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The City of San Carlos Parks and Sports Fields Field Use and Agronomic Specifications

*To Create an Inviting, Aesthetic, Functional and
Safe Environment for Play and Enjoyment*

Sports Field Use & Agronomic Programs

The City of San Carlos Parks & Sports Fields

*Arguello, Burton, Crestview, Heather, Highlands,
Laureola and Stadium*

I. Introduction

Sports field use philosophies must work in symphony with cultural maintenance concepts in order to create play environments that promote inviting, attractive and functional facilities that will endure and recover when subject to realistic levels of activity. Well conceived and aggressive cultural maintenance programs implemented by knowledgeable, dedicated maintenance personnel will ensure the future success of turfgrass systems within park and sports field settings.

The essential resources that are required to achieve such goals include the following:

Recreation staff and coaches who project realistic perspectives on seasonal and yearly field use,
Dedicated and open-minded field maintenance personnel who take pride in the condition of their fields,
Proper field maintenance staffing, equipment and materials, and
Aggressive agronomic programs to maintain existing surface quality and enhance recuperative potential.

The City of San Carlos, California is well respected by many municipalities within Northern California for their efforts in maintaining their city parks and sports fields. The City of San Carlos serves the needs of a wide range of sports and community activities including youth soccer, baseball and softball as well organized summer camps and community festivities. The philosophy of the community not only supports team athletics, but also the concept of 'open space' and 'open time'. This flexible use perspective encourages individual residents and families to enjoy their parks and sport fields during the time frame when organized events are not scheduled.

To date this balance of use has for the most part, served the community well. However, with the success and continued growth of the organized team sport programs, the increasing interest by San Carlos residents for open time, and the limited acreage available for parks and sports fields, the City of San Carlos now faces a realistic crossroad. As the number of hours of scheduled and nonscheduled use increases, and the level of surface quality expectations remains the same, how does the city maintain the existing standard? What steps must be taken now to ensure aesthetic, functional and safe surfaces for all to take pride in and enjoy?

Over the last six months Mark Mahady, President of *Mark M. Mahady & Associates, Inc.* a turfgrass consulting firm, has met with the Parks and Recreation Commission, City Council, Athletic Sites Advisory Council, Barry Weiss, Director of Parks and Recreation, members of the Recreation Division, leaders of participating athletic organizations, team coaches, members of the General Services Parks Division including Jon Barker, General Services Superintendent and his maintenance staff. The purpose of this process was to (a) gather practical information that relates to field use scheduling and maintenance programs, (b) develop a better understanding of the surface quality expectations and field use philosophy of all field use participants and the City of San Carlos, and, (c) begin to formulate practical concepts to balance field use and maintenance in order to ensure aesthetic, functional and safe play environments with high levels of surface quality and recuperative capacity.

The primary objectives of this report are to:

- 1) present findings associated with the current process of field use scheduling, needs of user groups, agronomic maintenance programs and the field use philosophies and surface quality expectations of The City of San Carlos,
- 2) offer sound perspectives on the balance of field use and agronomic program requirements,
- 3) recommend a step-by-step action plan to support the needs of field use scheduling coordinators, field use participants and the maintenance staff in order to design an operational field scheduling protocol that serves the primary needs of all groups, while maintaining and protecting field integrity, and the investments of the City of San Carlos.

II. San Carlos Parks and Recreation: Field Use Scheduling

The City of San Carlos Parks and Recreation Department, under the guidance of Director Barry Weiss, is comprised of the General Services Parks Division and the Recreation Division. Within the General Services Parks Division, Jon Paul Barker, General Services Superintendent, provides supervision and direction over a multifaceted staff with specific responsibilities in the areas of Sports Fields, Neighborhood Parks and Building and Maintenance. Jennifer Moore, Recreation Coordinator for Youth and Adult Athletics, is primarily responsible for coordination of all field use by sports organizations (see organizational chart on Page 4).

Field use coordinators have very challenging positions. Their primary function is to schedule and juggle field time for a multitude of organizations across many different fields throughout seasons with dynamically different weather conditions. They must strive to present an operational field scheduling process that serves the needs of all end-users while maintaining and protecting field integrity, the safety of all participants and the recreational investments of the City of San Carlos. In order to meet this goal a team concept of communication, responsibility, and mutual respect must be established among all participants.

The sports organizations that use the sports fields, as well as the City of San Carlos residents who walk the parks and enjoy the open time atmosphere, are perceived as customers. All employees responsible for the scheduling, use, and maintenance of the facility must establish customer service standards to meet the needs and expectations of all clients. It is essential that potential participants and users have equal access to sports fields and parks that maintain a high level of consistent field maintenance standards. To ensure equal access and high maintenance standards, groups interested in field and park use must actively participate in the method of scheduling field use, and must also understand the potential time, financial and agronomic conditions that may limit field and park use.

City of San Carlos Organizational Chart Here

Year 2000 Total Hours of Actual Field Use

The year 2000 Primary Sport Field Use Summary as recorded by Jennifer Moore, Recreation Coordinator, City of San Carlos is presented on Page 6. This summary presents best estimates of total game and practice hours of actual field use for primary sports activities including soccer, baseball, adult softball and football.

Key Points:

- Approximately 328 teams and 4,150 participants played on seven sports fields during the year 2000. The total time of primary sports field use recorded for soccer, baseball, adult softball and football was approximately 9,835.5 hours.
- Primary sports field use (9,835.5 hours) plus secondary use including sports camps, special needs, picnics, instructional soccer, hometown days, concerts and holidays (3,620) totaled 13,455.5 hours of actual total use for all activities.

A breakdown of the actual total hours of primary sports field use, hours per sport and percent of total hours per sport for the City of San Carlos during calendar year 2000 is presented in Table 1.

Table 1. Historical Breakdown of Total Actual Field Use Per Sport From Year 2000 Actual Field Use Summary. Data Provided by Jennifer Moore, Recreation Coordinator, City of San Carlos. 2001.		
<u>Sport</u>	<u>Hours of Primary Sports Field Use By Activity</u>	<u>Percent of Total Hours By Participant</u>
Soccer	5,483.5	55.74%
Baseball	3,967	40.29%
Adult Softball	367	3.72%
<u>Football</u>	<u>18</u>	<u>0.18%</u>
Total	9,835.5	99.93%

Key Point:

- Soccer is the most popular scheduled sport with 5,483.5 (55.74%) of 9,835.5 total primary sport use hours dedicated to play during the year 2000.

Tables 2 and 3 show a breakdown of percent field use by groups within soccer and baseball.

Table 2. Soccer and Year 2000 Historical Breakdown of Actual Field Use. Data Provided by Jennifer Moore, Recreation Coordinator, City of San Carlos. 2001.			
<u>Organization</u>	<u># Teams</u>	<u>Field Use Hours By League</u>	<u>Percent of Total Soccer Hours By Participant</u>
AYSO (Summer & Winter)	153	3,162	57.66%
<u>CYSA</u>	<u>15</u>	<u>2,321.5</u>	<u>42.33%</u>
Total	168	5,483.5	99.99%

2000 Field Use Summary Here

Table 3. Baseball and Year 2000 Historical Breakdown of Actual Field Use. Data Provided by Jennifer Moore, Recreation Coordinator, City of San Carlos. 2001.

<u>Organization</u>	<u># Teams</u>	<u>Field Use Hours By League</u>	<u>Percent of Total Baseball Hours By League</u>
Little League (Spring/Summer)	49	2,604	65.64%
Pony	6	573	14.44%
Colt	2	240	6.04%
Joe DiMaggio	1	176	4.43%
SAY	6	144	3.62%
Sandlots	2	20	0.50%
St. Charles Baseball	5	192	4.83%
PAL Jr. Giants	<u>2</u>	<u>18</u>	<u>0.45%</u>
Total	64	3,967	99.95%

Key Points:

- Baseball is the second most popular scheduled sport with 3,967 (40.29%) of 9,8356.5 total use hours dedicated to play during the year 2000.
- Little League is the most popular baseball level with 65.64% of total baseball use.

Factors to Consider When Determining Traffic Impact and Actual Hours of Wear By a Specific Sport and Type of Activity

How do we compare field use from sport to sport and within a wide range of age groups? To be very honest it is a challenging task. In our experience the following elements represent the most important factors to consider when attempting to determine the impact of a particular sport on a turf surface:

- **Time of seasonal use.** Is the sport played during the winter when seasonal rain softens the field surface and dynamically increases the potential for damaging the surface? Or is the sport played during the late spring, summer or fall when the turf surface is firm and is more resistant to wear?
- **Soil profile composition.** In our experience native soil fields perform very well under dry conditions and when poorly drained turn in to mud bowls during wet winter conditions. If properly constructed and maintained sand based profiles generally perform well under both dry and moist to wet conditions. However, under dry conditions non-reinforced sand profiles exhibit approximately 25% less wear potential than native soil fields. If sand based sports field are not regularly aerated and topdressed with sand they will rapidly accumulate an organic slime layer, which in turn will seal the sand profile. The field will drain poorly, retain moisture in the organic layer, divot excessively, and present a very poor and often unsafe playing surface.

- **Type of activity.** Sports such as soccer and football generally use large portions of the grass surface. Cleated shoes combined with the twisting, turning and traction requirements of these sports will often rapidly tear and divot the turf. On most fields involving baseball and softball only three outfielders may be on the grass playing surface at one time. While a player may stand in one location for an extended period of time causing surface compaction, the degree of turf damage caused by baseball or softball is generally 50% or less than soccer or football.
- **Age and weight of players.** General guidelines for the weight of children ages 6 to 18 are presented in Table 4. Weight, age, strength, speed and footwear type all influence potential damage to sports field surfaces.

Table 4. General Guidelines for Weight of Children. The National Center for Health Statistics. 2001

<u>Age</u>	<u>Males</u> <u>Average Weight Lb.</u>	<u>Upper/Lower</u> <u>Range Lb.</u>	<u>Females</u> <u>Average Weight Lb.</u>	<u>Upper/Lower</u> <u>Range Lb.</u>
18	152	127/195	124	105/160
16	136	112/172	123	100/158
14	112	90/145	110	90/145
12	88	70/112	92	72/123
10	68	56/90	71	57/98
8	55	48/68	55	45/70
6	45	38/53	44	37/53

In order to provide a more accurate assessment of the influence of specific sports traffic on turfgrass injury and field surface quality, weighted factorials are assigned to each designated activity. These factorials were developed based on considerations of a) historical perspectives of turfgrass injury following use, b) number of participants per event, c) age and weight of participants, d) footwear type, and e) time of seasonal use. When the factorial is multiplied by the total number of hours from a specific sport a weighted value representing a more realistic and practical perspective on turfgrass injury and surface quality can then be determined. For example, high school football played on a dry, cool season grass sports field in September characteristically carries a factorial of 1.0. So each hour of play or practice represents 1.0 factored use hour. In contrast high school soccer played on a wet, poorly drained native soil during a drizzle in early November may carry a factorial as high as 1.75. In other words soccer played on a wet field may result in 75% more turf injury than football played on a dry surface. Factorials for the primary sports played within the coordinated schedule of the City of San Carlos Recreation Department are presented in Tables 5, 6 and 7.

Table 5. Determining Approximate Average Wear Factorial for AYSO Based on Age, Weight of Players, Number and Length of Games, and Season of Play. MMM & Associates, Inc. 2001.

<u>AYSO</u> <u>Age Groups</u>	<u>Number</u> <u>Teams</u>	<u>Number</u> <u>Games</u>	<u>Hours</u> <u>Game</u>	<u>Game</u> <u>Hours</u>	<u>Practice</u> ¹ <u>Hours</u>	<u>Total</u> <u>Hours</u>	<u>Wear*</u> <u>Factor (R)</u>	<u>Factored</u> <u>Wear Hours</u>
Under 19	2	x 15	x 1.5	= 45.0	+ 72	= 117.0	x 1.50	= 175.5
Under 16	5	x 15	x 1.5	= 112.5	+ 180	= 292.5	x 1.25	= 356.6
Under 14	12	x 15	x 1.5	= 270.0	+ 432	= 702.0	x 0.92	= 645.8
Under 12	18	x 15	x 1.0	= 270.0	+ 648	= 918.0	x 0.75	= 688.5
Under 10	32	x 15	x 1.0	= 480.0	+ 1,152	= 1,632.0	x 0.55	= 897.6
Under 8	42	x 15	x 1.0	= 630.0	+ 756	= 1,386.0	x 0.40	= 554.4
Under 6	40	x 15	x 1.0	= 600.0	+ 240	= 840.0	x 0.30	= 252.0
				2,407.5	3,480	5,887.5		3,570.4

¹ Practice hours based on 36 hours/team/season for Under 19 to Under 10; 18 hours/team/season For Under 8 and 6 hours/team/season for Under 6.

* Estimated wear factor based on age and weight of player.

Average wear factor for this AYSO schedule: R=3,570.4/5887.5 = 0.61

Key Points:

- An average wear factor of 0.61 was established for AYSO. This number represents a group average for all age groups with this defined use schedule.
- The older the player the more that plays weighs and the higher the wear factor. The younger the child the less that child weighs and the less potential for turf injury, thus the lower wear factor. The large number of teams (82) with young players under 8 and under 6 greatly influences this average factorial.
- Adding practice hours to actual game hours dynamically increases yearly use.
- Calculation of practice hours are based on an estimate of 36 hours/team/season for Under 19 to Under 10, 18 hours/team/season for Under 8, and 6 hours/team/season for Under 6 (information source Jennifer Moore). The approximate number of practice hours for AYSO totals 3,480. Adding an estimated 3,480 practice hours to 2,407.5 game hours totals 5,887.5 non-factored hours or 3,570.4 factored hours.

Table 6. Determining Approximate Wear Factorial for CYSA Based on Age and Weight of Players, Number and Length of Games, and Season of Play. MMM & Associates, Inc. 2001.

CYSA Age Groups	Number Teams	Number Games	Hours Game	Game Hours	Practice ¹ Hours	Total Hours	Wear* Factor (R)	Factored Wear Hours
Under 19	2	x 15	x 1.5	= 45.0	+ 144.0	= 189.0	x 1.50	= 283.5
Under 17	1	x 15	x 1.5	= 22.5	+ 72.0	= 94.5	x 1.37	= 129.5
Under 16	1	x 15	x 1.5	= 22.5	+ 72.0	= 94.5	x 1.25	= 118.1
Under 15	2	x 15	x 1.5	= 45.0	+ 144.0	= 189.0	x 1.12	= 211.7
Under 14	3	x 15	x 1.5	= 67.5	+ 216.0	= 283.5	x 0.92	= 260.8
Under 13	3	x 15	x 1.5	= 67.5	+ 216.0	= 283.5	x 0.84	= 238.1
Under 12	4	x 15	x 1.5	= 90.0	+ 288.0	= 378.0	x 0.75	= 283.5
Under 11	2	x 15	x 1.0	= 30.0	+ 144.0	= 174.0	x 0.65	= 113.1
Under 10	1	x 15	x 1.0	= <u>15.0</u>	+ <u>72.0</u>	= <u>87.0</u>	x 0.55	= <u>47.9</u>
				405.0	1,368.0	1,773.0		1,686.2

¹ Practice hours based on 72 hours/team/season.
 * Estimated wear factor based on age and weight of player
Average wear factor for this CYSA schedule: $R=1,686.2/1,773.0 = 0.95$

Key Points:

- An average wear factor of 0.95 was established for CYSA.
- CYSA has more teams with older players and very few teams with young players. Thus the factorial is higher than AYSO, which has a great number of teams (82) with young players under 8 and less than 6.
- Calculation of practice hours is based on an estimate of 72 hours/team/season for CYSA (information source Jennifer Moore). The approximate number of practice hours for CYSA totals 1,368. Adding an estimated 1,368 practice hours to 405 game hours totals 1,773 non-factored hours or 1,686.2 factored hours.

Table 7. Determining Approximate Average Wear Factorial for Baseball Organizations Based on Age and Weight of Players, Number and Length of Games, and Season of Play. MMM & Associates, Inc. 2001

Baseball Age Groups	Number Teams	Number Games	Hours Game	Game Hours	Practice Hours	Total Hours	Wear* Factor (R)	Factored Wear Hours
DiMaggio (17-18)	1	x 28	x 2.0	= 56.0	+ 64.0	= 120.0	x 0.50	= 60.0
Colt (15-16)	2	x 28	x 2.0	= 112.0	+ 128.0	= 240.0	x 0.45	= 108.0
Pony (13-14)	6	x 28	x 2.0	= 336.0	+ 384.0	= 720.0	x 0.40	= 288.0
<u>Little League</u>								
Sr. Minors (9-12)	8	x 28	x 2.0	= 448.0	+ 512.0	= 960.0	x 0.35	= 336.0
Jr. Minors (8-10)	10	x 28	x 2.0	= 560.0	+ 640.0	= 1,200.0	x 0.30	= 360.0
Farms (7-8)	20	x 14	x 1.5	= 420.0	+ 480.0	= 900.0	x 0.25	= 225.0
T-Ball (5-6)	16	x 14	x 1.5	= 336.0	+ 0.0	= 336.0	x 0.20	= 67.2
<u>SAY</u>								
Majors (9-12)	2	x 14	x 2.5	= 70.0	+ 64.0	= 134.0	x 0.35	= 46.9
Juniors (13-15)	3	x 14	x 3.75	= 157.5	+ 96.0	= 253.5	x 0.40	= 101.4
<u>St. Charles</u>								
8 th Grade (13-14)	1	x 14	x 2.0	= 28.0	+ 24.0	= 52.0	x 0.40	= 20.8
7 th Grade (12-13)	1	x 14	x 2.0	= 28.0	+ 24.0	= 52.0	x 0.40	= 20.8
6 th Grade (11-12)	1	x 14	x 2.0	= 28.0	+ 24.0	= 52.0	x 0.35	= 18.2
5 th Grade (10-11)	1	x 14	x 2.0	= 28.0	+ 24.0	= 52.0	x 0.35	= 18.2
4 th Grade (9-10)	1	x 14	x 2.0	= 28.0	+ 24.0	= 52.0	x 0.30	= 15.6
				2,635.5	2,488	5,123.5		1,686.1
* Estimated wear factor based on age and weight of player								
Average wear factor for this baseball schedule: $R=1,686.1/5,123.5 = 0.32$								

Key Points:

- An average wear factor of 0.32 was established for all baseball groups. The great number of hours played by young players in Little League greatly influenced this average wear factor. There are fewer players on turf in baseball than soccer and for this reason wear factors are significantly lower.
- Adding practice hours to actual game hours dynamically increases yearly use. Based on an estimated 14 week game schedule and 16 week practice schedule with four hours of practice per week per team for Joe DiMaggio, Colt, Pony and Little League, two hours per week for SAY, and 1.5/1.0 hours per week for those younger (information source Jennifer Moore), the approximate number of practice hours for baseball totals 2,488. Adding an estimated 2,488 practice hours to 2,635.5 game hours totals 5,123.5 non-factored hours or 1,686.1 factored hours.

The Growth of San Carlos Programs

Comparing the year 2000 actual game use records of the seven sports fields involved through the City of San Carlos Recreation Program, to the proposed 2001 Field Request Summary, shows that the total estimated hourly game use will increase from 13,455.5 hours in 2000 to 14,681 hours during 2001.

This 8.3 % increase is primarily associated with the girls youth softball program. Year 2000 figures present Adult Softball only (400 hours) while 2001 presents both Adult and Youth Softball programs combined (1920 hours). The City of San Carlos has not provided fields for youth softball for several years, but now must find field time and space because the program is losing Tierra Linda as their exclusive field site. Total use hours for other primary sports

such as soccer and baseball remained basically the same over the two year period. Another key factor that must be noted prior to this discussion is the present renovation of Laureola. Due to the field renovation all scheduled activities for 2001 had to be moved to other sports field locations, putting even more scheduled hours on the remaining six fields. However, for the purpose of this discussion and to provide a balanced perspective for scheduled use per field in future years, Laureola will be included in the review as a viable and open field option for the year 2001.

However, when speaking with Jennifer Moore, Recreation Coordinator and determining the actual number of teams in all organizations, the number of games played, the hours per game, the hours per practice and the weeks in a season, it became apparent that there was a much greater projected increase in actual soccer and baseball field use than originally presented in the 2001 Field Request Summary. A comparison of the total year 2000 Field Use Summary, 2001 Field Request Summary and the 2001 Calculated Field Use for soccer and baseball is presented in Table 7A.

Table 7A. Comparison of the 2000 Field Use Summary, 2001 Field Request Summary and 2001 Calculated Actual Field Use for Soccer and Baseball. Summary Data Provided by Jennifer Moore, Recreation Coordinator, City of San Carlos, 2001.				
Sport	Year 2000 Hours Field Use Summary	Year 2001 Hours Field Request Summary	Year 2001 Hours Calculated Field Use	% Increase '00 vs. 01
Soccer	5,483.5	5,417	7,660.5	39.7%
Baseball	<u>3,967.0</u>	<u>3,724</u>	<u>5,123.5</u>	<u>29.1%</u>
Total	9,450.5	9,141	12,784	34.4%

Key Points:

- From the data presented it would appear that both soccer and baseball showed significant increases in total hours of field use when compared to the year 2000 Field Use Summary.
- Requested 2001 Use Hours are far below actual 2001 Calculated Field Use Hours. Field use hours for soccer have increased 39.7% over the period from 2000 to 2001. Baseball has increased 29.1% during the same time period.
- The method of determining actual field use for every organized sport should be standardized by establishing the number of games, number of practices, hours per game and hours per practice over all seasons of use.

With these increases in youth softball, soccer and baseball the following questions must be asked;

- *Do sports fields with different root zone profiles respond differently to traffic and for that reason exhibit different tolerances to sports activities?*
- *At what point will the total hours of field use cause so much turf injury and surface damage that Jon Barker and his maintenance staff will no longer be able to maintain safe and aesthetic play surfaces?*
- *What alternatives are available to the City of San Carlos in order to provide safe, functional and aesthetic sports fields to sports organizations as well enjoyable settings for open time community use?*

In order to gauge these questions and understand the impact of total use hours on turf injury and field integrity it is important to review the actual performance of typical sand, native soil and reinforced sand (sands strengthened with polypropylene fibers) profiles. Unfortunately, this type of information is not available in textbooks or academic journals. The best information is based on observation and the performance of specific field types under field conditions.

Professor Thomas Cook, State Turfgrass Extension Specialist, Oregon State University, has observed that sand based, cool season grass (Kentucky bluegrass/perennial ryegrass) sports fields in the Pacific Northwest can tolerate from 360 to 390 use hours per year, and still provide acceptable turf at the end of a year when combined with quality turfgrass management programs. Cool season grasses such as Kentucky bluegrass and perennial ryegrass are well adapted and grow vigorously in Northern California's very moderate Mediterranean climate. In his experience, native soil fields with textural classifications of loam, sandy loam or clay loam perform very well during dry summer conditions and very poorly during wet winter conditions. These native soils are poorly drained and become unstable when wet.

The soccer field at the Piedmont High School Sports Complex was constructed in 1998. This state of the art reinforced sand based field was sodded with a Tifway II hybrid bermudagrass/perennial ryegrass combination. The field was open for play in the fall of 1999. During the first year of play it was highly recommended that field use not exceed 500 hours. These recommendations were not followed and the field received in excess of 1,400 hours during the first year. After one year the turf was worn from 65% of the field surface. During the winter months the field surface was wet, slimy and very slippery. The surface was now unsafe for play and was closed for use. The next year a new synthetic FieldTurf surface was installed in order to accommodate the extreme play schedule and provide a high quality surface under moist to wet winter conditions.

From our field experience it would appear that the following perspectives are valid:

1. cool season grass fields with sand based profiles can tolerate approximately 360 to 390 hours of actual field use per year,
2. cool season grass fields with native soils can tolerate approximately 425 hours of actual field use, and
3. warm season grass fields grown in Northern California and supported with reinforced sand profiles may tolerate up to 500 hours of actual field use.

Based on these examples describing the relationship between actual hours of use, soil profile composition and resulting turf injury; where do the City of San Carlos sports fields fall in terms of hourly use, soil profile composition and potential for wear?

Table 8 presents a breakdown of all information presented in the 2001 Field Request Summary. The 2001 Field Request Summary presents the total hours of requested and estimated game and practice field use as well as hours per sport per field for the City of San Carlos Recreation Department during the year 2001. According to Jennifer Moore, Recreation Coordinator, in the past requested schedules have historically mirrored actual use.

Unfortunately, this trend has not continued during 2001. There is a great discrepancy between the 2001 Field Request Summary and the 2001 Calculated Field Use Hours for soccer and baseball. The 2001 Field Request Summary is not a compilation of actual use; it is an estimate. The City of San Carlos provides seasonal blocks of time to all sports organizations throughout the course of the year. The city does not control, designate or limit the number of games or practices with any sports organization. The recreation program in San Carlos is

growing rapidly. More teams are participating and more games and practices have been added.

When determining the number of teams in each organization and adding the number of games, practices, hours per game and hours per practice for soccer and baseball (Tables 5, 6, 7 and 7A), the 2001 Calculated Field Use Hours did not closely match the 2000 Field Use Summary or the 2001 Field Request Summary. Based on the fact that all other field use organizations other than soccer or baseball are accurately presented in the 2001 Field Use Summary, it is recommended that, for the purpose of this discussion, the information presented in Table 8 be used as a baseline. Where noteworthy, comments describing the possible impact of increases in soccer and baseball field use will be discussed.

From the data presented in the 2001 Field Request Summary as shown in Table 8, it would appear that the seven primary sports fields of the City of San Carlos which include Arguello, Burton, Crestview, Heather, Highlands, Laureola and Stadium will accumulate 14,681 total hours of scheduled game use or an average of 2,097 scheduled use hours per location during 2001. If the 2001 calculated 39.7% increase in soccer and the 29.1% increase in baseball were added to this total, the adjusted increase would total 18,324 hours of scheduled use and 2,617.7 use hours per location.

Actual scheduled use hours represent very important information, particularly in determining the coordination of team schedules and maintenance events. However, the simple determination of actual hours of scheduled use will not provide enough information to truly understand the impact of a particular sport or activity on turf or surface damage.

Table 8. Total Hours of Requested Field Use Plus Hours and (Percent Use) Per Sport Per Field. The City of San Carlos, 2001 Field Request Summary. MMM & Associates, Inc. 2001.

	<u>Arglo</u>	<u>Burt</u>	<u>Crest</u>	<u>Hther</u>	<u>High</u>	<u>Stad</u>	<u>Laurla</u>	<u>Total</u>
Soccer	240 (4.4%)	396 (7.3%)	1,284 (23.7%)	876 (16.2%)	1,084 (20.0%)	930 (17.2%)	607 (11.2%)	5,417
Baseball	504 (13.5%)	732 (19.7%)	* *	612 (16.4%)	930 (25.0%)	533 (14.3%)	413 (11.1%)	3,724
Softball	* *	1,170 (60.9%)	* *	* *	750 (39.1%)	* *	* *	1,920
Sports Camps	280 (17.5%)	400 (25.0%)	120 (7.5%)	* *	400 (25.0%)	400 (25.0%)	* *	1,600
Spec Needs	* *	* *	* *	* *	* *	* *	1,380 (100.0%)	1,380
Picnics	120 (33.3%)	120 (33.3%)	* *	* *	* *	* *	120 (33.3%)	360
Inst. Soccer	* *	200 (100.0%)	* *	* *	* *	* *	* *	200
Hometown Days	* *	42 (100.0%)	* *	* *	* *	* *	* *	42
Concerts	* *	32 (100.0%)	* *	* *	* *	* *	* *	32
Holidays	* *	6 (100.0%)	* *	* *	* *	* *	* *	6
	1,144	3,098	1,404	1,488	3,164	1,863	2,520	14,681

Key Points:

- Crestview receives the greatest percentage (23.7%) of scheduled soccer use.
- Highlands receives the greatest percentage (25.0%) of scheduled baseball use.

As previously discussed factored hours are actual use hours multiplied by a sport specific factorial that gives a more realistic perspective on true turf wear. These factorials were developed based on considerations of a) historical perspectives of turfgrass injury following use, b) number of participants per event, c) age and weight of participants, d) type of footwear, and e) time of seasonal use.

Sports organizations such as AYSO and CYSA are comprised of a range of age groups. Younger participants also weigh less. Their potential to cause turf damage and reduce surface quality is less than those players who are older, weigh more and move more quickly over a surface. As speed increases so does the need for enhanced traction, resulting in a much greater chance for tearing and divoting turf. The factorials for AYSO and CYSA were based on the actual year 2000 field use information and the number of games per age group (see Tables 5 and 6). This factorial is essential in determining actual field wear potential due to the obvious fact that 20 games of soccer played by 8 year old children is not equivalent to the same number of games played by 18 year old youths.

Sport by sport factorials are approximate models developed to help correlate field use and potential turf injury. Within each sport or activity there may be slight variations due to the increase or decrease in number of participants per unit area of field space. For the purpose of this discussion and the City of San Carlos Parks and Recreation Program, the factorials presented in Table 9 were established for the participating groups and their schedule of use.

	<u>Weighted Factorial</u>	<u>Comments</u>
AYSO	0.61	Based on age groups, weight & number of events in Table 5
CYSA	0.95	Based on age groups, weight & number of events in Table 6
Baseball	0.32	Based on age groups, weight & number of events in Table 7
Adult Softball	0.4	Limited turf activity; wear & compaction in outfields
Youth Softball	0.314	Limited turf activity; wear & compaction in outfields
Sports Camps	1.5	Significant impact based on the number of teams, many drills
Special Needs	0.3	Limited wear potential
Picnics	0.25	Limited wear potential, but based on number of participants
Instructional Soccer	0.5520	Based on age groups similar to AYSO
Hometown Days	1.0	Significant impact based on the number of attendees
Concerts	1.25	Significant impact based on the number of attendees
Holidays	1.0	Significant impact based on the number of attendees

Based on the factorials per sport and activity presented in Table 9, factored total hours of field use per sport and field are presented in Table 10. The data presented in Table 10 shows the baseline data from the 2001 Field Request Summary. The seven primary sports fields of the City of San Carlos that include Arguello, Burton, Crestview, Heather, Highlands, Laureola

and Stadium were subject to 8,175 total hours of factored use. Factorials help us measure the combined impact of several variables such as the type of activity, age group and weight of participants to potentially injure turf. This total divided by seven sports fields generates an average of 1,167.8 factored use hours per location during 2001. If the 2001 calculated 39.7% increase in soccer and the 29.1% increase in baseball were added to this total, the adjusted increase would total 9,816 hours of factored use and 1,402.3 factored use hours per location.

Table 10. Factored Total Hours of Field Use and Hours Per Sport Per Field. The City of San Carlos, 2001 Field Request Summary. MMM & Associates, Inc. 2001.

	<u>Argllo</u>	<u>Burt</u>	<u>Crest</u>	<u>Hther</u>	<u>High</u>	<u>Stad</u>	<u>Laurla</u>	<u>Total</u>
Soccer	133	219	940	362	641	681	335	3,311
Baseball	152	221	*	185	280	161	125	1,124
Softball	*	388	*	*	249	*	*	637
Sports Camps	420	600	180	*	600	600	*	2,400
Spec Needs	*	*	*	*	*	*	414	414
Picnics	30	30	*	*	*	*	30	90
Inst. Soccer	*	111	*	*	*	*	*	111
Hometown Days	*	42	*	*	*	*	*	42
Concerts	*	40	*	*	*	*	*	40
Holidays	<u>*</u>	<u>6</u>	<u>*</u>	<u>*</u>	<u>*</u>	<u>*</u>	<u>*</u>	<u>6</u>
	735	1,657	1,120	547	1,770	1,442	904	8,175

The average acreage of a sports field may vary tremendously depending on the sport played, such as soccer, baseball or softball, and also the age group of the participants. Little League Baseball, Inc. recommends a minimum of 1.2 acres (52,272 square feet) of ground space while Babe Ruth Baseball and Senior League Baseball recommend a minimum ground space of 3.0 to 3.85 acres (130,680 to 167,706 square feet). The Amateur Softball Association of America recommends 1.5 to 2.0 acres of ground space for play fields. Ground space for soccer can vary widely based on the age of the players with 1.0 to 2.1 acres most time required, but very often field size is dictated by the available space divided by the number of games required to be played in a specific amount of time.

The field-by-field percent breakdown of scheduled hourly use for the seven primary sports fields within the City of San Carlos is presented in Table 11. Due to the range in size of the fields, it is also very important to attempt to compare the fields based on a common denominator of similar square footage or acreage. For this reason the comparative percent of hourly use for a standard sports field of 1.5 acres is also presented.

Table 11. Percent of Scheduled Hourly Use Per Actual Field Size Compared to the Percent Hourly Use Per 1.5 Acre Field. The City of San Carlos. MMM & Associates, Inc. 2001.

	<u>Argllo</u>	<u>Burt</u>	<u>Crest</u>	<u>Hther</u>	<u>High</u>	<u>Stad</u>	<u>Laurla</u>
Size in Acres	1.5	3.25	1.1	1.5	4.2	2.0	1.3
Percent of Use/Actual Field Size	7.8%	21.1%	9.56%	10.1%	21.6%	12.7%	17.2%
Percent of Use/1.5 Acres	7.8%	9.7%	13.0%	10.1%	7.7%	9.5%	19.8%

Key Points:

- In Table 11 Burton and Highlands have the highest percentage of scheduled use per actual field size. However, because Burton and Highlands are the two largest facilities, with 3.25 and 4.2 acres, respectively, these figures misrepresent true levels of scheduled use on a per acre basis when compared to smaller fields. For this reason, in order to compare apples to apples, it is essential to choose a common surface area, in this case a 1.5 acre field, and then compare use.
- A key consideration for determining wear impact on natural grass surfaces is the number of players or participants per unit area over time. When large acreage facilities are used for sports activities, there is often the possibility of rotating fields throughout the facility or rearranging the actual field boundaries so that no one particular area receives excessive wear. The wear is spread out over a large area and its effect almost diluted. When smaller acreage facilities are used there are fewer options for moving or rotating actual field boundaries. In these cases the same grass areas receive repeated, concentrated activity and turf injury results.
- Different grasses exhibit different capacity to tolerate or resist traffic affects. Of the cool season grasses perennial ryegrass and tall fescue have shown to be more tolerant to traffic than Kentucky bluegrass. However, perennial ryegrass shows better recuperative potential than tall fescue primarily because it exhibits a more rapid growth rate during both warm and cool conditions. Hybrid and common bermudagrass exhibit some of the best resistance to wear within the warm season grasses. They show great recuperative potential, due to their stoloniferous (surface runners) when conditions are warm, but very slow recuperative potential when soil and air temperatures are cool to cold (November to March in Northern California).
- All grasses exhibit what we call a ‘critical threshold rate’ of wear capacity. This term refers to the total amount of traffic over a specific amount of time that a natural turf field can tolerate before it no longer exhibits an acceptable degree of recovery in an acceptable amount of time. It is very possible to wear out and/or destroy a grass sports field with excessive wear. It is also possible to significantly damage these surfaces little by little over time by not conducting the types of standard cultural practices, such as drill seeding and aeration that are required for recuperative capacity. If plant replacement through seeding is not conducted, or is conducted at the wrong time of the year when potential for germination and growth is poor, then eventually the composition of the grass stand will change. Other undesirable grassy and broadleaf weeds with limited root systems, poor wear tolerance and poor recuperative capacity will invade. As these poorly suited plants are worn out, more and more of the soil root zone will become exposed. As events are played during moist to wet conditions the slippery dirt areas will begin to rut, resulting in a change of grade, reduction in surface smoothness and an unsafe surface.

Table 12. Percent Scheduled Hourly Use Per 1.5 Acre Field and the Percent Factored Hourly Use of a 1.5 Acre Field. The City of San Carlos. MMM & Associates, Inc. 2001.							
	<u>Argllo</u>	<u>Burt</u>	<u>Crest</u>	<u>Hther</u>	<u>High</u>	<u>Stad</u>	<u>Laurla</u>
% Sched Hours/1.5 Acres	7.8%	9.7%	13.0%	10.1%	7.7%	9.5%	19.8%
% Factored Hours/1.5 Acres	11.4%	13.0%	23.8%	8.5%	10.1%	16.9%	16.2%

Key Point:

- On a per acre basis Laureola and Crestview receive the greatest levels of ‘scheduled sports field use’. However, it is important to look at ‘factored hours’ which paint a much truer picture of how different sports activities influence turfgrass wear and

surface quality. In terms of the severity of factored hours Crestview, Stadium and Laureola received the greatest potential degree of wear based on the age of the players, and the type and length of activity.

The seven sports fields found within the City of San Carlos vary in size. The approximate acreage for each field, scheduled use hours per actual field size, factored hours per actual field size and factored hours per a standard 1.5 acre field size field are presented in Table 13. Considering field acreage while comparing scheduled hours of field use with factored hours of use provides a more accurate estimation of the impact of specific activity on turf wear.

Table 13. Approximate Acreage for Each Field, Scheduled Use Hours Per Actual Field Size, Factored Hours Per Actual Field Size and Factored Hours Per a Standard 1.5 Acre Field. The City of San Carlos, 2001.

	<u>Arglo</u>	<u>Burt</u>	<u>Crest</u>	<u>Hther</u>	<u>High</u>	<u>Stad</u>	<u>Laurla</u>	<u>Total</u>
Size in Acres	1.5	3.25	1.1	1.5	4.2	2.0	1.3	14.85
Scheduled Use Hours	1,144	3,098	1,404	1,488	3,164	1,863	2,520	14,681
Factored Hours (FH)	735	1,657	1,120	547	1,770	1,442	904	8,175
FH/1.5 Acre Field	735.0	764.8	1,527.3	547.0	632.1	1,081.5	1,043.1	*

Key Points:

- Crestview, Stadium and Laureola are subject to the greatest amount of factored use hours and for that reason are most prone to turf injury and reduction in surface quality. Sports fields such as Stadium and Laureola, which are composed of native soil, would show better wear tolerance during dry conditions and very poor wear tolerance during wet conditions. Crestview is a sand based profile, but unfortunately exhibits drainage problems due to questionable subprofile construction and an organic slime layer at the soil/grass interface that retains moisture thus increasing the potential for turf injury.
- The seven primary sports fields, Arguello, Burton, Crestview, Heather, Highlands, Laureola and Stadium, average 904.3 factored field hours per 1.5 acre sports field. This average does not include “open community time” or unscheduled, non-permitted events.
- The 904.3 factored field use hours per 1.5 acre would represent more than twice as many hours as would be recommended to maintain a cool season grass sports field in good and safe condition.
- If the 2001 calculated 39.7% increase in soccer and the 29.1% increase in baseball were added to this total, the adjusted increases per field based on the percentage use of specific fields for soccer and baseball would greatly increase the factored hourly totals (see Table 13A.)

Table 13A. Approximate Acreage for Each Field, Factored Hours Per Actual Field Size and Factored Hours Per a Standard 1.5 Acre Field Based on Calculated Increases in 2001 Hours for Soccer and Baseball. The City of San Carlos, 2001.

	<u>Arglo</u>	<u>Burt</u>	<u>Crest</u>	<u>Hther</u>	<u>High</u>	<u>Stad</u>	<u>Laurla</u>	<u>Total</u>
Size in Acres	1.5	3.25	1.1	1.5	4.2	2.0	1.3	14.85
Factored Hours (FH)	831	1,807	1,493	743	2,105	1,758	1,072	9,809
FH/1.5 Acre Field	831.0	836.5	2,035.9	743.0	751.8	1,352.3	1,236.9	*

Key Points:

- With these calculated and more realistic totals the seven primary sports fields, Arguello, Burton, Crestview, Heather, Highlands, Laureola and Stadium, average 1,112.5 factored field hours per 1.5 acre sports field. This average does not include “open community time” or unscheduled, non-permitted events.
- It is estimated that cool season grass fields with native soils can tolerate approximately 425 hours of actual field use per year and still be maintained in acceptable condition. The calculated 1,112.5 factored field use hours per 1.5 acre sports field would represent 2.6 times as many hours as would be recommended to maintain a cool season grass sports field in good and safe condition.

Perspectives and Recommendations on Field Use Scheduling

The City of San Carlos Recreation Program continues to flourish from year to year. However, the combination of continued program growth and limited available sports field acreage may ultimately result in field surfaces that no longer meet acceptable surface quality and surface safety expectations.

The most significant key in addressing the interrelated problems of excessive field use, sports organization field use scheduling and scheduling of essential maintenance events during agronomically sound time periods, is to in some way find additional space and create turf surfaces that are acceptable for sports field use. If this could be accomplished through some creative thought it would dynamically enhance scheduling flexibility of both game events and essential maintenance events. Scheduled sporting events could be rotated off primary fields and scheduled at alternative sites of equal or better surface quality. This would allow Jon Barker and his maintenance staff the luxury of renovating fields during that long agronomic window of opportunity from April to October when soil and air temperatures are optimum for germination and growth of cool season grasses.

The following recommendations are presented as options to address perspectives on program growth and limited sports field acreage:

1. **Be creative.** Use existing sports field acreage more efficiently and/or find more available acreage that could potentially be used for sports fields.
 - Consider converting Crestview from a natural grass field with no lighting to a synthetic surface, such as FieldTurf or AstroPlay, with lighting. FieldTurf is a synthetic surface that will provide a) excellent wear tolerance and performance under frequent use, b) excellent surface quality, particularly for soccer, under both dry and moist conditions, and c) guaranteed performance for a period from 8 to 15 years. The combination of a surface such as FieldTurf plus evening lighting could combine to provide an excellent surface for soccer throughout all seasons, both wet and dry, as well as provide an opportunity for extended use into evening hours. The presence of two synthetic surfaces among the City of San Carlos’s natural turf sport fields would improve the conditions of the natural turf fields by reducing the number of hours played on the natural turf and also reducing the hours played on natural turf during moist to wet conditions when native soil fields are wet, soft, most susceptible to wear and potentially unsafe. The use of synthetic fields would then create a realistic opportunity to develop a field use scheduling plan that would rotate the grass fields out of use and

into a renovation program during any four week period from April to October.

One of the many benefits of installing a synthetic surface on an existing sports field site is that new property, which can be exceedingly expensive, does not need to be acquired.

Following installation of the synthetic field, evaluate performance over a two year period. If the Recreation Program continues to grow at the current pace and the synthetic field meets the expectations of the players, coaches and the Park and Recreation Administration, consider the installation of a second synthetic field with lights at Stadium.

In order to determine how a synthetic turf field may best serves the needs of the City of San Carlos contact the following individuals:

For further information and/or developing realistic cost numbers contact James C. Moore at Robert A. Bothman, Inc. (408) 279-2277. To learn more about the FieldTurf artificial surface system visit their web site at www.fieldturf.com or contact them directly at: FieldTurf, 5050 Pare Street, Montreal, PQ, Canada, H4P1P3, (800) 724-2969.

There are a number of locations in California where FieldTurf has been installed. Several locations are presented below and many more are presented on their web site. It is highly recommended that a site visit to several locations ranging from recent installations to older installations be planned with the administrative staff and all coaches if this product were to be seriously considered for use. The FieldTurf web site is very informative and will help answer many questions about the performance and success of their product.

Field Turf Locations

San Jose City College (Outdoor Football Field: 1/8/01)

San Jose, CA
Bert Bonanno (408) 288-3731

St. Ignacious High School (Outdoor Soccer Field: 1/7/00)

San Francisco, CA
Bob Vergara (415) 731-7500 ext. 538

Marin Academy High School (Outdoor Soccer Field: 1/10/99)

San Rafael, CA
Joan Kalkstein (415) 453-3616 ext. 237

Sacred Heart Cathedral (Outdoor Football Field: 1/7/99)

San Francisco, CA
Phil Freed (415) 775-6626 ext. 737

- Identify large parking lots at school facilities, commercial sites or shopping malls. The technology is available today to convert asphalt overflow parking areas into irrigated, reinforced (polypropylene fibers: TurfGrids) sand based profiles that have been sodded with Tifway II hybrid bermudagrass. These sites, such as the new stadium in Nashville, Tennessee, support traffic when needed, but also serve as very acceptable surfaces for sporting events. Another proposed project is to convert the

overflow parking lot for the Phoenix Open PGA (Professional Golf Association) event into a grassed reinforced area suitable for sports activities. The polypropylene fibers provide tremendous shear strength to the profile, so they will easily support car traffic when required. They can also provide a very acceptable turf surface for soccer, baseball softball and other sports. These are turf sites and with parked cars they are subject to severe compaction so they need to be maintained with proper cultural practices such as aeration, fertilizing, mowing and proper irrigation. To inquire about this technology contact:

Charles "Chuck" R. Dixon, Senior Agronomist
Jeffrey L. Bruce & Co. L.L.C.
1907 Swift Street, STE. 204
N. Kansas City, MO 64116
Phone: 816-842-8999, Fax: 816-842-8885
Cell: 816-916-8885
Email: cdixon@jlbruce.com
Web site: <http://www.jlbruce.com>

- The same concept can be used to convert the top floor of parking structures or the roofs of commercial buildings into safe and viable sports field surfaces.
- Improve surface quality and turf conditions at Central Middle School. Renovate existing fields and establish an agronomic and maintenance program. Remove concrete and asphalt and install grass that can serve a dual purpose.
- Build a new field on the slope above the day care facility at Tierra Linda. The slope would have to be cut and a retaining wall constructed. The field would have to be fenced with a tall structure to prevent ball escape.

2. Limit Program Growth

- Reduce total hours of scheduled use by no longer providing blocks of time to sports organizations. Instead get involved in league operations and establish maximum numbers of games played. Do not cripple leagues, but consider reducing the number of games by 10% to 20% in order to reduce total hours of use and provide staff with more flexibility in completing essential field maintenance.
- For those teams that schedule practices, reduce all practice hours by 25%.
- Reduce total hours of all organizations by 15%.

III. Sports Field Review

The City of San Carlos maintenance staff as directed by Jon Paul Barker, General Services Superintendent, conducts day-to-day maintenance on seven primary sports fields within the City of San Carlos. These fields include Arguello, Burton, Crestview, Heather, Highlands, Laureola and Stadium. The combined acreage totals approximately 14.85 acres.

Arguello

Arguello covers approximately 1.5 acres and is complimented with a backstop, ball diamond, skinned infield and extended turf outfield. This facility serves the needs of Little League and SAY baseball, as well as AYSO soccer and sports camps. This field is also a favorite picnic site based on its tranquil setting. The field was established in approximately 1957. There is no field lighting.

The turf at Arguello consists primarily of a cool season mixture including annual bluegrass (*Poa annua*), perennial ryegrass (*Lolium perenne*), Kentucky bluegrass (*Poa pratensis*) and some tall fescue (*Festuca arundinacea*). Kikuyugrass (*Pennisetum clandestinum*), which is a very invasive warm season grass, is also present in small concentrations. The primary weed types observed included white clover, annual bluegrass, spurweed, sorrel and broadleaf plantain.

Strengths: Arguello is a native soil field and for that reason performs very well during dry conditions.

Limitations: Arguello is a poorly drained, native soil field and for that reason performs very poorly during moist to wet conditions. The soil is classified as a true loam consisting of 41.2% sand, 38.5% silt, 20.3% clay and 5.04% organic matter by dry weight (USDA Particle Size Analysis, Turf Diagnostics & Design, February 2, 2001, See Appendix I). The infiltration rate of this soil is less than 0.1 inches per hour, which creates ponding problems following minimal rainfall events. Such soils maintain saturated conditions for extended periods during the winter season. When saturated and subject to sports activity these soils will compact severely and the turf layer will tear and divot easily. Saturated soil profiles that do not drain well lead to surface ponding as well as slippery, unsafe conditions during moist to wet conditions.

Photograph 1. Drainage problems at Arguello. MMM & Associates, Inc. 2001.

Arguello has a drainage problem. Water accumulates on the infield near the shortstop position and extends out to left and center field. The trees that line the outfield area from right to center field and beyond create cool, shady conditions that also contribute to slow surface drying.

Irrigation uniformity is also a problem. Wet and dry areas are common.

Scheduling Problems: Arguello is open from March 15 to December 10 (see Year 2001 Arguello Field Use Scheduling on Page 21). No permits for field use are available from December 11 to March 14, but technically the field is not closed and still open to public use. The field receives 735 factored hours of organized activity use per year plus nonscheduled and open public use not included in this total. Based on industry standards this level of activity represents 1.7 times the recommended use hours for a cool season grass field to be maintained in good condition. If the 2001 calculated 39.7% increase in soccer and the 29.1% increase in baseball were added to this total, the field would receive 831 factored hours of organized activity use per year. This level of activity represents 1.95 times the recommended use hours for a cool season grass field to be maintained in good condition.

The other major problem along with excessive use is the lack of scheduled down time from March to December for staff to conduct a rejuvenation program.

2001 Arguello Field Use Scheduling												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Little League			15th	→			1st	M-F 3pm-Dusk				
Pony/Colt			15th	→			1st	Sat 8am-Dusk				
DiMaggio			15th	→			1st	Sun 8am-Dusk				
SAY								21st	→		21st	T, F 3-Dusk
												Sat 12:30-Dusk
Adv Spt Camp						15th	→		1st	M-F 9-4		
Picnics				1st	→						1st	50% Avail Wknds PM
Soccer/AYSO								15th	→		10th	M, W, Th 3-Dusk
												Sat 8am-12:30 pm

Such a program consists of aeration, drill seeding, broadcast seeding and fertilizing; plus light and frequent irrigation to keep the seed bed moist. Following these cultural practices the field should be closed for a minimum of four weeks to get the young seedlings up and growing before subjecting young grasses to traffic. The existing schedule provides some time for this activity from the end of December to March. However, this three month winter time frame is inappropriate for seeding and renovation because air and soil temperatures are much too cold for maximum germination as well as growth of grass seedlings following germination. California Irrigation Management Information System (CIMIS Bay Area Year 2000) information shows that the Maximum Air Temperature ranges from 40 to 61 degrees F, Minimum Air Temperature ranges from 38 to 42 degrees F and Average Soil Temperature ranges from 48 to 52 degrees F. From a 'best practice management perspective' cool season grasses such as perennial ryegrass, Kentucky bluegrass and turf type tall fescue should be seeded when average soil temperatures reach a minimum of 60 to 65 degrees F. According to

CIMIS information, this acceptable soil temperature range of 60 to 65 degrees F occurs between April and October in the San Carlos microclimate.

Based on the field use scheduling presented there is no four week block without sports activity available during any month from April to October. The open times for maintenance include the following:

- The cold months of December, January and February which are unacceptable for the germination and growth of grass seedlings.
- March 15 to June 14. Monday through Friday from 7:00 am to 2:00 pm.
- September 1 to November 21 7:00 am to 2:00 pm.

Considering this real life field use schedule, the question remains, how is staff supposed to renovate Arguello? The answer is 'not very well'. The only option staff has is to conduct multiple drill seeding events during the spring months of April, May and June in the mornings prior to the start of afternoon baseball, which begins at 3:00 pm. Then again in the late summer during September and October prior to the start of SAY and AYSO soccer which begin play at 3:00 pm. Staff cannot use light frequent irrigation to germinate seed because otherwise the field will be too wet for safe activity. Staff cannot limit traffic, as they should, to protect the growth of young germinating seedlings. Some seedlings will germinate in out of play areas. Very few seedlings will germinate in worn areas where they are needed the most. Unfortunately, even those few seedlings that do germinate in worn areas will not survive even moderate traffic conditions, and they too will die. Seeding heavy traffic areas without at least a four week window of rest for germination and growth produces almost no improvement in turf density. It is a waste of seed, time and effort. If the task is completed at the proper time, followed by four weeks of rest, significant improvement in turf density will result.

Photograph 2. A worn turfgrass area and shady conditions in the outfield at Arguello.
Mark M. Mahady & Associates, Inc. 2001.

Options to Address Scheduling Problems: The biggest key to addressing the problems with both overuse and the coordination of essential maintenance events and sports schedules is to find additional locations to expand the acreage and number of sports fields. If this could be accomplished through a) converting Crestview into a lighted, synthetic FieldTurf or AstroPlay surface that could handle activity day and night under dry and moist-to-wet conditions, b) converting local overflow asphalt parking lots into reinforced, sand based, Tifway II hybrid bermudagrass sports fields, or c) improving the size and surface quality of fields at Central School, then staff would have some flexibility to move scheduled events off primary fields for four week periods during a period from April to October when soil and air temperatures are more optimum for germination and growth of cool season grasses.

Other Recommendations for Improvement: According to Jon Barker, Arguello is scheduled for renovation within the year. Perspectives to consider include the following:

- If on-site native soils are to be used for renovation, a properly graded crowned field will be necessary to maintain water sheeting across the surface due to the poor internal drainage and excessive water retention of these soils. Interceptor drains or slit drainage in most cases will show only short term effects and are usually not cost effective for such poorly drained soils.
- If on-site native soils are to be used for renovation and a properly graded crown is constructed, consider a sand topdressing program to firm the surface and keep moisture from the surface. However, remember that sand is costly, and that these programs require multiple sand applications (four or more) per year. Equipment (TyCrop sand topdresser) and labor add to the overall cost.
- Trim the trees bordering the outfield every two years in order to reduce shading on outfield turf and improve air movement across the surface of the turf canopy. Trim up lower branches and thin upper tree canopies.
- Primary field use is from mid March to mid December. Despite the potential for rain during March and April, and again during December, the majority of field use is during the dry season from May to November. These native soils do perform well when dry.
- Enhance cultural management programs. Use sequential postemergent herbicide programs in the spring to control weeds when they are young and susceptible to herbicides. Aerify with both hollow tines and deep tines a minimum of twice per year. Native soils should be deep tined spring and fall. Deep tining causes only minimal surface disruption.
- A more defined agronomic program review for Arguello will be presented in the agronomic calendar section.

Burton Park

Burton Park consists of two ball fields, Flanagan Field and Madsen Field that meet outfield-to-outfield and cover approximately 3.25 acres. This facility serves the needs of Little League, Pony, Colt, Joe DiMaggio and SAY baseball, as well as AYSO soccer, Adult and Youth Softball, Sports Camps and Instructional Soccer. Burton Park is also a favorite community meeting place and is used for picnics, Hometown Days, Concerts, and holidays such as Halloween and Easter. Both fields were renovated in 1999.

New turfgrasses were seeded on Flanagan and Madsen Field during the renovation of Burton Park in November of 1999. On-site native soils were ripped and an organic amendment was incorporated at a rate of four cubic yards per thousand square feet. Preplant fertilizers were incorporated and the field was drill seeded with a turf seed mixture consisting of 60% perennial ryegrass, 20% Kentucky bluegrass and 20% creeping red fescue. The fields are irrigated with potable water.

Unfortunately, due to the historical on-site presence of annual bluegrass (*Poa annua*) and the late fall seeding date, significant populations of annual bluegrass germinated at the same time as the perennial ryegrass, Kentucky bluegrass and creeping red fescue mixture. Today the turf type composition is estimated to be more than 65% annual bluegrass. Other broadleaf weeds observed in low populations included broadleaf plantain, mallow, buttercup, knotweed and scarlet pimpernel.

Strengths: Flanagan Field and Madsen Field are native soil fields and perform well during dry conditions.

Limitations: The soil on the sports fields at Burton Park is a very poorly drained, native soil. The soil is classified as a true loam consisting of 48.7% sand, 29.1% silt, 22.2% clay and 5.84% organic matter by dry weight (USDA Particle Size Analysis, Turf Diagnostics & Design, February 2, 2001, See Appendix I). The infiltration rate of this soil is 0.2 inches per hour. Such soils often pond water soon after minimal rain events and maintain saturated conditions for extended periods during the winter season. When saturated and subject to sports activity these soils will compact severely and the turf layer will tear and divot easily. Saturated soil profiles that do not drain well lead to surface ponding as well as slippery, unsafe conditions during moist to wet conditions.

Irrigation uniformity was a problem during the year 2000. However, after the sprinklers and nozzles were thoroughly evaluated and distance of throw corrected by Assistant Superintendent, Guy Wallace, both the irrigation uniformity and the condition of the turf have improved tremendously.

Photograph 3. Burton Park outfield grass. Mark M. Mahady & Associates, Inc. 2001.

Problems: Burton Park is open from March 15 to December 1. The park is closed from December 2 to March 14.

Recommendations for Improvement:

- Primary field use is from mid March to December 1, so the majority of field use is during the dry season and these soils do perform well when dry.
- Every six weeks hollow tine aerify those areas in the outfield that receive traffic and become compacted from players standing in one area for extending periods of time.
- Deep tine in late April and early October. Deep tining will not cause significant surface disruption.
- Use sequential postemergent herbicide programs in the spring to control weeds when they are young and susceptible to herbicides. Apply the first application when the average soil temperature reaches 60 degrees F for three consecutive days (approximately April 20-30). Apply the next application four weeks later. Sequential herbicide applications such as these will remove 95% of broad leaf weeds for the entire season.
- A more defined agronomic program review for Burton Park will be presented in the agronomic calendar section.

Scheduling Problems: Burton Park is open from March 15 to December 1 (see Year 2001 Burton Park Field Use Scheduling on Page 27). The field is closed from December 2 to March 14. The 3.25 acre field receives 1,657 factored hours of organized activity use per year. Nonscheduled and open public use is not included in this total. Extrapolated to a standard size 1.5 acre field reveals an equivalent of 764.8 factored hours per year on Burton Park. Based on industry standards this level of activity represents 1.8 times the recommended use for a cool season grass field to be maintained in good condition. If the 2001 calculated 39.7% increase in soccer and the 29.1% increase in baseball were added to this total, the field would receive 836.5 factored hours of organized activity use per year. This level of activity represents 1.97 times the recommended use hours for a cool season grass field to be maintained in good condition.

In addition to excessive use, the other major problem is the lack of scheduled down time from March to December for the park staff to conduct a rejuvenation program.

Based on the field use scheduling presented for Burton Park there is no four week block without sports activity available during any month from April to October. The open times for maintenance include the following:

- The cold months of December, January and February which are unacceptable for the germination and growth of grass seedlings.
- March 15 to June 14. Monday through Friday from 7:00 am to 2:00 pm.
- September 1 to November 21 7:00 am to 2:00 pm.

This schedule of available maintenance times is very similar to Arguello. As with Arguello, the only option Jon Barker has is to conduct multiple drill seeding events during the spring months of April, May and June in the mornings prior to the start of afternoon baseball, which begins at 3:00 pm. Then again in the late summer during September and October prior to the start of SAY and AYSO soccer which begin play at 3:00 pm.

Light, frequent irrigation practices cannot be used to germinate seed because this practice will result in wet, unsafe field conditions. Traffic cannot be limited to protect the growth of young germinating seedlings because there is no field down time. Some seedlings will germinate in out of play areas. A very small percentage of seedlings will germinate in worn areas where they are needed the most.

This type of agronomic approach is a grave misuse of agronomic and economic resources. Once the field is damaged by excessive wear it will never recover under this agronomic philosophy. Annual and perennial weeds will invade in the worn, compacted areas providing poor wear tolerance for future seasons of play and increasing the potential for unsafe field conditions.

2001 Burton Park Field Use Scheduling													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Little League			15th	→			31st	M-F 3pm-Dusk					
Pony/Colt			15th	→			31st	Sat 3pm-Dusk					
DiMaggio			15th	→			31st	Sun 9am-Dusk					
SAY								21st	→			21st	F 6:30-10pm Sat 3:30-10pm Sun 8am-2pm
Soccer/AYSO								15th	→			1st	M-F 3-Dusk Sat 8am-4pm
Adult Softball			15th	→			15th	T,Th 5-10pm Sun 2-7pm					
Adult Softball								1st	→			20th	M,T,W,Th 5-10pm Sun 2-7pm
Picnics				1st	→							1st	50% Avail Wkndpm
Hometown Days					May	Wkend, F, Sat, Sun 8am-10pm							
Concerts						30th	→		25th	F 6-10pm			
Halloween										31st	Hal Wkend		
Easter			31st	East Wkend									
Adv Spt Camp						15th	→			1st	M-F 8am-6pm		
Instr. Soccer		1st	→									1st	W 3-8pm

Crestview

The sports field at Crestview covers approximately 1.1 acres. This sand based field was constructed in 1977 and does not have lighting. According to those familiar with the history of Crestview, the field drained well during the first year, but since that time has never drained

well. Due to the presence of an organic slime layer the turf was removed and the field seeded in 1987. Today the field once again has significant problems with an organic slime layer located between the surface of the sand profile and the green growing turf (Photograph #4). The thickness of this layer ranges from 2.0" to 2.75". This is not a true thatch layer, but an anaerobic layer that retains excessive moisture and seals the sand profile from atmosphere. As a result the field does not drain well, is soft and divots easily. Over time the field wears rapidly and creates a bumpy and uneven surface (Photograph #5). Ball roll for soccer is poor. More importantly surface stability and traction during moist to wet conditions can be treacherous and field safety compromised.

Photograph 4. An organic slime layer located between the sand profile and the actively growing turf at Crestview. Mark M. Mahady & Associates, Inc. 2001.

The turf at Crestview consists primarily of a cool season mixture including annual bluegrass, perennial ryegrass, and Kentucky bluegrass. Very few weeds were observed on-site, only low concentrations of broadleaf plantain were observed.

Strengths: Crestview seems to provide a marginally acceptable surface at best. Some players and coaches like the surface because it is soft. Crestview is a real asset to the neighborhood. Many community events are staged at this scenic park. It is a popular location for birthday parties and many walkers and joggers enjoy the park. Crestview receives a tremendous amount of unscheduled use.

Limitations: Despite the fact that Crestview is a sand based sports field it is poorly drained and retains moisture after rain events due to the fact that the organic slime layer has sealed the field surface and the subprofile drainage design is flawed. The sand profile consists of 94.5% sand, 2.5% silt, 1.7% clay and 1.16% organic matter by dry weight (Particle Size Evaluation,

Turf Diagnostics & Design, February 2, 2001, See Appendix I). The infiltration rate of this sand is 13.5 inches per hour. The quality of the sand in the profile is good, however, the presence of the organic slime layer combined with subprofile design and drainage flaws dramatically prevents this field from performing well.

According to coaches and maintenance personnel Crestview has drained poorly for years. Wet spots are a common occurrence at the south corner of the field. The lower one-third of the field often has to be taken out of play during rainy winter months due to wet and unsafe conditions. A review of the original design shows V-shaped trenches with drainage lines located at the bottom of the V-trench running parallel to the steep slope located on the north and west portion of the park. A more effective drainage concept, standard in sports field construction today, is to design the drainage lines to run perpendicular to flow from the hill. In this way with drainage lines on 15 to 20 foot centers running across the field perpendicular to flow, there are numerous opportunities for water to run through the sand profile, hit the hard subprofile, and run along the based of that profile until they reach a collection point which is a drain line.

Photograph 5. A worn, divoted and bumpy surface at Crestview. Mark M. Mahady & Associates, Inc. 2001.

Photograph # 6 shows the sand profile. At this location in the center of the field, the sand was 14" deep with no subprofile gravel layer. Although it is slightly difficult to see in this photograph, there is standing water at the bottom of the profile. Such an occurrence generally means that the drainage system is not carrying water away from the subprofile. Crushed or clogged drainage pipe or improper outflow that causes water to backup in the drainage system could be contributing factors.

Jon Barker has conducted a preliminary evaluation of the drainage system and found numerous problems associated with pipe type and outflow at the lower end of the field where

all the water is collected. Members of the maintenance staff as well as Park and Recreation Commissioner Robert Dehner both mentioned that they were suspicious that drainage lines in the field may have been crushed or otherwise damaged by heavy equipment in 1987 when the sod was stripped from the field surface.

Photograph 6. The 14 inch deep sand profile at Crestview. Note standing water at the bottom of the trench. Mark M. Mahady & Associates, Inc. 2001.

It is highly recommended that a complete evaluation of the drainage lines and outflow system at Crestview be conducted. Technology is available to run tiny cameras on drain pipe snakes to check for crushed and broken lines. Ground radar systems are also available to evaluate soil profiling, composition and depth. No monies should be spent on replacing the turf or improving the field until the actual problems surrounding drainage have been determined.

If a FieldTurf synthetic field were to be considered at Crestview to support the soccer community, it is essential that the problems with drainage, outflow and water accumulation at the base of the profile be identified and solved prior to making this investment. It is possible that the existing field will have to be removed and rebuilt from the bottom up in order to solve the drainage problem and prevent these problems from occurring with a new synthetic surface. In such a case the turf would be cut with a big roll sod harvester and removed, the sand removed and stockpiled for later use, the old irrigation and drainage system scrapped, and the subprofile regraded. Following removal of the field the subprofile would be regraded to specification, sand would be screened for reuse, a properly draining sand profile constructed and a synthetic surface installed.

Be selective in choosing a contractor to complete the work. Do not assume that contractors who have been building roads all their lives understand the intricacies of sports field construction. We have had the opportunity to work with a number of very qualified

contractors over the years. One of the most experienced contractors in sports field construction who continues to produce a very high quality product is Robert A. Bothman, Inc. This firm has constructed high quality sports fields at San Francisco City College, Cal Berkeley and San Francisco State University to name just a few over the last several years. For further information contact James C. Moore, Vice President, Robert A. Bothman, Inc., 650 Quinn Avenue, San Jose, CA 95112, (408) 279-2277.

Regardless of who may be chosen to complete the work, make sure that a review of past field construction is a part of the evaluation process. In this way the quality of work can be evaluated. During field reviews it is also valuable to speak with stadium managers, coaches and maintenance staff members to gain further insight about the operational strengths of construction firms as well as their level of professionalism and attention to detail.

Scheduling Problems: Crestview serves the needs of CYSA and AYSO as well as sports camps. The field is almost totally dedicated to soccer. During the year 2000 Crestview received 23.7% of all soccer scheduled within the City of San Carlos Recreation Program. Crestview is open from January 2 to December 10 (see Year 2001 Crestview Field Use Scheduling on Page 31). The 1.1 acre field receives 1,120 factored hours of organized activity use per year. Nonscheduled and open public use is not included in this total. Extrapolated to a standard size 1.5 acre field reveals an equivalent of 1,527.3 factored hours per year on Crestview. Based on an industry standard of 360 field use hours per year for a sand based field, this level of activity represents 4.24 times the recommended use for a cool season grass field to be maintained in good condition.

If the 2001 calculated 39.7% increase in soccer use were added to this total, the field would receive 2,035.9 factored hours of organized activity use per year. This level of activity represents 5.6 times the recommended use hours for a cool season grass field to be maintained in good condition.

2001 Crestview Field Use Scheduling												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Soccer												
CYSA/AYSO								1st	→			10th
												M-F 3pm-Dusk
												Sat 8-Dusk
												Sun 8-Dusk
Soccer												
CYSA/AYSO	2nd	→				2nd	M-F 2:30-Dusk					
							Sat 8-Dusk					
							Sun 8-Dusk					
Sports Camps						19th	→	18th	M-F 9am-12pm			

Crestview is used year round. It is used extensively during the winter by CYSA and AYSO for their winter/spring soccer schedule that runs from January 2 to June 2. Based on the fact that December (3.8" rain), January (4.2" rain), February (3.3" rain) and March (2.9" rain) are the wettest months of the year (derived from NCDC Cooperative Stations, 61 complete years between 1931 and 1995), it is not surprising that Crestview drains poorly and divots easily. As a result the field surface is slippery, bumpy and uneven. These factors combine to create a poor quality surface that compromise player safety.

The reason sand based fields are constructed is to provide acceptable to good surface quality under moist to wet conditions. In other words, sand profile fields are built to play on safely during the wet winter months. Due to the organic slime layer that retains moisture in the surface and the flawed drainage design and system, Crestview will never perform well during the winter and only marginally well during the dry summer months. To further complicate the matter, Crestview receives frequent and excessive use without a realistic four week time frame to renovate and rejuvenate the field.

To maintain surface and profile integrity sand based fields require a more intense cultural management program than native soil base fields. Regularly scheduled hollow tine aeration and sand topdressing are essential in order to prevent the buildup of organic slime layers and reduce the potential for surface sealing. Over time failure to conduct these practices as part of a regularly scheduled agronomic calendar will result in failure of the field.

Prior to the development of any enhanced maintenance program, turf replacement or field replacement, it is essential that the cause of the drainage problems at Crestview be identified. Once this is accomplished a sound decision on the future of the field and its expected performance can be more easily determined.

At Crestview there is no four week block without sports activity available during any month from April to October. The open times for maintenance include the following:

- December 11 to January 1 when temperatures are unacceptable for the germination and growth of grass seedlings.
- January 2 to June 2. Monday through Friday from 7:00 am to 1:30 pm.
- June 3 to June 18.
- August 19 to December 10 7:00 am to 2:00 pm.

Options to Address Scheduling Problems: If Crestview were to be converted to a synthetic turf surface and lights were installed for evening play, this would provide the City of San Carlos with the following advantages:

- a field surface that performed equally well under moist or dry conditions,
- safer play under moist to wet conditions,
- superior ball roll for soccer,
- greater wear tolerance under both dry and wet conditions while maintaining surface quality and field integrity,
- transfer of natural turf field use hours to a more wear tolerant synthetic field when renovation programs are required for the maintenance and longevity of natural grass fields,
- an increase in available field use hours with lighting during the short days of winter.

Other Recommendations for Improvement:

- As previously mentioned, it is highly recommended that a complete evaluation of the drainage lines and outflow system at Crestview be conducted. Technology is available to run tiny cameras on drainpipe snakes to check for crushed and broken lines. Ground radar systems are also available to evaluate soil profiling, composition and depth. No monies should be spent on replacing the turf or improving the field until the actual problems surrounding drainage have been determined.
- For safety reasons trim up lower branches and thin upper canopies of the trees on the hillside.

Heather

The sports field at Heather Elementary covers approximately 1.5 acres. This facility serves the needs of CYSA and AYSO, as well as Little League baseball. The field is approximately 30 years old and does not have field lighting.

The turf at Heather like most of the other fields consists primarily of a cool season mixture including annual bluegrass (*Poa annua*), perennial ryegrass (*Lolium perenne*) and Kentucky bluegrass (*Poa pratensis*). The primary weed types observed included white clover, annual bluegrass, sorrel and broadleaf plantain.

Strengths: Heather is a native soil field and for that reason performs very well during dry conditions.

Limitations: Heather is a poorly drained, native soil field and for that reason performs very poorly during moist to wet conditions. The soil is classified as a true loam consisting of 42.5% sand, 35.6% silt, 22.0% clay and 5.29% organic matter by dry weight (USDA Particle Size Analysis, Turf Diagnostics & Design, February 2, 2001, See Appendix I). The infiltration rate of this soil is less than 0.1 inches per hour, which creates ponding problems following minimal rainfall events. Such soils maintain saturated conditions for extended periods during the winter season. When saturated and subject to sports activity these soils will compact severely and the turf layer will tear and divot easily. Saturated soil profiles that do not drain well lead to surface ponding as well as slippery, unsafe conditions during moist to wet conditions.

Like the other native soil fields Heather has a drainage problem. On the day of our field evaluation the field was saturated and closed to any activity. Irrigation uniformity is also a problem. Wet and dry areas are common.

Photograph 7. Heather Elementary School sports field. MMM & Associates, Inc. 2001.

Scheduling Problems: Heather is open from January 2 to December 10 (see Year 2001 Heather Field Use Scheduling on Page 34). The field receives 547 factored hours of organized activity use per year. Nonscheduled and open public use is not included in this total. Based on industry standards this level of activity represents 28% more activity than recommended for a native soil field planted to cool season grasses. If the 2001 calculated 39.7% increase in soccer and the 29.1% increase in baseball were added to this total, the field would receive 743.0 factored hours of organized activity use per year. This level of activity represents 1.75 times the recommended use hours for a cool season grass field to be maintained in good condition.

2001 Heather Field Use Scheduling												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Soccer												
AYSO								1st	→			10th M-Th 3-Dsk
CYSA												Sat 8-Dusk
												Sun 8am-12p
Soccer												
CYSA	2nd	→				2nd	M-F 2:30-Dsk					
AYSO							Sun 8am-12pm					
Pony/Colt			15th	→			1st	M-F 3-Dusk				
DiMaggio			15th	→			1st	Sun 8am-Dusk				
SAY								21st	→		21st	F 3-Dusk
												Sun 12pm-Dusk

The open times for maintenance include the following:

- The cold period from of December 11 to January 1 which is unacceptable for the germination and growth of grass seedlings.
- March 15 to June 1. Monday through Friday from 7:00 am to 2:00 pm.
- August 1 to December 10 from 7:00 am to 2:00 pm.
- July 1 to August 1.

Although options for germinating grass seedlings are not great, they are better than the other fields because the field is void of any scheduled activity during July. The best program would be to conduct multiple drill seeding events during May and June in the mornings prior to the start of afternoon sports, which begins at 2:30 pm, and then again the first week of July. With this multiple seeding concept and no activity during July, a fair percentage of seedlings will germinate in worn areas where they are needed the most.

Other Recommendations for Improvement:

- Consider a sand topdressing program to firm the surface and keep moisture from the surface. However, remember that sand is costly, and that these programs require multiple sand applications (four or more) per year. Equipment (TyCrop sand topdresser) and labor add to the overall cost.

- Enhance cultural management programs. Use sequential postemergent herbicide programs in the spring to control weeds when they are young and susceptible to herbicides. Aerify with both hollow tines and deep tines a minimum of twice per year. Native soils should be deep tined spring and fall. Deep tining causes only minimal surface disruption.
- A more defined agronomic program review for Heather will be presented in the agronomic calendar section.

Highlands

The two sports fields at Highlands cover approximately 4.2 acres. Valley Crest, a division of Environmental Care Industries, constructed these lighted fields in approximately 1990. According to the maintenance staff and field users the sand based fields at Highlands drain better and are more stable than the sand field at Crestview. Surface ponding is not a frequent issue.

During our field walk through a 1.0 to 1.5 inch thick organic slime layer mixed with thatch was observed. This condition was not as extreme as the 2.0 to 2.75 inch thick organic slime layer observed at Crestview. This is one of the reasons that Highlands performs better than Crestview as a sand based surface. No dynamic problems with divoting were observed. The field surface was much more even and firm than Crestview.

The turf at Highlands consists primarily of a cool season mixture including annual bluegrass (*Poa annua*), perennial ryegrass (*Lolium perenne*) and Kentucky bluegrass (*Poa pratensis*) Very few weeds were observed on-site, only low concentrations of white clover and broadleaf plantain were observed.

Photograph 8. The sports fields at Highlands. Mark M. Mahady & Associates, Inc. 2001.

Strengths: Based on personal observations as well as comments from coaches and maintenance personnel, the two sand based sports fields at Highlands appear to provide a functional and acceptable surface for a multitude of sports activities. As previously mentioned the fields drain much better than the sand based field at Crestview.

Limitations: The sand profile consists of 93.4% sand, 3.4% silt, 2.9% clay and 0.99% organic matter by dry weight (Particle Size Evaluation, Turf Diagnostics & Design, February 2, 2001, See Appendix I). The infiltration rate of this sand is 4.3 inches per hour. The quality of the sand in the profile is acceptable.

The surface at Highlands could be improved with more frequent hollow tine and deep tine aerations combined with sand topdressing. These types of aggressive cultural programs will reduce the thickness and negative influence of the organic thatch layer. Unless these cultural concepts are incorporated into a regularly scheduled maintenance program, the thickness of the organic slime layer at Highlands will continue to increase. If this occurs the surface organic layer will hold more moisture and increase the potential for surface sealing and divoting. Over time these factors will contribute to the development of an uneven and bumpy surface very similar to that presently observed at Crestview. Player safety will be compromised.

2001 Highlands Field Use Scheduling												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Little League			15th	→			1st	M-F 3-10pm				
Pony/Colt			15th	→			1st	Sat 8am-10pm				
DiMaggio			15th	→			1st	Sun 8am-1pm				
SAY								21st	→		21st	Sun 8am-6pm
Soccer/CYSA								1st	→		10th	M-F 3-10pm
Soccer/AYSO								1st	→		10th	Sat 8a-10pm
Soccer/CYSA	2nd	→			2nd	M-F 2:30-Dusk						
Adult Softball			15th	→			15th	M-Th 5-10pm				
									Sun 2-7pm			
Spt Camps						19th	→		18th	M-F 8am-6pm		
Tourney/Events						Summer	Days Vary					

Scheduling Problems: Highlands serves the needs of CYSA, AYSO, Little League as well as Pony, Colt and SAY baseball. Adult softball, sports camps and various tournament events are also scheduled at Highlands. During the year 2001 the City of Can Carlos proposed field use summary projected 20% of all soccer, 25% of all baseball, 39.1% of all softball and 25% of all sports camps to be scheduled at Highlands. Highlands is open from January 2 to December 10 (see Year 2001 Highlands Field Use Scheduling on Page 36).

The field receives 1,821 factored hours of organized activity use per year. Nonscheduled and open public use is not included in this total. Extrapolated to a standard size 1.5 acre field reveals an equivalent of 632.1 factored hours per year. Based on industry standards this level of activity represents approximately 1.75 times the amount recommended for a cool season grass sand based field to be maintained in good condition.

If the 2001 calculated 39.7% increase in soccer and the 29.1% increase in baseball were added to this total, the field would receive 751.8 factored hours of organized activity use per year. This level of activity represents 2.08 times the recommended use hours for a cool season grass field to be maintained in good condition.

The sports fields at Highlands are used year round. They are used extensively during the winter by CYSA for their winter/spring soccer schedule that runs from January 2 to June 2. Based on comments from the maintenance staff and end users Highlands performs adequately during this wet rainy season from January to April.

The reason sand based fields are constructed is to provide acceptable to good surface quality under moist to wet conditions. In other words sand profile fields are built to play on safely during the wet winter months. Enhancing hollow tine aeration, deep tining and sand topdressing will improve the fields at Highlands, particularly during moist to wet winter months.

Unfortunately, like the rest of the sports fields with the City of San Carlos Recreation Program, Highlands receives excessive, frequent use without a realistic four week time frame to renovate and rejuvenate the field. To maintain surface and profile integrity sand based fields require a more intense cultural management program than native soil base fields. Regularly scheduled hollow tine aeration and sand topdressing are essential in order to prevent and reduce the buildup of organic slime layers and reduce the potential for surface sealing. Over time failure to conduct these practices as part of a regularly scheduled agronomic calendar will result in failure of the field. Player safety will be compromised.

At Highlands there is no four week block without sports activity available during any month from April to October. In fact Highlands is only scheduled to be closed from December 11 to January 1 each year. The open times for maintenance include the following:

- December 11 to January 1 when temperatures are unacceptable for the germination and growth of grass seedlings.
- January 2 to June 19. Monday through Friday from 7:00 am to 1:30 pm.
- September 19 to December 10 from 7:00 am to 2:00 pm.

Options to Address Scheduling Problems: If Crestview were to be converted to a synthetic turf surface and lights were installed for evening play, this would provide the City of San Carlos Recreation Program with the opportunity to rotate at least one of two fields at Highlands out of play and into a renovation program consisting of aeration, overseeding and sand topdressing during the period from April to October when conditions for the germination and growth of grass seed is most optimum.

The only other best option would be to conduct multiple drill seeding events from May 1 to June 19 in the mornings prior to the start of afternoon sports, which begins at 3:00 pm. Another good time frame would be following the Sports Camps on September 19. With this multiple seeding concept at least some seedlings will germinate in worn areas where they are needed the most. Unfortunately, the type of light, frequent irrigation recommended for the proper germination and growth of young perennial ryegrass seedlings is not possible, due to the fact that this will create a moist, wet, slippery and potentially soft surface for sports

activities. Jon Barker and his staff will have to stay with their standard irrigation program and hope that they get adequate germination. Unfortunately, even once these seedlings germinate, few will reach maturity and contribute to a real improvement in turf density because they have very little traffic tolerance at this young growth stage. Rapidly germinating and maturing perennial ryegrass needs a minimum of four weeks growth to begin to show tolerance to even minimum traffic.

Other Recommendations for Improvement:

- Consider a sand topdressing program to firm the surface and keep moisture from the surface. However, remember that sand is costly, and that these programs require multiple sand applications (four or more) per year. Equipment (TyCrop sand topdresser) and labor add to the overall cost.
- Enhance cultural management programs. Use sequential postemergent herbicide programs in the spring to control weeds clover and broadleaf plantain when they are young and susceptible to herbicides.
- A more defined agronomic program review for Highlands will be presented in the agronomic calendar section.

Stadium

The native soil field at Stadium covers approximately 2.0 acres. According to Parks and Recreation Commissioner Robert Dehner, the field at Stadium was constructed several years prior to the remainder of the park. The field was constructed with minimum funds (\$50,000) provided by the City of San Carlos and AYSO. The field exhibits a 2% crown to facilitate surface runoff to collection points and catch basins. This facility serves the needs of Little League baseball, AYSO and CYSA soccer and Sports Camps.

Photograph 9. Stadium field. Mark M. Mahady & Associates, Inc. 2001.

Turf composition at Stadium consists of a mixture of cool season grasses including perennial ryegrass, Kentucky bluegrass, tall fescue and annual bluegrass. Broadleaf weeds observed in low populations included broadleaf plantain and clover.

Strengths: Being a native soil field Stadium performs very well during dry conditions. It exhibits very limited thatch (0.25" to 0.5") and can tolerate extensive activity when soil moisture is minimal.

Limitations: The soil at Stadium is a very poorly drained, native soil. The soil is classified as a true loam consisting of 42.6% sand, 35.7% silt, 21.7% clay and 2.72% organic matter by dry weight (USDA Particle Size Analysis, Turf Diagnostics & Design, February 2, 2001, See Appendix I). The infiltration rate of this soil is less than 0.1 inches per hour. Such soils often pond water soon after minimal rain events and maintain saturated conditions for extended periods during the winter season. When saturated and subjected to sports activity these soils will compact severely and the turf layer will tear and divot easily. Saturated soil profiles that do not drain well lead to surface ponding as well as slippery, unsafe conditions during moist to wet conditions.

Irrigation uniformity is a problem. Dry spots continue to appear between sprinklers. The field surface at Stadium is rather uneven with low spots and ruts. Safe footing is an issue.

Scheduling Problems: Stadium is open from January 2 to December 18 (see Year 2001 Stadium Field Use Scheduling on Page 40). The field is only closed from December 19 to January 1. The 2.0 acre field receives 1,442 factored hours of organized activity use per year. Nonscheduled and open public use is not included in this total. Extrapolated to a standard size 1.5 acre field reveals an equivalent of 1,081.5 factored hours per year on Stadium. Based on industry standards this level of activity represents 2.5 times the field use recommended for a native soil, cool season grass field to be maintained in good condition. If the 2001 calculated 39.7% increase in soccer and the 29.1% increase in baseball were added to this total, the field would receive 1,352.3 factored hours of organized activity use per year. This level of activity represents 3.18 times the recommended use hours for a cool season grass field to be maintained in good condition.

The other major problem along with excessive use is the lack of scheduled down time from April to October for the park staff to conduct a renovation program.

Based on the field use scheduling presented there is no four week block without sports activity available during any month from April to October. The open times for maintenance include the following:

- The cold months of December, January, February and March which are unacceptable for the germination and growth of grass seedlings.
- April 1 to June 14. Monday through Friday from 7:00 am to 2:00 pm.
- August 1 to December 18 from 7:00 am to 2:00 pm.

There is really no viable time to complete a renovation program on Stadium. Young seedlings will not survive without at least a four week period of inactivity following seeding. Winter/spring CYSA followed by all day summer and late summer/fall soccer eliminates any opportunity for a seeding window.

2001 Stadium Field Use Scheduling												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Little League			15th	→			1st	M-F 3pm-Dusk				
								Sat 8am-Dusk				
								Sun 9am-5pm				
Soccer/AYSO								1st	→			18th M-F 3-Dusk
Soccer/CYSA								1st	→			18th Sat8a-5:30p
Soccer/CYSA	2nd	→				2nd	M-F 2:30-Dusk					Sun8am-6pm
Adv Spt Camp						19th	→	18th	M-F	8am-6pm		

Recommendations for Improvement:

- The winter/spring CYSA schedule runs from January to June. Historically, January through April are rainy, wet months in Northern California. Deep tine aeration during November and December prior to the start of seasonal rains will help more moisture move off the surface.
- The late summer/fall AYSO and CYSA schedule runs from August to December. The majority of this season is during a historically drier period and field performance should be acceptable. Hollow tine aeration, topdressing with sandy loam and rolling will aid in smoothing the surface. Stripping sod from low areas, filling to an even grade with a loamy soil and replacing sod is also recommended.
- Use sequential postemergent herbicide programs in the spring to control clover and broad leaf plantain when weeds are young and susceptible to herbicides. Apply the first application when the average soil temperature reaches 60 degrees F for three consecutive days (approximately April 20-30). Apply the next application four weeks later. Sequential herbicide applications such as these will remove 95% of broad leaf weeds for the entire season.
- A more defined agronomic program review for Stadium will be presented in the agronomic calendar section.

Laureola

The 1.3 acre native soil field at Laureola is presently under renovation. However, the field still deserves discussion based on its extensive use and field contribution within the City of San Carlos Recreation Program.

The Old Field: The old field at Laureola was approximately 30 years old. The old turf prior to renovation consisted of a cool season grass mixture including annual bluegrass, perennial ryegrass and Kentucky bluegrass. A small percentage of tall fescue was present in the infield of the ball diamond. Broadleaf weeds observed in low populations included broadleaf plantain, malva, sorrel and clover.

Strengths: Being a native soil field Laureola performs very well during dry conditions. It exhibits very limited thatch (0.25" to 0.5") and can tolerate extensive activity when soil moisture is minimal.

Photograph 10. Standing water on the infield at Laureola. MMM & Associates, Inc. 2001.

Limitations: The soil at Laureola is a very poorly drained, native soil. The soil is classified as a true loam consisting of 33.7% sand, 39.0% silt, 27.3% clay and 5.35% organic matter by dry weight (USDA Particle Size Analysis, Turf Diagnostics & Design, February 2, 2001, See Appendix I).

The infiltration rate of this soil is 0.3 inches per hour. Such soils often pond water soon after minimal rain events and maintain saturated conditions for extended periods during the winter season. When saturated and subject to sports activity these soils will compact severely and the turf layer will tear and divot easily. Saturated soil profiles that do not drain well lead to surface ponding as well as slippery, unsafe conditions during moist to wet conditions.

The field has no internal drainage, but is crowned with a grade of approximately two percent. On the day of our evaluation during January of 2001 the outfield area was saturated and standing water observed in both the outfield and infield areas (Photographs #10 and #11). Surface flow from the asphalt parking lot shown in Photograph #12 was contributing to the saturated conditions in the outfield at Laureola.

Photograph 11. Standing water in the outfield at Laureola. MMM & Associates, Inc. 2001.

Key Point:

- Note the extreme wear in the saturated areas. When native soil fields are wet they get extremely soft and loose stability. Under such conditions native soil fields are subject to extreme damage from normal sporting events.

Scheduling Problems: Laureola is open from January 2 to December 15 (see Year 2001 Stadium Field Use Scheduling on Page 44). The field is only closed for 15 days per year from December 16 to January 1.

The 1.3 acre field receives 904 factored hours of organized activity use per year. Nonscheduled and open public use is not included in this total. Extrapolated to a standard size 1.5 acre field reveals an equivalent of 1,043.1 factored hours per year on Laureola. Based on industry standards this level of activity represents approximately 2.4 times the amount recommended for a native soil, cool season grass field to be maintained in good condition.

If the 2001 calculated 39.7% increase in soccer and the 29.1% increase in baseball were added to this total, the field would receive 1,236.9 factored hours of organized activity use per year. This level of activity represents 2.9 times the recommended use hours for a cool season grass field to be maintained in good condition.

The other major problem along with excessive use is the lack of scheduled down time from April to October for Jon Barker and his staff to conduct a renovation program.

Photograph 12. Water sheets off asphalt parking lot and flows into the outfield area at Laureola.
Mark M. Mahady & Associates, Inc. 2001.

Based on the field use scheduling presented there is no four week block without sports activity available during any month from April to October. The only times for any possible renovation program include the following:

- The last two weeks of December when soil temperatures are too cold for the germination and growth of grass seedlings.
- April 1 to July 1. Monday through Friday from 7:00 am to 12:00 pm.
- July 1 to August 15 from 7:00 am to 12:00 pm.
- August 15 to December 15 from 7:00 am to 12:00 pm.

There is really no viable time to complete a renovation program at Laureola. Young seedlings will not survive without at least a four week period of inactivity following seeding. Winter/spring CYSA followed by Little League and Special Needs eliminates any opportunity for a viable seeding window.

The best alternative plan may be to conduct multiple drill seedings early in the morning during the month of July before Special Needs activity. In this way it would at least be possible to get seed in the ground prior to AYSO soccer, which begins August 15. Again, some seeds will germinate. Fewer will survive and grow to maturity. With the rapid onset of continuous foot traffic, very little improvement in turf density will be observed. This approach is not an efficient use of resources.

2001 Laureola Field Use Scheduling													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Little League			15th	→			1st	M-F 3pm-Dusk					
								Sat 8am-Dusk					
Soccer/AYSO	2nd	→		15th	M-F 8am-Dusk				15th	→		10th	M-F 3-Dusk
													Sat 8a-5:30p
Soccer/CYSA	2nd	→		15th	M-F 3-Dusk								
Picnics				1st	→						1st	50% of Avail.	
													Wknd pm
Special Needs	2nd	→						2nd	M-F 12-6pm				
Special Needs								2nd	→		15th	M-F 12-6pm	

The New Field: The new turf will be a sodded mixture of Tifway II hybrid bermudagrass overseeded with perennial ryegrass. Tifway II hybrid bermudagrass is a warm season grass that develops an extensive surface stolon (above ground stem) and underground rhizome (below ground stem) system. These plant characteristics improve footing, traction, wear tolerance and recuperative potential of sports fields. A new irrigation system will be installed.

Recommendations for Improvement:

- The goal of all new sports field construction should be:
 1. great drainage
 2. build only what you need
 3. build only what you can manage
 4. good air movement in the profile
 5. good compaction resistance (aeration)
 6. smooth well graded surface that serves sporting events and directs water
- Direct water in the asphalt parking lot with a berm to a drain prior to reaching the field. In addition cut a curtain drain along the perimeter of the asphalt parking lot and the outfield to carry any over flow from the lot away from the outfield.
- Deep tine aeration during November and December prior to the start of seasonal rains will help more moisture move off the surface.
- Use sequential postemergent herbicide programs in the spring to control clover and broad leaf plantain when weeds are young and susceptible to herbicides. Stay away from Turflon 4E (triclopyr: Dow AgroSciences) as a postemergent herbicide. Turflon 4E will injure the Tifway II hybrid bermudagrass.
- A more defined agronomic program review for the new field at Laureola will be presented in the agronomic calendar section.

IV. Customer Service Standards

In all walks of life, we try to please others. One of the key aspects of trying to please or help others is to try to understand what people want and what they need. Unless they can help us understand their needs and see their vision, it can be an experience that is often times more frustrating than rewarding.

In order to identify and satisfy the needs of others many organizations establish customer service standards or level of service standards. In order to develop these programs the first thing they need to do is speak with their customers to try to determine their primary needs.

The City of San Carlos residents who walk the parks and enjoy the open time atmosphere, as well as the sports organizations and all the players that use the sports fields, are perceived as customers. Departments and employees responsible for the scheduling, use, and maintenance of city parks and sports fields establish customer service standards to attempt to meet the needs and expectations of the individuals and teams who use these facilities.

Surface Quality Expectations

Discussions with the Parks and Recreation Commission, members of the Athletic Sites Council, coaches of individual sports, and representatives from participating sports organizations all emphasized that the City of San Carlos and its residents are not trying to develop 'Show Case Fields' with unrealistic expectations of surface quality. The goal is to develop programs for the successful maintenance of 'General Use Fields' that exhibit a smooth, safe surface with good turf density. With proper maintenance and a team concept of responsibility these sports fields and parks will serve the needs of the community for many years to come.

Comments From Sports Organizations

Meetings with the Athletic Sites Advisory Council and onsite field reviews with coaches and participating members of sports organizations produced many good comments and ideas concerning the present condition of the San Carlos sports fields. A special thanks to all the individuals who took time from their schedules to participate in these gatherings including: Tom Johnstone (Baseball), Brian Cole (Pony/Colt), John Volkert (Little League), Don Hartnett (AYSO Field Director), Barbara Billings (AYSO Soccer), Logan Wolf (CYSA Soccer), Jeff Grace (CYSA Soccer), Rod Lehr (AYSO Soccer), Jim Garrity (Pop Warner Football), Greg Beratlis (Pop Warner Bayside Broncos), Dawn Reeves (Central Middle School), Tom Harrelson (Soccer), Barney Mooney (Youth Softball), Commissioner Robert Dehner (Park and Recreation Commission), Barry Weiss (Director, Parks & Recreation), Jon Barker (General Services Superintendent, Parks & Recreation), Guy Wallace (Assistant Superintendent, Parks Division), Jennifer Moore (Recreation Coordinator, Athletics), and the entire Parks and Recreation sports field Maintenance Staff. Thanks also to other individuals who participated, but whose names are not mentioned here. These individuals have many years of personal experience in the development and operation of organized sports within the City of San Carlos. Their ideas, constructive comments and historical knowledge have provided great insight and are of great value. Their input is very much appreciated.

In our discussions concerning practical and realistic ways to improve the condition of the sports fields all participants were asked the following question:

- ***From the perspective of a player, coach or sports organization representative, what can Jon Barker and his maintenance staff do to improve the sports fields of the City of San Carlos?***

As a group all participants voiced very positive opinions about the overall condition of the sports fields and were most complimentary of the performance, contributions and effort put forth by Jon Barker and his maintenance staff. To date they have been very impressed with the section concept of having one individual being responsible for one park. The very good condition of the fields is a direct reflection of the pride, passion and sense of responsibility exhibited by the maintenance staff.

Constructive suggestions and recommendations to further enhance field performance were mentioned by many of the representatives from organized sports. Where possible we will attempt to correlate comments with specific field sites.

Observations, Comments and Recommendations at Highlands

1. The field has improved every year for the last three years.
2. Large sand lip on the infield of the North Field (6'-8' elevation over a 10 foot area).
 - Pick up drag mat, do not pull onto grass
3. On the North Field move the valve boxes behind third base off the field of play.
4. Lots of clover and bees, control weeds.
5. Many dry spots, check the irrigation system.
6. More hose connections near the infield would be appreciated.

Observations, Comments and Recommendations at Stadium

1. A good, tough field when dry, it wears very well.
2. Good early in the season prior to winter rains, then very slippery when wet.
3. Limit practices, use for games.
4. Secure soccer goals off the field with a locking system.
5. Cover the metal grates over catch basins with rubber matting.
6. Another quick coupler near the infield would be helpful.
7. Many dry spots on the field, review the irrigation uniformity.
8. Some small ruts and uneven areas on the field.
9. Ground wasps and gophers found on the field.

Observations, Comments and Recommendations at Burton Park

1. A well maintained field.
2. Drainage and sprinkler cover much better than in past years.
3. It appears that more water is being applied during hot periods to maintain turf quality.
4. More trash cans or trash cans with greater capacity are needed for effective trash pickup.
5. If trash cans are full toward the end of the day coaches should encourage players and families to take their trash home.
6. Leashed dogs are able to walk on fields, need additional dog dropping boxes with owner pickup responsibilities posted.
7. Fence in outfield is good; it promotes safety and prevents ball escapes.
8. Increase height of fence in left field at Flanagan to prevent home runs from damaging cars and crossing street into residential homes.
9. Parents standing along sidelines and referees running up and down the field contributes to turfgrass wear during youth soccer games.
10. During soccer practice rotate goal locations.

11. Goals should be stored off the field and out of the way, locking system may be required.
12. Following rain events judge fields independently for potential closure based on age and weight of players (fields will be checked on Saturday and Sunday this year).
13. Soccer coaches would rather skip practices than games.
14. Trash pickup is the biggest issue; make everyone responsible after each game.
15. Final field cleanup after the last game of the day should be coordinated by the coaches with the assistance of all players.
16. Trash pickup should be mandatory and an essential part of the permitting process.

Observations, Comments and Recommendations at Crestview

1. Field is soft, easy to fall on.
2. Ball roll for soccer is slower than other fields.
3. A great park for the neighborhood, a real asset, many walkers, swings for children to play.
4. Could use lighted pathways.
5. The field is dry toward the hill and wet further down the fill particularly in the South corner.
6. Wet spots are a real problem. During mid winter after a rainfall you would sink up to your ankles in wet spots near the South corner of the field.
7. During winter you have to shorten the field to play on a drier surface, the bottom one-third of the field is wet and the upper two-thirds is acceptable for play.
8. Not a lot of flexibility in arranging the field, so goal and center field areas get worn.
9. Field is poorly graded, many sprinklers are too high.
10. Not used much from June 10 to August 15.
11. Crestview receives a fair amount of unscheduled use, but primarily local community use.
12. Remove soccer goals from field and secure them onto the hillside with a locking system.
13. Do not use goals for practice, cones only.
14. Could use a new platform for seating and maybe new trees to provide shade.
15. Prune trees on hill for visual safety.

Observations, Comments and Recommendations at Arguello

1. Excellent field.
2. Over watering near first base and toward batters box, also on cut walkway to mound, it seems to be a problem on Fridays.
3. Often wet in center and left field during winter season.

Other Observations, Comment, Questions and Recommendations

1. Could the city join the school district to improve the fields at Central?
2. Is there any space at Tierra Linda to build a new field?
3. Prioritize games over practices.
4. When considering field closure consider age and weight of players as they relate to potential turf injury and surface damage.
5. The popularity of the Recreation Program continues to grow and in turn the number of participants.
6. New families with children continue to move to San Carlos and their children enjoy soccer and Little League.
7. It seems like the soccer program continues to grow every year.

Comments From The Maintenance Staff

It is obviously very important to understand the needs of the general public, sports organizations, coaches and participants who use the City of San Carlos sports fields. This level of constructive communication can only assist the maintenance staff in addressing key issues, prioritizing needs and striving to continually improve surface quality.

While end-users are perceived as customers, it is also important to remember that in a very practical sense everyone involved in field use, be it the general public, Parks and Recreation Commission, Recreation Department, maintenance staff, sports organizations, coaches, players or hired consultants, ultimately plays a contributing role in the condition of those sports fields. For this reason is it important to remember that like so many things in life there is rarely one single factor that brings about misunderstanding or discourse or change. No individual, team, organization or department is solely responsible for the challenges presented and the concerns expressed. That responsibility belongs to all of us. It involves considering not what is best for me, but what is best for all. It involves building a 'team concept of responsibility' and addressing the following question:

- *What can I do as an individual today to help improve the surface quality of the sports fields in the City of San Carlos?*

With this team concept of responsibility in mind, I asked Jon Barker and the members of his maintenance staff the following question during a meeting reviewing agronomic programs:

- *From your perspective as grass growers and managers of surface quality what can the coaches, players and representatives of sports organizations do for you in order to help out, try to make your job a little easier and ultimately help you improve field conditions?*

Observations, Comments and Recommendations from the Maintenance Staff

1. On the mornings after sporting events, we spend 25% to 30% of our time picking up trash. The time it takes just to clean up the field site prior to starting our turf responsibilities greatly reduces our effective time for quality maintenance practices. Considering our small staff this significant trash problem greatly reduces our ability to deliver the best product possible.
2. It has taken a great amount of time and effort to improve the condition of the fields. We are proud of our fields. We wished that the coaches and players that use our fields took more pride in ownership and showed more responsibility regarding their use.
3. On certain occasions, we still see coaches and players on fields that are closed due to wet conditions. Field use guidelines should be strictly enforced and tied to the permitting process. If coaches and players abuse these privileges they should be given one verbal warning and then lose their playing privileges.
4. Teams should follow a philosophy of **'leave the park and field in better condition than you found it.'** Coaches should be required before the first practice of every season to have a mandatory orientation with all players in order to explain their responsibilities in the care of fields and park facilities. This could be included in a discussion of team rules and expectations. Sports fields and parks are present for all to enjoy, and everyone has some degree of responsibility for their care. Following every practice and every game coaches should lead a ten minute team walk through of the field and facility. All trash should be picked up and placed in trash containers.

If trash containers are full, plastic trash bags should be provided by the team, trash collected in the bags, tied securely and placed neatly next to trash receptacles. This clean up concept should be a defined requirement of all field permitting.

Field Use Policies

The current City of San Carlos Field Use Policy (Amended December 6, 2000) is presented in Appendix II, along with an example of a Rental Contract/Permit as used by the Parks and Recreation Department.

A New Change

Information provided by Barry Weiss, Director of Parks and Recreation, indicates that starting this fall and winter season, a new feature will be added to the Rain Day Policy within the City of San Carlos Field Use Policy. In the past, fields proposed for weekend play were evaluated on Friday only. In some instances fields evaluated and closed on Friday due to wet conditions were also closed for the weekend. If unexpected warmer and drier conditions prevailed through the weekend, there was a real possibility for the better draining and faster drying fields to present acceptable conditions for weekend play. To alleviate these possible concerns this coming rainy season all fields will be evaluated on a daily basis, including Saturday and Sunday, and this information presented on the 'Field Condition Hotline' recording. This new service will allow the Parks and Recreation Department to make more accurate daily determinations of field conditions, even throughout the weekend, while greatly assisting coaches and players in their effort to complete league schedules under acceptable field conditions.

Recommendations for Change

- Require a mandatory meeting in the form of an introductory walk through on all fields to be used in order to identify care and maintenance of the field and the obligations that the end user has upon entering the facility, using the field and before leaving the facility. An agreed upon clause in the permit will identify the specific penalty should the coach and team fail to meet the requirements.
- Following every practice and every game coaches should lead a ten minute team walk through of the field and facility. All trash should be picked up and placed in trash containers. If trash containers are full, plastic trash bags should be provided by the team, trash collected in the bags, tied securely and placed neatly next to trash receptacles. This clean up concept should be a defined requirement of all field permitting and included in the Rental/Permit document under 'Conditions for Use.'
- **Soccer Field Policies:** In order to accommodate the proposed soccer schedule at Burton Park while reducing wear patterns on field areas and sidelines the following recommendations are proposed:
 1. An additional field that is measured and marked as a field positioned diagonally across or perpendicular to the original field location. Lines for original field locations should be painted in one color (e.g. white) and additional fields painted in a different color (e.g. orange). Primo Maxx (trinexapac-ethyl: Syngenta Crop Protection, Inc.) can extend the duration of marking visibility when applied before or with marking agents. Mix Primo Maxx with water first when combining with latex-based marking agents. Refer to the marking agent's product label for further instructions. See Appendix III for the Primo Maxx label. This format will not only change the goal locations and primary areas of

wear, but also the spectator sidelines. Original and additional field locations should be rotated on a weekly basis for both practices and game events. This concept of rotational field use will reduce the total number of hours of use by approximately 40%-50% per field.

When first measuring fields pound one inch PVC couplers all the way into the ground at each corner location as permanent corner markers (small 1" x 6" redwood stakes may be pounded into the ground next to the PVC coupler just in case the PVC coupler is removed or kicked out during aeration). Mark the PVC coupler with a dot of orange marking paint. Measure from the PVC marker to another permanent object such as an irrigation sprinkler in order to have a reference for the location of the permanent marker.

2. No goals (cones only) shall be used during practice events.
3. Practice drills shall be conducted on a rotational basis across the field to reduce wear.
4. Secure soccer goals off the field with a locking system.

Field Use: ‘Open Community Time Versus Sports Use Time’

A review of field use hours for the City of San Carlos shows that more than 97% of all activities are dedicated to organized sports such as soccer, baseball, softball or sports camps (Table 8). Only 3% of 14,681 organized use hours are dedicated to organized non-sport activities such as picnics, Hometown Days, concerts and holidays.

During a March 7, 2001 meeting with the Parks and Recreation Commission, Commissioner Robert Dehner raised an interesting point. When reviewing the needs and interests of all San Carlos residents including those involved in organized sports and those who may just like to walk in the park on a warm summer night, how do we prioritize the needs and the right of each group in relation to city park access? How do we determine which group comes first? Are we maintaining parks for the general public’s right to equal access, or are we maintaining sports fields for a much smaller percentage of the population who are directing quality and highly valuable organized sports programs and who by all rights are equally as deserving?

This is a difficult question to answer. It requires much more thought and a more thorough review than what can be presented in this document. It requires candid opinions from both positions. Perhaps those San Carlos residents not involved in organized sports kindly accept the present field use philosophy. Maybe they enjoy watching young children of all ages participating in organized sports activities that teach teamwork, leadership and the value of vigorous exercise. Maybe there is still plenty of available time for them, outside of organized sports schedules, to enjoy the parks and sports fields as they see fit. But then again maybe they do not at all agree with the manner in which the parks are scheduled and used. Maybe they feel that their needs have never been addressed and that their opinions are not important.

If this topic is worthy of further discussion, maybe a good place to start would be to ask the general public for their thoughts and comments. Regardless of the findings, this exercise only amplifies the fact that the total acreage available for park and sports field use in the City of San Carlos is highly inadequate in serving the growing population and its passion for organized sports activities.

V. Agronomic Programs

The four keys to agronomic success in sports field maintenance programs include the following:

- a qualified, dedicated and properly staffed maintenance team with a true passion for creating a great product,
- well conceived and timely strategies for the growth and recuperation of turf,
- proper equipment to complete the necessary cultural tasks in a timely manner, and,
- an upper management group that supports the real needs of the maintenance team and creates an environment that allows that team to be most productive.

The City of San Carlos Sports Field Agronomic Program

The maintenance schedule presently used to maintain the seven primary sports fields within the City of San Carlos Park and Recreation Department is presented on Page 52.

Jon Barker and his staff represent a very hard working, knowledgeable and dedicated maintenance team. However, the combination of limited equipment, staffing concerns and inopportune timed renovation windows dynamically reduces their ability to maintain the sports fields at the level of surface quality they know is possible.

Further complicating the situation is the fact that today the City of San Carlos has two sports fields with two different types of profiles. Crestview and Highlands have sand profiles, while Arguello, Burton, Heather, Laureola and Stadium were constructed with on-site native soils. Sand profile fields are built for drainage. Sand profile fields require very different maintenance strategies than soil fields.

We build fields out of sand to take advantage of the natural drainage properties of sand. Sand fields are meant to perform when conditions are too wet for native soil fields. We don't build sand based fields because it's easier to grow grass on sand – it's not. We don't build sand based fields because turf will respond better to traffic– it doesn't. We build sand profile fields because when they are managed correctly they can provide a firm surface even when the rain is pouring down.

Sand profile fields require more intense management than native soil fields. They require more frequent fertilization, aeration and sand topdressing to maintain the integrity of the surface. Sand fields with perennial ryegrass turf have a tendency to produce organic slime layers that seal the surface, retain moisture and divot easily.

I have seen perfectly built, two million dollar sand fields that were not aggressively managed fail in less than two years.

2001 Monthly Maintenance Schedule: City of San Carlos Parks & Recreation													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Mowing	Once/Week on Thursday at 2.5" →												
Fertility	Seasonal Applications Based on Visual Evaluation: 3-4 Times/Year: Sand Fields, 6 Times/Year												
Irrigation	Based on Daily Inspections and Need												
Aeration	Aerovator Used on Infields, As Needed. Drum Aerifier Tears Turf.												
Topdressing	None At This Time												
Dethatching	On Seeding Unit Only. Perhaps Once/Year												
Overseeding						Crestview →					All Other Fields		
Sodding	Soccer Goal Mouths As Needed												
Weed Control/Pre	None At This Time												
Weed Control/Post	Once During 2001												
Insect Control	None At This Time												
Disease Control	None At This Time												
Soil Testing	None At This Time												

Agronomic Programs for Sand Based Sports Fields

In order for a sand profile field to perform as designed, the surface, described as the turf and the sand to a four inch depth, must be worked constantly to keep it open. The level of surface management will determine how long and how well the surface will perform.

A recommended agronomic program for the two sand profile sports fields within the City of San Carlos Parks and Recreation Program, Crestview and Highlands, is presented on Page 53.

Mowing

The field should be mowed twice per week at a cutting height of 2.0” during the most active growth periods from March through October. During the cooler, wetter and more moderate growth months from November through February vertical growth is reduced and mowing once per week should be acceptable. Mower blades should be sharpened on a regular basis to avoid fraying of leaf tips. Sharp mower blades are essential for clean mowing of perennial ryegrass. Total number of mowings may range from 70 to 84 depending on the degree of seasonal growth and labor resources. Clippings should be removed.

2002 Monthly Sand Profile Maintenance Schedule: City of San Carlos Parks & Recreation												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mowing	March to October, Twice/Week on M & TH at 2.0". Sweep, Vacuum or Collect Clippings in Baskets.											
	November to February, Once/Week on TH at 2.5". Sweep, Vacuum or Collect Clippings in Baskets.											
Soil/Tissue Testing	Submit in February to Establish Seasonal Baselines											
Fertility	Applications Every 5-6 Weeks. 1.0-1.5# Nitrogen/1000. Stress N & K Balance											
	Cal. Nitrate	▶	15-15-15	→	SCU 22-2-22 (Simplot)	→	Gypsum	15-15-15	→	Cal.Nit.		
Irrigation	Based on Daily Inspections and Need											
Aeration				Deep Tine		Hollow Tine		Hollow Tine		Deep Tine		
Topdressing				Sand		Sand		Sand				
Slicing	Weekly	→								Weekly	→	
Dethatching												
Overseeding												
Sodding												
Weed Control/Pre												
Weed Control/Post												
Insects/Disease				Rust	Rust	White Grubs						

Fertilization

In order to establish a nutrient baseline submit tissue and soil samples for testing during February of every year. Sand profile sports field require regular fertilization throughout the year with a combination of both soluble and controlled release fertilizer sources. To support active growth and recuperative potential apply 1.0 to 1.5 pounds of actual nitrogen per thousand square feet (lb. AN/M) every four to six weeks from March though October. During this active growth period use controlled release fertilizers such as polymer coated sulfur coated urea (PCSCU: Simplot’s 22-2-22) or PCSCU plus Polyon (polymer coated urea from Simplot). For best results use these products in multiple application sequences. Apply 15-15-15 at a rate of 1.5 lb. AN/M and gypsum at 20 lb./M during late summer overseeding. As temperatures cool in November, apply multiple treatments of either calcium nitrate at 1.5 lb. AN/M or IBDU at a rate of 2.0 lb. AN/M. These products will provide good color throughout the winter. Return to 15-15-15 as a spring application to balance phosphorus and potassium.

The actual amount of nitrogen required and the exact application interval will vary from site to site. Consider the rates and intervals described above as a model, but use your own best

judgment and keep accurate records from year to year. Sand has a propensity to leach nitrate and potassium. Fertilizers with N-P-K ratios in the range of 5-1-5 or 5-1-3 will work well. Apply a complete N-P-K fertilizer plus micronutrients following overseeding or at least twice per year. Kelp based biostimulants plus micronutrients and humic acids (Emerald Isle's CPR product or Roots 1-2-3 product) can help enhance root density when applied two to three weeks after overseeding.

Irrigation

Sand profiles give up water rapidly and do not retain as much water as native soil fields. For this reason sand profile fields should be irrigated frequently and kept slightly moist to prevent localized dry spots. Water daily or every other day to match water use rates or evapotranspiration (ET). Within two years Jon Barker will have installed new irrigation software that will monitor flow and calculate replacement ET. This will increase irrigation efficiency and reduce overall water use. Until that time continue to monitor sites daily and use a soil probe or a simple screw driver to monitor soil moisture. Irrigate three to four times per week during the summer to avoid leaching. Try not to apply more than 0.5 inches of water per irrigation cycle. Hand water dry spots as required. As winter approaches watch weather patterns closely and keep sand profile fields on the dry side.

Weed Control

The most prevalent broadleaf weeds are white clover and broadleaf plantain. Other weeds observed include sowthistle, mallow and knotweed. The best time to control weeds postemergently is in the spring when the weeds are young. Our research has shown that two sequential spring applications of a three way herbicide mixture such as Cool Power (MCPA Ester, triclopyr and dicamba: Riverdale Chemical) and or HorsePower (MCPA, triclopyr and dicamba) will provide approximately 90% to 95% control. Applications should be made on approximately May 1 and June 1 for best control.

Herbicide products impregnated on a fertilizer granule are available. However, their degree of effectiveness is markedly less than spray applications and the products are not inexpensive. In order for these herbicide/granular products to be effective the weeds need to be young, the leaf surface of the weed needs to be moist, and the granule needs to stick to the leaf or crown area for proper uptake. Confront (clopyralid + triclopyr) is a popular product on fertilizer. Other three way herbicide mixtures are available. Further information can be supplied upon request.

Due to the broadleaf weed types found in the sports field turf, preemergent herbicides will not be as effective as postemergent products. However, for control of broadleaf weeds in ornamental beds consider a preemergent ornamental bed weed control program. Develop a city wide weed map identifying specific weed types in specific ornamental beds. Determine the life cycle of the weed, for example, winter annual or summer annual. Use the specific preemergent that shows the best level of preemergent control for that particular broadleaf or grassy weed. Select and use preemergent herbicides such as Gallery, Snapshot, Surflan, Ronstar and Pendulum based on the specific weeds present. Use of preemergent herbicides in ornamental beds will significantly enhance landscape aesthetics by reducing weed populations, requirements for hand weeding and requirements for postemergent herbicide applications. Gallery (isoxaben) is an excellent product for preemergent broadleaf weed control. However, Gallery is very weak on grasses. Products such as Ronstar (oxadiazon) and Pendulum (pendimethalin) exhibit a broader spectrum of preemergent grassy weed control plus some broadleaf weed control. Snapshot (isoxaben + oryzalin) also provides very good control of both broadleaf and grassy weeds. For best control these products need to be applied

prior to weed emergence and generally require a minimum of two applications (spring and fall) per year. Read and follow all label directions.

Aeration

For best results, aerify with solid tines to a depth of eight inches during spring and fall. Hollow tine in combination with overseeding in April and August. It is essential that sand profile fields receive aerification on a regular and consistent basis. The deep tine system will penetrate deeper than the hollow tine, break up any subsurface layers and enhance water movement through the profile. The hollow tine will help remove the thatch and organic slime layer at the surface. This process will help keep the grass layer and the sand open to the atmosphere.

Slicing

Slicing is a viable tool for maintaining surface infiltration during the season when hollow tine aeration may be too disruptive. Slicing is a very valuable procedure and should be conducted weekly during fall, winter and spring. The effects of slicing are very short lived and that is why this practice is conducted so frequently.

Dethatching

The thatch that we see developing on home lawns rarely forms on sand profile sports fields. What we see on sports fields is organic debris that gets ground into the surface. This material can accumulate and plug the surface. The dethatching unit on the drill seeder will help reduce this organic layer. For this reason the more drill seeding that is conducted, the more dethatching that will take place. On heavily worn fields, dethatching with a tractor mounted flail device may be needed to prepare the surface for seeding.

Sand Topdressing

Topdressing with sand identical to that used in construction will help maintain a uniform surface profile and keep a smooth grade for maintaining a safe surface. Topdressing should be conducted during active seasonal growth periods from April through October to prepare the fields for fall and winter play. Plan on a minimum of three sand topdressings per year. Individual sand topdressing events should never exceed ¼ inch to avoid smothering of turf.

Contracted sand topdressing services are available. Emil Yappert of La Selva Consultants Inc. (831) 684-1420 or mobile (408) 671-8991 is a very reputable individual who has been providing sand topdressing, fertilizer and gypsum application services for many years. He has served many quality clients in our area including the Pebble Beach Company and The City of San Mateo. Cost of his services is based on a fee per ton to apply the sand, plus the cost of the sand. For example, for a standard size football or soccer field to be sand topdressed to a depth of ¼ inch requires approximately 50 tons of sand. Fifty tons of sand multiplied by approximately \$22.00/ton equals, \$1,100.00 for the sand alone. Then there is the cost of application. For project needs over 300 tons the cost to apply sand is \$8.00/ton. For sand quantities less than 150 tons, the cost to apply sand is \$10.00 to \$12.00/ton. At a maximum cost to apply of \$12.00/ton, multiplied by 50 tons, this portion of the cost is \$600.00. The approximate total for sand (\$1,100.00) plus application cost (\$600.00) equals \$1,700.00. The cost per field to apply sand would be less should more fields be involved. Cost per ton of sand may also be slightly less (approximately \$20.00/ton) if more sand were purchased. Emil is a very honest and conscientious individual who provides a quality product at a fair price. He is also very knowledgeable in the areas of quality sand suppliers, sand availability and fair market sand prices.

Another alternative is purchase your own TyCrop 400 sand topdressing unit for approximately \$22,000-\$23,000 and conduct your own sand topdressing. The decision to purchase your own unit should be made only if the following considerations are in place: a) the one-time capital outlay for equipment is available, b) the cost of sand is a standard budgeted item for a minimum of three years, and preferably for five to six years, c) time, labor and resources to complete the task is available and scheduled a minimum of three times per year and preferably four times per year. Is it a good decision to purchase the TyCrop topdressing unit, purchase the sand and complete the task yourself, or is it easier just to pay the price for contracted services and let someone else deal with this painstaking and time consuming process?

As an example, let's say that a TyCrop 400 was purchased. Based on the approximate purchase price of \$20,000 and the thought of topdressing Highlands and Crestview, how long would it take to recoup your investment when comparing the cost of contract services? The cost of the sand would be approximately the same in both cases. For the purpose of this discussion, without including labor costs for the city, the deciding factor is the contracted cost per ton to distribute sand. If The City of San Carlos were to hire a contracting service such as Emil Yappert to apply a ¼ inch layer of sand three times per year to the 5.3 total acres on Crestview and Highlands, the approximate cost to apply sand would be \$5,596.77 per year based on an estimated 155.46 tons of sand per topdressing event and a cost of \$12.00/ton to apply sand. With an estimated cost of \$20,000 for the TyCrop sand topdresser, it would take approximately four years for the city to recoup the investment cost of a TyCrop sand topdresser if they conducted sand topdressing in-house. This basic example does not include the cost of labor for the city to complete the sand topdressing nor take into account the fact that with limited staffing employees would be pulled away from other essential tasks to complete sand topdressing applications.

Other than the application costs another critical key is the cost of sand to complete three sand topdressings per year at Crestview and Highlands. Based on 155.46 tons of sand per topdressing event and 466.38 tons for three events, at a price of \$22.00/ton for sand the total cost for sand to topdressing Crestview and Highlands three times per year would be approximately \$10,260.36. The total combined cost for contracting three sand topdressings on the 5.3 acres at Crestview and Highlands would be approximately \$5,596.79 for applying sand and \$10,260.36 for the sand itself, totaling \$15,857.33.

If the City of San Carlos considers purchasing a TyCrop unit and attempting the task of sand application itself, the city must not only determine the actual time and labor cost required to complete this task in-house, but also the hours of labor that will be taken away from other essential services to complete sand topdressing. In order to maintain the present level of quality and include multiple yearly sand topdressing events, additional staff would have to be hired. Regardless of the agronomic benefit it may be that with the numerous tasks already facing a limited work force, the coordination and completion of a time consuming task such as sand topdressing may not really be realistic or even feasible from a time/cost/benefit perspective.

Slice Seeding

Turf on sports fields is always worn and abused by players. In such cases, the grass is really just a temporary cover that needs to be replanted on a very regular basis in order to keep the surface covered with desirable grasses. The drill seeder or slice seeder is a very effective tool for overseeding because it is relatively non-disruptive and plants the grass seed in grooves where they have a good chance to germinate and establish. Multiple slice seeding can be planned any time from April to October when soil temperatures are adequate for germination

and rapid development of the seedling. Complimenting this practice with hollow tine aeration and broadcast seeding is also a very popular practice. For best results, following renovation the field should be allowed to rest for four weeks without organized sports activity. Slice seeding is an essential part of the renovation and rejuvenation process.

Agronomic Programs for Native Soil Sports Fields

A recommended agronomic program for the five soil profile sports fields within The City of San Carlos Parks and Recreation Program is presented below. Soil fields include Arguello, Burton, Heather, Highlands, Laureola and Stadium.

2002 Monthly Native Soil Profile Maintenance Schedule: City of San Carlos												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mowing	March to June, Twice/Week on Monday & Thursday at 2.0". July to February, Once/Week on Thursday at 2.5".											
Soil/Tissue Testing	Submit in February to Establish Seasonal Baselines											
Fertility	Applications Every 6 Weeks. 1.25-1.5# Nitrogen/1000. Stress N & K Balance Cal. Nitrate → 15-15-15 → SCU 22-2-22 (Simplot) → Gypsum 15-15-15 → Cal.Nit. Calcite											
Irrigation	Based on Daily Inspections and Need											
Aeration				Deep Tine			Hollow Tine			Hollow Tine Deep Tine		
Topdressing				Sand			Sand			Sand		
Slicing	Weekly	→									Weekly	→
Dethatching	During Every Drill Seeding											
Overseeding				Drill/Broadcast						Drill/Broadcast		
Sodding	Soccer Goal Mouths As Needed											
Weed Control/Pre	Based on Weed Types, Plantain, Clover, Sowthistle, Mallow, Not Required											
Weed Control/Post	Sequential Applications of a 3-Way Mix on 5/1 and 6/1 Cool Power HorsePower (Riverdale)											
Insects/Disease				Rust	Rust	White Grubs						

Good quality native soil fields require many of the same cultural practices as sand profile fields. Overall, native soil fields perform well under dry conditions and turn into mud bowls during rainy, wet conditions. Soil fields can be improved with regular sand topdressing. Topdressing native soil fields serves to firm and smooth the surface. Sand topdressing native soil fields does not improve drainage.

Mowing

The field should be mowed twice per week at a cutting height of 2.0” during the most active growth periods from March through June. During the remainder of the months when growth is not as aggressive mowing once per week at a cutting height of 2.5” should be acceptable. Mower blades should be sharpened on a regular basis to avoid fraying of leaf tips. Sharp mower blades are essential for clean mowing of perennial ryegrass. The total number of mowing events may range from 60 to 70 depending on the degree of seasonal growth and labor resources. Clippings do not contribute to thatch production on native soil fields and do not need to be collected or removed.

Fertilization

In order to establish a nutrient baseline submit tissue and soil samples for testing during February of every year. Like sand profile sports fields, native soil fields require regular fertilization throughout the year with a combination of both soluble and controlled release fertilizer sources. Returning clippings may reduce fertilizer needs by 20 to 25 percent. To support active growth and recuperative potential apply approximately 1.25-1.5 pounds of actual nitrogen per thousand square feet (lb. AN/M) every six weeks from March through October. During this active growth period use controlled release fertilizers such as polymer coated sulfur coated urea (PCSCU: Simplot’s 22-2-22) or PCSCU plus Polyon (polymer coated urea from Simplot). For best results use these products in multiple application sequences. Apply 15-15-15 at a rate of 1.5 lb. AN/M and gypsum at 20 lb./M during late summer overseeding. As temperatures cool in November apply multiple treatments of either calcium nitrate at 1.5 lb. AN/M or IBDU at a rate of 2.0 lb. AN/M. These products will provide good color throughout the winter. Return to 15-15-15 as a spring application to balance phosphorus and potassium.

The actual amount of nitrogen required and the exact application interval will vary from site to site. Consider the rates and intervals described above as a model, but use your own best judgment and keep accurate records from year to year. Fertilizers with N-P-K ratios in the range of 5-1-5 or 5-1-3 will work well. Apply a complete N-P-K fertilizer plus micronutrients following overseeding or at least twice per year. Kelp based biostimulants plus micronutrients and humic acids (Emerald Isle’s CPR product or Roots 1-2-3 product) can help initiate rooting and enhance root density when applied two to three weeks after overseeding.

Irrigation

The increased silt and clay levels in native soil fields retain more moisture than sand profiles. For this reason it is best that native soil fields be watered as deeply as possible, while avoiding runoff, and as infrequently as possible without turf loss. The goal is to fill the soil profile with water and then let it dry out slowly. Keeping native soil fields on the drier side will improve rooting depth and also wear tolerance. Daily irrigation of native soil fields promotes shallow roots and reduced wear tolerance. Good sprinkler irrigation uniformity is essential to achieve these goals.

As previously mentioned, within two years Jon Barker will have installed new irrigation software that will monitor flow and calculate replacement evapotranspiration (ET: the total combined water loss from turf systems due to evaporation from leaf surfaces and transpiration through plant metabolism). This will increase irrigation efficiency and reduce overall water use. Until that time continue to monitor sites daily and use a soil probe or a simple screw driver to monitor soil moisture. Hand water dry spots as required. As winter approaches watch weather patterns closely and keep native soil fields on the dry side.

Weed Control

Weed control perspectives are the same for both sand and native fields. One important reminder is to avoid the use of Turflon 4E (triclopyr) on the Tifway II/perennial ryegrass sod at Laureola. Turflon can damage and suppress growth of hybrid bermudagrass.

The most prevalent broadleaf weeds are white clover and broadleaf plantain. Other weeds observed include sowthistle, mallow and knotweed. The best time to control weeds postemergently is in the spring when weeds are young and very susceptible to herbicide applications. Our research has shown that two sequential spring applications of a three way herbicide mixture such as Cool Power (MCPA Ester, triclopyr and dicamba: Riverdale Chemical) and or HorsePower (MCPA, triclopyr and dicamba) will provide approximately 90% to 95% control. Applications should be made on approximately May 1 and June 1 for best control.

Herbicide products impregnated on a fertilizer granule are available. However, their degree of effectiveness is markedly less than spray applications and the products are not inexpensive. In order for these herbicide/granular products to be effective the weeds need to be young, the leaf surface of the weed needs to be moist, and the granule needs to stick to the leaf or crown area for proper uptake. Confront (clopyralid + triclopyr) is a popular product on fertilizer. Other three way herbicide mixtures are available. Further information can be supplied upon request.

Due to the broadleaf weed types found in the sports field turf, preemergent herbicides will not be as effective as postemergent products. Read and follow all label directions.

Aeration

For best results, aerify with solid tines to a minimum depth of eight inches during spring and fall. Solid tining prior to winter rains will cause minimal surface disruption while creating channels to accept moisture. The deep tine system will penetrate deeper than the hollow tine option, break up any subsurface layers and enhance water movement through the profile.

Aerify with 0.75" hollow tines in combination with overseeding in April and August. The hollow tine will help reduce thatch and surface compaction. Sweep up cores or drag and mow cores to break up cores on the surface.

Dethatching

The dethatching unit on the drill seeder will help reduce thatch. Another option for more aggressive thatch removal is to use a flail or solid blade dethatcher to remove organic debris. Removing thatch helps prevent the development of a thick organic layer that plugs the surface, creates hydrophobic conditions and reduces the uptake of nutrients. Dethatching is best timed in late spring when soil is firm and relatively dry. A typical sequence of renovation might include coring, dethatching, debris removal, overseeding, topdressing and fertilizing.

Sand Topdressing

Soil fields can be improved with regular sand topdressing. Topdressing native soil fields serves to firm and smooth the surface. Sand topdressing native soil fields does not improve drainage. Results from sand topdressing are generally quite promising if a consistent program can be maintained for three years. If sand topdressing events are sporadic or conducted for less than three years, not much value will be realized. Unless a three year budget program including the cost of three to four sand topdressings per year can be accepted, it is often better

not even to begin. Dedicate these monies to purchasing equipment and supporting program concepts that will enhance turf and surface quality performance in other ways.

How much money would it cost to contract a service to sand topdress all seven San Carlos sports fields? If a ¼ inch layer of sand were applied to all 14.85 acres of turf on seven sports fields three times per year, the approximate cost to distribute sand would be \$10,454.40. Cost for sand would be approximately \$26,136 based on the need for 1,306.8 tons of sand at \$20.00/ton. Total estimated cost would be \$36,590.40.

Regardless of the agronomic benefit, it may be that the coordination and completion of a time consuming task such as sand topdressing may not really be realistic or even feasible from a time/cost/benefit perspective.

Slice Seeding

Slice seeding is just as valuable on soil fields as on sand profile fields. The drill seeder or slice seeder is a very effective tool for overseeding because it is relatively non-disruptive and plants the grass seed in grooves where they have a good chance to germinate and establish. Multiple slice seeding can be planned any time from April to October when soil temperatures are adequate for germination and rapid development of the seedling. Complimenting this practice with hollow tine aeration and broadcast seeding is also a very popular practice. For best results, following renovation the field should be allowed to rest for four weeks without organized sports activity. Slice seeding is an essential part of the renovation and rejuvenation process.

■ A Review of Water and Soil Tests

Complete results of the water and soil tests as completed by Dr. David York of Tournament Turf Laboratories are presented in Appendix IV. The soils information for each sports field is presented. This information is to be used to fine tune the general nutritional recommendations presented in both the agronomic program models for soil and sand based profiles. All fertilizer products and the ROOTS products can be acquired through either Sierra Pacific Turf Supply at (408) 374-4700 or Target Specialty at (800) 767-0719.

Water Analysis

Overall test results indicate that the irrigation water is of good quality. A few negative factors include an alkaline water pH of 8.6 and moderate bicarbonates of 146 parts per million (ppm). If a high level of bicarbonates accumulate on or near the surface of the soil, problems with water infiltration/penetration into the soil could occur. If such problems do occur acidification of the water, the addition of granular calcium, the use of wetting agents, the application of soluble chelated calcium, the use of acidifying fertilizers and humic acid may aid in water penetration.

Arguello Soil Analysis

Changes to the fertilizer program model presented in the 2002 Soil Profile Maintenance Schedule are as follows:

1. Following hollow tine aeration in the spring and fall apply 50 pounds of calcite calcium and 50 pounds of gypsum per thousand square feet.
2. Substitute Simplot's 12-6-16 Pro-Prills for 15-15-15 during spring and fall.
3. Conduct soil and tissue tests next February to establish baseline levels for 2002.

Burton Soil Analysis

Changes to the fertilizer program model presented in the 2002 Soil Profile Maintenance Schedule are as follows:

1. Following hollow tine aeration in the spring and fall apply 50 pounds of calcite calcium and 8 pounds of granular humic acid per thousand square feet.
2. Substitute Simplot's 12-6-16 Pro-Prills for 15-15-15 during the fall.
3. Conduct soil and tissue tests next February to establish baseline levels for 2002.

Crestview Soil Analysis

Changes to the fertilizer program model presented in the 2002 Sand Profile Maintenance Schedule are as follows:

1. Following hollow tine aeration in the spring and fall apply 50 pounds of calcite calcium, 50 pounds of gypsum, 8 pounds of granular humic acid and 10 pounds of EndoRoots 3-3-4 (Roots Company) per thousand square feet.
2. Substitute Simplot's 12-6-16 Pro-Prills for 15-15-15 during fall.
3. Apply 10 pounds of Pro-Mag 36 per thousand square feet.
4. Conduct soil and tissue tests next February to establish baseline levels for 2002.

Heather Soil Analysis

Changes to the fertilizer program model presented in the 2002 Soil Profile Maintenance Schedule are as follows:

1. Following hollow tine aeration in the spring and fall apply 100 pounds of calcite calcium per thousand square feet and 8 pounds of granular humic acid per thousand square feet.
2. Substitute Simplot's 12-6-16 Pro-Prills for 15-15-15 during the fall.
3. Conduct soil and tissue tests next February to establish baseline levels for 2002.

Highlands Soil Analysis

Changes to the fertilizer program model presented in the 2002 Sand Profile Maintenance Schedule are as follows:

1. Following hollow tine aeration in the spring and fall apply 50 pounds of calcite calcium, 50 pounds of gypsum, 8 pounds of granular humic acid and 10 pounds of EndoRoots 3-3-4 (Roots Company) per thousand square feet.
2. Apply 5 pounds of Pro-Mag 36 per thousand square feet.
3. Conduct soil and tissue tests next February to establish baseline levels for 2002.

Laureola Soil Analysis

Although Laureola has been renovated and returfed since this soil analysis, the soil nutrient base is most likely still quite similar. Changes to the fertilizer program model presented in the 2002 Soil Profile Maintenance Schedule are as follows:

1. Following hollow tine aeration in the spring and fall apply 50 pounds of calcite calcium, 50 pounds of gypsum and 8 pounds of granular humic acid per thousand square feet.
2. Substitute Simplot's 12-6-16 Pro-Prills for 15-15-15 during the fall.

3. Apply 8 pounds of Pro-Mag 36 per thousand square feet.
4. Conduct soil and tissue tests next February to establish baseline levels for 2002.

Stadium Soil Analysis

Changes to the fertilizer program model presented in the 2002 Soil Profile Maintenance Schedule are as follows:

1. Following hollow tine aeration in the spring and fall apply 50 pounds of calcite calcium, 50 pounds of gypsum, 8 pounds of granular humic acid and 10 pounds of EndoRoots 3-3-4 (Roots Company) per thousand square feet.
2. Substitute Simplot's 12-6-16 Pro-Prills for 15-15-15 during the fall.
3. Conduct soil and tissue tests next February to establish baseline levels for 2002.

A Review of Existing Turfgrass Maintenance Equipment

Turfgrass maintenance equipment represents nothing more than the functional concept of “the right tool for the right job.” The proper equipment provides the maintenance staff with the assistance required to complete field tasks in an aesthetic and time efficient manner. Limited staffing is a problem throughout many municipalities and universities across the nation. Selection of the proper equipment is even more important when maintenance departments are faced with challenging field use perspectives, aggressive agronomic programs that must be completed within a short and specific time frame, and limitations in support staffing.

Presented below is a listing of key equipment inventory used by the City of San Carlos maintenance staff.

1. **Aerovator:** 2 years old. Loosens dirt infields.
2. **John Deere 5210 Turf Special Tractor with LandPride Drill Seeder:** 2 years old. Drill seeds and dethatches fields during renovation process.
3. **Turf Flyer pull type aerifier:** 40 years old. This unit tears turf when aerifying, is no longer appropriate for the needs of the maintenance staff and should be replaced with a deep tine aerifying unit.
4. **Toro slit seeder.** Age unknown. A small unit, but still works well.
5. **John Deere F935 72” front deck rotary:** approximately 2 years old. Turf mower.
6. **Toro GroundsMaster 88” front deck rotary:** 10 years old. Turf mower.
7. **ExMark, UltraVac 52” rotary mower:** 1 year old. Turf mower.
8. **Lely fertilizer spreader:** Age unknown. Large fertilizer spreader that pulls behind a tractor.
9. **Cushman Utility Vehicles (2):** 19 and 11 years old. Transport maintenance staff and supplies.
10. **Kubota F2100 Mower:** 7 years old. Turf mower (poor quality cut on heavy grass).
11. **Walk-behind rotary spin spreaders (3):** Age unknown, old. Applies fertilizer in small areas.

Turfgrass Maintenance Equipment Recommended for Purchase

As the City of San Carlos Parks and Recreation Program continues to grow the number of scheduled events increases every year. With this expansion comes more players, more games, more activities, more soil compaction, more worn turf and less time to complete essential cultural practices for turf renovation and recovery. The seven sports fields within the City of San Carlos comprise almost 15 acres of playing surface. In order to properly conduct time

consuming cultural practices such as deep tine or hollow tine aeration on this much acreage requires not only the right type of equipment, but also the right size equipment. Proper equipment combined with a knowledgeable staff ensures that those cultural practices which are essential to maintaining surface quality and safe fields will be completed in a timely fashion.

In many cases the service that a specific manufacturer or distributor provides may be as or more important as the equipment itself. Before making a final decision on an equipment purchase consider service history and location of the distributor. We all need the right piece of equipment to do the best job we can in the most efficient manner. In the long run we will also need the best service possible to support the maintenance of that unit. Evaluate turfgrass equipment suppliers in the area. Request bids for lease options. Evaluate the cost/benefit of a lease option program versus a purchase program. Dan Rogers of Reed Equipment (209) 482-3881 is well known in Northern California for providing sound information and top of the line equipment to support sports field maintenance.

The following equipment is highly recommended for purchase in order to support The City of San Carlos maintenance staff achieve their goals of surface quality while maintaining safe and aesthetic sports fields and parks:

1. **Triplex riding reel mower** to maintain the new Tifway II/perennial ryegrass field at Laureola. There are several manufacturers that produce triplex reel mowers for sports field maintenance. However, over the last several years John Deere has moved to the forefront in mowing equipment for sports fields maintenance. The mower of choice for Laureola is most likely the John Deere 2653 Professional Utility Mower. This triplex unit has hydraulic reel drive, all wheel power and can mow at a variety of cutting heights from 3/8" to 3.0". The only downside of this unit is that to my knowledge it does not come with collection baskets for picking up clippings. Clippings would have to be picked up with a sweeper or vacuum. To gather information on the web go to www.johndeere.com or call Dan Rogers at Reed Equipment at (209) 482-3881 to request a demonstration.
2. **A deep tine aerifying unit** that can be fitted with either solid tine shanks or hollow core tines is essential for maintaining both soil and sand profile sports fields. The two primary manufacturers in this market are Soil Reliever and Verti-Drain. These companies manufacture very high quality equipment and are well respected in the industry. It will be essential to have an on-site demonstration with both units and models prior to making a purchase decision. To gather information on the web go to www.vertidrain.com or www.soilreliever.com. To contact Verti-Drain for a list of local distributors and an on-site demonstration call (570) 602-3058. To request a demonstration of the Soil Reliever call Dan Rogers at Reed Equipment at (209) 482-3881 to request a demonstration.
3. **A multi-spike or level spike slicing unit.** Slicing is one of the most valuable cultural practices for sand and soil based sports fields. These units can slice 4" to 8" deep, remove thatch and help keep moisture off the surface. To gather information on the web go to www.vertidrain.com. To contact Verti-Drain for a list of local distributors and an on-site demonstration call (570) 602-3058. AerWay also manufactures a number of models of slicing units including the SportsTine and ShatterTine. To contact AerWay on the web go to www.aerway.com. For a list of local AerWay distributors, call (800) 457-8310. It will be essential to have an on-site demonstration with both units and models prior to making a purchase decision.

4. **A sweeper** would be of great value to pick up clippings, aeration cores, leaves and other debris that may accumulate on the fields after sporting events, concerts or other community activities. There are basically two types of sweepers. One is a true sweeper with no vacuum that uses rotating wheels equipped with rubber fingers or polypropylene brushes. The other is a combination sweeper plus vacuum, such as the Toro Rake-O-Vac. The Toro-Rake-O-Vac is the industry standard. Go to www.toro.com to view information on the Rake-O-Vac and find a list of California distributors to provide you with a demonstration. Another new sweeper that is receiving good reviews is the John Deere TC125. To gather information on the web about this John Deere unit go to www.johndeere.com. For further information or to request a demonstration of the John Deere TC125 call Dan Rogers at Reed Equipment at (209) 482-3881.
5. **A small hollow tine aerator** to aerate small areas such as compacted areas where outfielders stand or areas subject to repeated drills from sports field camps would be a great compliment to these other equipment requests. A piston driven unit is essential. Do not waste your money on a drum roller type. The drum types tear the turf and do not pull a uniform core. The two top units in the industry are the Ryan LA-28 and the Ryan GA-30. The LA-28 is a walk behind unit that pulls a hollow tine core. It is a very durable unit that is relatively narrow and can get through gates and entry areas easily. The GA-30 is a small riding unit that works very well on small acreage. Great for small acreage. For further information and on-site demonstrations, contact Far West Equipment in Concord, California at (503) 252-1249. Bill Eperson is your contact. Another distributor in Northern California is Turf Star in Hayward at (510) 887-1222.
6. **A small sod cutter** is essential for cutting out and resodding goal mouths and any other extremely worn areas that require replacement. The industry standard is the Ryan Junior Sod Cutter. Two models are available, the 12" model (544844) and the 18" model (544845). For further information and on-site demonstrations contact Far West Equipment in Concord, California at (503) 252-1249.
7. **The TyCrop MH400** sand topdressing unit is the product of choice if considering a large acreage sand topdressing unit to conduct your own in-house work. For further information and to request a demonstration of the TyCrop MH400 call Dan Rogers at Reed Equipment at (209) 482-3881.
8. **Rotary fertilizer spreaders** are important for small acreage use. The best walk behind, big wheel unit on the market is the Scotts SR2000. This is a big wheel, stainless steel unit with a side deflector that provides the best application uniformity in the industry. The AccuPro 2000 is another very good model without stainless steel. For further information contact Sierra Pacific Turf Supply at (408) 374-4700 or Target Specialty at (800) 767-0719.
9. **Small tow behind trailers** are very valuable for carrying mowers, edgers, blowers and other essential maintenance equipment. Those units with lift beds are ultimately the safest for employees. Designed service trailers increase the transport and on-site efficiency of maintenance crews.
10. **Equipment storage units** for storing mowers and other essential equipment on-site at various park locations. Having essential equipment safely locked and stored on site would significantly improve employee productivity and time efficiency.

VI. Employee Staffing and Communication

The City of San Carlos Parks and Recreation Department presently employs eight maintenance and three senior maintenance (lead worker) employees. The average tenure of a park employee is greater than ten years. Each year employees receive on the average four weeks of vacation, two to three weeks of comp time, twelve national holidays and one week of sick leave.

The city has 66 acres of maintained parks, approximately 2.5 acres of landscaped median strips and 86 acres of open space park land. The maintained parks and landscape medians require a high standard of maintenance. The wild land park does not require the level of maintenance specific to urban parks, but does require trail maintenance, trash removal and invasive species control.

The maintenance staff is responsible for a wide and diverse range of responsibilities from turf management to building maintenance. Presented below are several creative ideas to support the maintenance staff in their efforts to complete tasks in a timely manner while continuing to maintain quality.

1. Hire more seasonal part-time people during the year to support the primary maintenance personnel. There are crunch times every year when there are just too many things to do. One of these eight hour per day seasonal employees could be assigned to each park to and help with highly visible, but easily learned tasks such as dragging infields, hand watering, picking up trash and cleaning restrooms. This process would also create a potential pool of quality and experienced workers should additional maintenance positions within the city be created or become available.
2. Initiate a Park and Recreation Summer Intern Program. There are a number of universities, colleges and community colleges within the state of California that support within their curriculum landscape management and horticulture degrees. There are many students who would be interested in working for the summer as part of the maintenance staff and learning the many facets of responsibility associated with this industry. This program concept has been tremendously successful within the golf course industry.
3. Initiate a process that identifies the number of hours required to maintain a specific acreage in order to be able to defend increases in staffing as program responsibilities continue to expand.
4. Delegate special projects to other groups. Speak with the leaders within the sports organizations and see if with their support, specific tasks can be completed with their assistance.

Communication and Education

1. Allow sports field maintenance employees to attend local and regional turfgrass maintenance seminars. Request that participants prepare a review and present new findings to the remainder of the staff upon their return.
2. Allow sports field maintenance employees to visit other sports complexes to share ideas, discuss problems and learn new techniques for improving the field maintenance programs.

3. Once per quarter arrange for a visiting speaker with extensive sports field maintenance experience to come for one hour and discuss their experiences in field maintenance and describe new trends in the industry.
4. Red Cross, CPR, EMT and first aid training is also very valuable. Document training for all employees.

Interdepartmental Information and Communication

1. Jon Barker, Guy Wallace and Jennifer Moore all do a very good job of communicating and coordinating field use events and maintenance scheduling. To continue to improve that process and support improved access to that information, establish a separate field use calendar for every field and park used that identifies all types of use and the respective time required per event. Include practices, game events, field renovation events and maintenance events. It is highly recommended that the city purchase a calendar software program such as Calendar Creator Five out of Creative Office (Windows Program). In this way events can be color coded and easily understood based on different colors for sporting events and maintenance events.
2. The sports turf maintenance staff should be involved in all design reviews for new construction. Coordinating a team concept of expertise and experience, and sharing ideas of success and failure will ultimately improve the final product from both a design and maintenance perspective.
3. It seems that while new buildings and projects come along all the time, little consideration is given to the significant increase in required maintenance and the actual manpower needed to maintain a quality standard. All new projects, no matter how big or small need to be evaluated in terms of total scope of required maintenance, monthly and yearly payroll hours, and equipment and product needs.

VII. Community Issues

To Fence or Not To Fence

There is no doubt that the concept of fencing sports fields or parks to limit access in The City of San Carlos is a very delicate subject. On numerous occasions during formal meetings with the Parks and Recreation Commission and Athletic Sites Advisory Council individuals stated quite clearly that they had absolutely no interest in erecting fences to limit access to parks and sports fields. From their perspective the use of fencing was in direct conflict with the 'open park concept' the community was trying to promote.

In our experience it is by far the best philosophy for all municipalities to aspire to an open park use concept. Open park use promotes equal access and enjoyment for all.

It is also our experience that the open park concept and limiting access to parks, during short, specific periods, are not mutually exclusive. We already have times when open parks have limited access – at night. We already have times when open parks are closed for play – when they are too wet. We already have times when we cannot play on a field – when an organized

event has scheduled the field. Our goal is to have parks open to the public at all times, unless field use policies designate that access be limited due to scheduled games, activities, unplayable conditions or following field renovation.

Maybe there is no disagreement on the idea that even with open parks, there must be short periods from time to time when, in the best interests and safety of the community, as well as the best interests of the field, access must be limited.

Maybe the real disagreement is over how this goal is to be accomplished and the method we use to limit access.

In our experience, despite the best efforts of city workers, concerned coaches, watchful local residents and even city police, if someone who is not willing to follow the rules wants to play on the field, they usually will. In these situations posted signs will not stop them. Posted signs don't stop the invaders that start pickup football games one week after Jon Barker and his staff have seeded and renovated a field. The invaders have no idea of the damage they have done, or the true cost involved to repair a damaged field again. Fences will not stop them all the time but they will be a greater deterrent.

So what do we do? Time and time again it has been proven that posting fields with 'Field Closed' signs is not effective. Yet respected members of the community do not want to fence their parks and fields to limit access because fences do not fit the open park perception.

In our experience the best intramural and city park sports fields are those that have the capacity to limit play and outside activities under certain conditions. The presence of a fence is not to lock people out and prevent use, but to control use during specific time periods so that the field can recover and present a safe, quality surface for all those who chose to enjoy the facility. Under these conditions the field would always be open, even with a fence around it, unless the city's field policy designated that access be limited. Such cases might include, following field seeding and renovation events, after a torrential rainfall when unscheduled field use will result in extreme surface wear or following a herbicide application. Fences also serve to protect our children's safety by preventing ball escapes into heavily trafficked city streets.

When combined with clear and informative board postings, fences are reasonable indicators for reasonable people who may be picnicking, walking dogs or organizing family pick-up games, but who do not realize that the field is closed. On-site posting boards describing the reason for park closures, anticipated dates for reopening and the location of other available nearby parks would also help alleviate any misunderstanding associated with park closures.

If the city does not want to install permanent or even temporary fences around sports fields to protect those fields from unscheduled use, that is their decision. However, I honestly feel that the City of San Carlos would be making an enormous mistake. By supporting a concept of anytime access, you are placing your tremendous investment at risk and compromising public safety.

In the same light, I would like to challenge those who believe that there are other reasonable alternatives to this field access dilemma and ask them to formally present their ideas to the Recreation Commission for review. I would also ask that any policy chosen as an alternative to fencing be evaluated for one year.

Park Hours

During meetings with the maintenance staff several questions came to light concerning the daily park schedule for opening and closing. In several instances when members of the maintenance staff were working early in the morning, several residents were playing tennis and other residents with children were enjoying the playground areas. Obviously, the reason that the City of San Carlos provides these types of amenities is for the use and enjoyment of its residents. Unfortunately, in more and more cases particularly during early morning hours the presence of both adults and children at city parks prevents maintenance personnel from completing their tasks. These tasks have often involved the use of string trimmers, which cause flying debris and potentially endanger both adults and children. On other occasions heavy equipment to renovate, fertilize and seed were used. In these cases flying fertilizer, seed and equipment posed a risk of injury to the public.

Very often there is only one day per week at a specific location and during a very early morning hour to complete a specific task. If this task cannot be completed during that scheduled time, there is not an alternative time during the week to reschedule. In that case the task that is normally scheduled to be completed once per week, may not be completed for two weeks or more.

While human safety is always the number one priority, completing work in a timely manner is also important. Several members of the maintenance staff asked the following question:

1. Would it be possible to delay the official park opening time by one or two hours once or twice per week, to ensure completion of important tasks without interruption by residents and without endangering their safety?

Park Appreciation Day

Based on the issues surrounding minimum staffing, there are many times during the year that it is a challenge just to complete the basic maintenance requirements, much less deal with trash pickup and the requested maintenance programs.

A Park Appreciation Day is proposed in order to enhance the neat, clean appearance and beauty of the parks in the City of San Carlos, as well as increase awareness associated with the energy and effort that goes into maintaining city parks and sports fields. The primary goals of the program would be the following:

1. educate participants about their obligations as end-users and the daily tasks required to maintain parks and sports fields,
2. thoroughly clean up trash and debris in and around the park and sport field areas, and
3. physically remove by hand as many broadleaf weeds as possible from the grass and infield areas of the field. Hand weeding of broadleaf weeds would reduce the need for herbicide use while improving turf competition, density and surface quality.

Players, coaches and representatives from all sports organizations would be asked to join other city administrators in Park Appreciation Day. Teams and players could be assigned a particular park and with the leadership of maintenance personnel learn what each group can do to improve field conditions.

VIII. Summary and Practical Perspectives

‘Sports field use philosophies must work in symphony with cultural maintenance concepts in order to create play environments that promote inviting, attractive and functional facilities that will endure and recover when subject to realistic levels of activity. Well conceived and aggressive cultural maintenance programs implemented by knowledgeable, dedicated maintenance personnel will ensure the future success of turfgrass systems within park and sports field settings.’

Using these concepts as a template for evaluating the Parks and Sports Field of The City of San Carlos directs us to several key observations.

- The City of San Carlos has a very successful Parks and Recreation Program.
- Participation in the program continues to grow year after year.
- The sports organizations that include CYSA and AYSO soccer, Joe DiMaggio, Little League, Pony, Colt and SAY baseball, adult and youth softball and Pop Warner football are well organized and represented by knowledgeable and dedicated coaches.
- The maintenance staff under the direction of Jon Barker is a knowledgeable and dedicated group with a passion for field quality.
- The sports fields receive excessive use and the extensive use schedule leaves little time during spring and summer for any type of quality renovation program.
- Timing of agronomic programs and maintenance schedules are dictated by the athletic programs.
- Fields are closed in December and January and the fields are scheduled for renovation. This time frame is too cold for the proper germination and growth of grasses.

So what have we learned? The City of San Carlos Parks and Recreation Program is too large to be adequately supported by the available sports field acreage. The city maintains approximately 14.85 acres of sports fields, which is equivalent to nine 1.5 acre fields. Based on field use data presented in the 2001 Field Request Summary, these sports fields serve the needs of approximately 8,175 factored hours of total use.

The seven primary sports fields, Arguello, Burton, Crestview, Heather, Highlands, Laureola and Stadium, average 904 factored field hours per 1.5 acre sports field. This average does not include “open community time” or unscheduled, non-permitted events. With regular maintenance native soil fields with cool season grasses can tolerate approximately 425 factored use hours per year. The 904 factored field use hours per 1.5 acre field represents 2.1 times the level of recommended use hours to maintain a native soil, cool season grass sports field in good and safe condition.

If the 2001 calculated 39.7% increase in soccer and the 29.1% increase in baseball were added to this total, the seven sports fields in the City of San Carlos would average 1,112.5 factored hours of organized activity use per 1.5 acre sports field per year. This level of activity represents 2.6 times the recommended use hours for a cool season grass field to be maintained in good condition.

Based on the conservative data estimates presented in the 2001 Field Request Summary, the City of San Carlos would require approximately 31.2 acres of sports fields (20 sports fields measuring 1.5 acres), or approximately twice the 14.85 acres available today in order to reduce the number of factored hours to 425 hours per field.

Year round excessive use combined with limited sports field acreage and insufficient time to conduct quality field renovation programs will rapidly lead to a dynamic decline in surface quality. Ultimately, field safety will be compromised.

Where Do We Go From Here?

In order to address the continuing growth of the Parks and Recreation Program, develop a rotation field program to ensure that each field is properly renovated during an appropriate seasonal time period, and continue to improve the surface quality and safety of existing sports fields, the following next steps are highly recommended:

- 1. Improve the wear tolerance of your existing sports field sites.**
 - Convert Crestview into a lighted, synthetic turf field (FieldTurf).
 - Evaluate field performance for two years. If the field meets the expectations of The City of San Carlos, convert Stadium to a lighted, synthetic surface in two years.
- 2. Determine creative ways to expand and acquire new acreage for sports fields.**
 - Convert asphalt overflow parking areas into irrigated, reinforced (polypropylene fibers: TurfGrids) sand based profiles that have been sodded with Tifway II hybrid bermudagrass. These sites support traffic when needed, but also serve as very acceptable surfaces for sporting events.
 - The same concept can be used to convert the top floor of parking structures or the roofs of commercial buildings into safe and viable sports field surfaces.
 - Improve surface quality and turf conditions at Central School. Renovate existing fields and establish an agronomic and maintenance program. Remove concrete and asphalt and install grass that can serve a dual purpose.
- 3. Protect your investment in your existing natural turf fields.**
 - Purchase the proper equipment to complete essential tasks quickly and efficiently.
 - Hire part-time seasonal employees during peak seasons to help complete essential tasks.
 - Rotate fields out of activity for renovation every year.
 - Install fencing or develop new ideas to limit access after renovation or when fields are too wet for play.
- 4. Limit Program Growth (only if absolutely required).**
 - Reduce total hours of scheduled use by no longer providing blocks of time to sports organizations. Instead, get involved in league operations and establish maximum numbers of games played. Do not cripple leagues, but consider

reducing the number of games by 10% to 20% and practices by 25% in order to reduce total hours of use and provide staff with more flexibility in completing essential field maintenance.

Final Thoughts

Everyone involved with field use, be it the general public, Parks and Recreation Commission, Parks and Recreation Department, maintenance staff, sports organizations, coaches, players or hired consultants, ultimately plays a contributing role in the condition of the sports fields and parks within the City of San Carlos.

No individual, team, organization or department is solely responsible for the challenges presented and the concerns expressed. That responsibility belongs to all of us. It involves considering not what is best for me, but what is best for all. It involves building a 'team concept of responsibility' in order to create inviting, aesthetic, functional and safe environments for play and enjoyment.

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