												
				Current Wear Level	4.50												
				Current Maintenance Level	3.64												
				Needed Maint. Level-Weather Adjusted	4.5												

This concludes our Sports field Assessment for these three sites. We are available for answering any questions concerning this report. 719-265-6003