



Eisenhower Golf Club
Environmental Baseline Assessment
U. S. Air Force Academy, Colorado Aug 02



Executive Summary

U. S. AIR FORCE GEM PROGRAM GOALS

The U. S. Air Force Golf Course Environmental Management (GEM) program is a proactive Air Force Center for Environmental Excellence (AFCEE) initiative to foster a better understanding of the environmental challenges facing our golf courses worldwide. Armed with the support and approval of the Air Force Services Agency golf program, AFCEE's goal is to facilitate the creation of an environmentally friendly golf course facility while supporting the mission.

The primary tenets of the GEM Program are to minimize or eliminate potential negative environmental impacts, attain and maintain daily compliance with all appropriate regulations, and constantly examine our processes on all aspects of golf course management to achieve the highest standards of environmental excellence.

GEM PROGRAM PROCESS

There are five steps in the GEM program process.

- Analysis
- Documentation
- Implementation
- Evaluation
- Revision

This report is the result of the analysis step.

EISENHOWER GOLF COURSE U. S. AIR FORCE ACADEMY, COLORADO ENVIRONMENTAL CHALLENGES

The following environmental challenges were identified during the GCEBA process:

- Invasive exotics & vegetation management
- Threatened & endangered species
- Proposed golf course expansion
- Natural resources management
- Air quality
- Maintenance Facility Environmental Restoration Program (ERP) site
- Bird/Wildlife Aircraft Strike Hazard (BASH)
- Water use & conservation

Further information on the environmental challenges at Eisenhower Golf Course can be found in the Conclusion of this Golf Course Environmental Baseline Assessment.

WHERE DO WE GO FROM HERE?

The golf course staff should determine their preferred management approach for the challenges above in context with their ongoing goals of providing the best golfing experience for the money. They should then coordinate these practices with the installation environmental staff to ensure their compatibility with installation wide natural resources and environmental goals and objectives followed by implementation.

Table of Contents

Introduction	1
Program Process	2
Course Specific Analysis	6
Miscellaneous Facility Review	9
Overall Management Philosophy & Documentation	15
Safety, Training, & Awareness	17
Compliance.....	19
Course Playability	21
Pollution Prevention.....	23
Conservation Practices	25
Aesthetics & Naturality	27
Maintenance Practices	29
Customer Relations & Education	31
Miscellaneous Special Projects & Activities	33
ECQ Summary.....	35
GCEBA Results.....	35
Conclusion.....	36
Bibliography	46

Introduction

The golf course environmental baseline assessment (GCEBA) is the initial step in the process of creating a successful ecosystem-based Golf Course Environmental Management (GEM) Plan.

The ultimate intent of the program is to provide a foolproof, customer-driven management tool that will free up course managers and superintendents to devote more of their efforts to caring for their customers and the course. Properly designed and implemented, the GEM Plan will keep the facility in compliance with the ever-changing environmental rules and regulations while providing a vital recreational opportunity for the installation.



Rolling terrain that is the highlight of the Eisenhower Golf Club.



Picture perfect weather is commonplace in Colorado Springs during the summer.

Goal of the GEM Program

The goal of the U. S. Air Force GEM program is to facilitate the creation of an environmentally friendly golf course facility for its customers while supporting the installation mission. The Air Force Center for Environmental Excellence (AFCEE) is dedicated to helping to identify ways that more rounds can be played on better-conditioned courses while minimizing or eliminating negative impacts to the environment. In most cases, the U. S. Air Force's golf courses are being managed compatibly with the environment. The GEM program is the vehicle to document our successes while communicating directly with the golfers, our commanders, and the local community.



Quality features at every turn.

Program Process

Implementation is the most important phase of any initiative where practices and procedures are examined and may undergo significant change. This is especially true of the GEM Plan process. The specifics for the GEM Plan components and directions for their completion will be delineated in AFCEE's ***Golf and the Environment, Guidelines for the 21st Century***.

The GEM Program is derived from many diverse environmental regimes such as the National Environmental Policy Act, the Environmental Compliance Assessment and Management Program, and the ISO 14000 environmental management system. The primary tenets of the GEM Program are

to minimize or eliminate potential negative environmental impacts, attain and maintain daily compliance with all appropriate regulations, and constantly examine our processes on all aspects of golf course management to achieve the highest standards of environmental excellence. There are five basic steps in the implementation of the GEM Program process:

- Analysis
- Documentation
- Implementation
- Evaluation
- Revision



Pristine conditions greet the Eisenhower Golf Club customer.



R. T. Jones, Sr. courses feature large greens and bunkers.

Analysis

Experienced environmental managers realize the importance of assembling all of the data relevant to a problem prior to determining its best solution. Analysis is the first and most important task of the golf course environmental baseline assessment (GCEBA) and the GCEBA is the initial step in the process of creating an ecosystem-based Golf Course Environmental Management (GEM) Plan. Properly completing the GCEBA is paramount to the long-term compatibility of an installation's golf course management practices with the GEM Program, and more importantly, the U. S. Air Force's natural resource and environmental management goals and objectives.

GCEBA COMPONENTS

The GCEBA is comprised of the following components:

- Site visit, interviews, and data collection
- Course specific analysis
- Miscellaneous facility review
- Environmental compatibility quotient checklists
- Identification of environmental management challenges
- Summary report

Documentation

It is not enough just to know how to create a successful golf course environmental management program. There has to be a written record of existing site data, maintenance practices, pesticide applications, and other historical golf course activities. By documenting what we know, we will be able to determine how to make better decisions in the future. The completed GEM Plan will be a comprehensive report with a map that will assist in the daily management of the course while providing a convenient vehicle to communicate to our customers the environmental issues that challenge us on our golf course and our plans to deal with them. In order to reach the environmental stewardship goals set by the U. S. Air Force, we must consistently employ only those management practices that minimize or eliminate potential negative impacts to the environment.

GEM PLAN COMPONENTS

The GEM Plan will be comprised of the following components:

- GCEBA report
- Map of the entire golf course facility grounds depicting locations of the significant environmental management challenges and the golf course facilities
- Booklet that describes the environmental management challenges on the GEM Plan map
- Specific practices that will be employed by the golf course staff to deal with each environmental management challenge after coordination with and approval by the installation environmental staff
- Compilation of best management practices employed at the golf course in their implementation of the GEM program recommendations

Implementation

Positive and decisive action is the only true measure of the success of a GEM Program. By implementing new practices, whether to knowingly improve the course's role in the environmental stewardship of the installation or to just try new ideas to determine their value, will the golf staff and golfers benefit. The Eisenhower staff should adopt the GEM Program Environmental Policy and immediately begin finding ways to minimize or eliminate any and all negative impacts to the environment.

Evaluation

In order to ensure the highest quality of customer service and environmental stewardship, there must be continual self-evaluation and improvement. There also should be consistent, on-going measurement of the reduction or elimination of environmental impacts the newly implemented practices have on the course. For example, documenting the reduced use of inputs such as fertilizers, pesticides, and irrigation can be used to demonstrate the increased environmental stewardship of the golf course management practices as well as the overall value of the GEM Program. It is important for U. S. Air Force golf courses to show improvement over time. This can be easily accomplished by regularly evaluating golf course maintenance methods, practices, and management approaches to day-to-day issues and changing when appropriate.

Revision

The very nature of a superior GEM program implies that all documents be regularly maintained to represent the most current conditions. U. S. Air Force golf course managers and superintendents should be constantly looking for ways to improve their environmental stewardship. Acting on lessons learned is right behind initial implementation as the most important aspect of a successful GEM Program. The GEM Plan should be kept as current as possible at all times. Ideally, it should be completely updated at least every three years.



Eisenhower Golf Club

Course Specific Analysis

One of the most pragmatic and enjoyable tasks in the GCEBA process is the course specific analysis. From a general overall description of the course to the details of the course's history and makeup to the various observations on the way the course plays, looks, and is managed, the course specific analysis sets the stage for the rest of the GCEBA report. It is comprised of the following tasks:

- Course description
- Course details
- Maintenance facility evaluation
- Miscellaneous facilities examination



The enticing par 5, 11th may qualify as the Academy's signature hole.

Course description

The U. S. Air Force Academy's Eisenhower Golf Club is blessed with two fine 18-hole courses nestled in pristine Foothills Zone ponderosa pine woodlands ecosystem of the seemingly pristine Rocky Mountain Front Range in what has been described as an "alpine desert". The original course, or the Blue, was designed by the venerable and prolific golf architect, Robert Trent Jones, Sr., and is one of the top 100 courses in the United States. The Blue is characterized by large, runway-like teeing areas and huge, rolling greens that were once christened "treacherous" by the late designer. Four-putt greens are commonplace as are wildlife encounters with elk and wild turkey.

The Silver Course, fourteen years junior to the Blue, is a little shorter and maybe a little narrower, but definitely no less enjoyable than its big brother to the south and east. Designed by Frank Hummel, the Silver offers Eisenhower customers another satisfying golfing experience. Besides relieving the pressure of 75,000 annual rounds on the Blue Course, the Silver provides an equitable challenge to all levels of golfers.

Much like the rest of the Academy's facilities, the Eisenhower Golf Club demonstrates the best the U. S. Air Force has to offer. Director of Golf, Eddie Ainsworth, and his staff delivers the best golf value in the area while raising the bar of excellence for golf facilities in the rest of the U. S. Air Force.



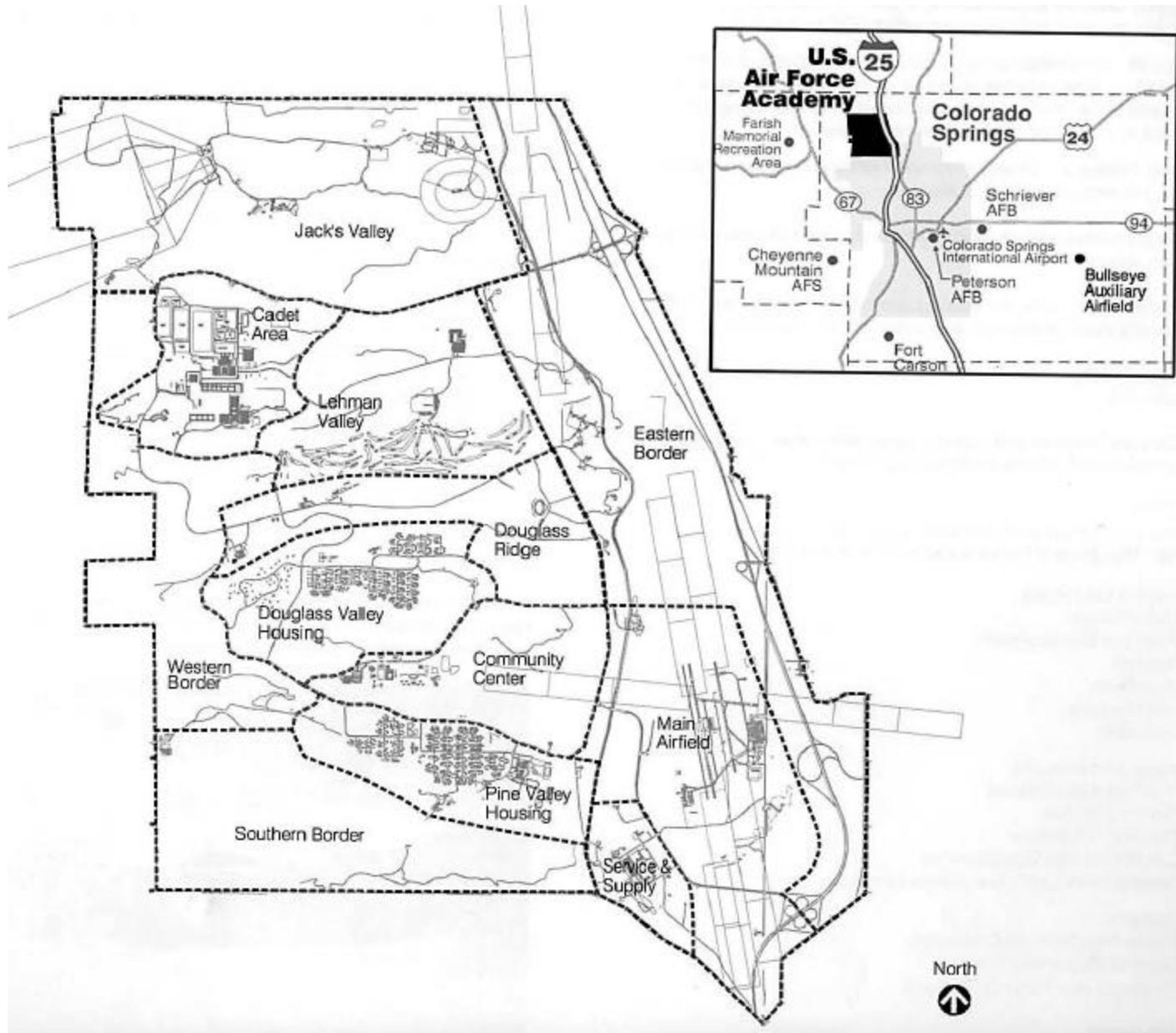
Course details

Architect	Blue- Robert T. Jones, Sr. Silver- Frank Hummel
Year constructed	Blue- 1961, Silver- 1975
Climate	Rocky Mountain, dry
Average annual rainfall	15-17 inches
Winds/Prevailing Direction	North-northwest
Total Facility Acreage	361 acres (140 natural)
Par	Blue- 36-36-72

Yardage/Rating/Slope	Falcon- 7301/74.2/137 Blue – 6966/72.6/134 White- 6516/70.5/128 Red – 6041/68.2/120 Yellow- 5564/65.3/115
Par	Silver- 36-36-72
Yardage/Rating/Slope	Blue- 6510/70.5/121 White- 6003/68.0/116 Red - 5445/65.4/108 Yellow – 5149/63.5/105
Golf course manager	Eddie Ainsworth
Superintendent	Tony Scites
Turfgrass	Poa/Bluegrass
Tees	Poa/Bluegrass
Fairways	Poa/Bentgrass
Greens	Kentucky Bluegrass
Roughs	



Caption



Miscellaneous Facility Review

Although the course is primary to the enjoyment and eventual return of most of Eisenhower' customers, the support facilities play a huge role in the overall success of the operation. This section of the GCEBA will examine the following facilities for their aesthetic, functional, and environmental values:

- Clubhouse/pro shop/snack bar
- Practice areas
- Maintenance complex
- Pesticide mixing and storage
- Cart barn
- Infrastructure



Clubhouse is attractively landscaped and maintained.



Well-outfitted and tidy, the pro shop caters to the discriminating.

Clubhouse

The existing clubhouse is by all estimations, a functional facility that is basically just too small in almost every category. Accordingly, the Academy's General Plan short-range projects list includes a new 50,000SF clubhouse.

The new clubhouse seemingly will have to be sited near the existing one providing an extra challenge for the designers and builders as to how to continue with business during demolition and construction. The Academy's "International Style" design guidance should be considered in the design process. AFCEE will be happy to facilitate the completion of the environmental impact analysis requirement.



Existing range is cramped and turf-challenged during peak seasons.

Practice areas

The Eisenhower Golf Course has a small driving range and three practice putting greens. One of the practice greens may not survive the clubhouse reconstruction. The Academy's General Plan lists a new golf course as a long-term project requirement. In discussions with the golf staff, a learning center, or a specialized, highly developed golf practice area, would also be part of the long-term vision. This would be a wonderful addition to the Eisenhower Golf Club amenities and is a great tribute to the Academy's desire to provide the absolute best at every opportunity.



Fertilizers and soil amendments are as close as you can get to pesticides at the Eisenhower Golf Club maintenance facility.

Pesticide mixing and storage

Since the installation entomology shop is located in close proximity to the golf course, all chemicals are stored off the golf course grounds. Mixing and applications are still accomplished by the golf course maintenance staff. Director of Maintenance, Tony Scites is a licensed applicator and believes in the minimalist approach to pesticide use.



Cart maintenance facility is well removed from the clubhouse.

Cart barn

The existing cart barn is a collection of different buildings constructed over the years away from the clubhouse along a road that leads to the golf maintenance facility. It also is planned for replacement in the General Plan. Electric golf carts are used exclusively for efficiency and their lack of air emissions at Eisenhower Golf Course.



Irrigation supplies for the courses come from groundwater, recycled water, and captured runoff.

Infrastructure

This section examines important elements of a quality golf course that are difficult to group into another category. Cart paths are in fair to poor condition. The parking lot is in fair condition and seems large enough to satisfy the regular demands of Eisenhower' customers. Landscape development attempts have been relatively successful and should be continued where appropriate. There is a site amenity group near most teeing areas.

Maintenance complex

The maintenance complex is spread out over a large area seemingly with ample space for equipment, parking, storage, and administrative areas. The golf maintenance facility is listed in the General Plan for replacement in the long-term. With the exception of a being a diverse collection of different buildings, the maintenance complex appears to function extremely well.



Equipment maintenance shop is neat, clean, and well outfitted.



The maintenance complex is largely screened from the player's view.



Director of Maintenance, Tony Scites' office is understated yet comfy.

Environmental Compatibility Quotient Checklists

The following is a brief compilation of some of the observations in each of the ten Environmental Compatibility Quotient (ECQ) categories during the site visit.

ECQ Categories

- Overall Management Philosophy & Documentation
- Safety, Training, And Awareness
- Compliance
- Course Playability
- Pollution Prevention
- Conservation Practices
- Aesthetics & Naturality
- Maintenance Practices
- Customer Relations & Education
- Miscellaneous Special Projects & Activities

ECQ Checklists

The Environmental Compatibility Quotient (ECQ) checklists are a convenient method of assessing the overall performance, implementation, and completeness of an installation's Golf Course Environmental Management Plan. The checklists can be used in many ways including:

- As an analytical tool while compiling a Golf Course Environmental Baseline Assessment like this one.
- As a self-assessment tool for the golf course manager or superintendent.
- As an award nomination evaluation by a Golf Course Assessment Team (GCAT).



Water is definitely golf's limiting factor in Colorado.



Silver course starter shack.

Determining the Environmental Compatibility Quotient

The ECQ compiled for an installation's course is a snapshot of the overall performance and compliance with the GEM Plan. There are two ways to use the ECQ checklists to determine the status or quality of the environmental management program: determining the actual and potential environmental compatibility quotients.

- **Actual ECQ-** the total percentage of "Yes" responses for all ten checklists.
- **Potential ECQ-** the total percentage of "Yes" responses plus the total percentage of "Partial" responses for all ten checklists.

Key to checklist responses

- **Yes** = Practice is complete or ongoing and can be verified.
- **Partial** = Practice has been initiated but needs further attention and improvement.
- **No** = Practice is not in place.

ECQ Scoring Scale

Percent Responses Yes or Partial per Category	Level
93-100%	Advanced
83-92%	Getting there
73-82%	Showing progress
63-72%	Early stages
Less than 62%	Just started

Overall Management Philosophy & Documentation

U.S. Air Force GEM program goals

- Enhance the installation ecologically and economically
- Demonstrate that the golf course is managed with consideration for the unique conditions of the ecosystem of which it is a part
- Document management practices to promote more widespread understanding and appreciation for environmentally sound golf course facilities
- Share information on the environmental opportunities and constraints of your golf facility with your customers, the golfers

Observations

- Need to compile and document actions already taken to create “continuity” document
- Implement planned improvements to all aspects of the golf facility management
- Utilize installation environmental management geographic information system and civil engineering digital aerial photographs for mapping requirements
- Need to secure computer hardware and software upgrades to increase overall

efficiency and provide high speed internet access

- New clubhouse interior should be appointed with a location to present environmental information to customers



Inconsistent soil conditions create headaches for the superintendent.

Overall Management Philosophy & Documentation				
#	Environmental Compatibility Indicator	Yes	Partial	No
1	Has management demonstrated that the environment is an important part of their responsibilities by initiating the GEM Planning process?	✓		
2	Has the golf course adopted and posted an Environmental Policy?		✓	
3	Is the GEM Plan underway or completed, available, and updated regularly?			✓
4	Is a map of the property highlighting environmental opportunities or constraints such as wildlife habitat, water resources, sensitive landscapes, special management zones, etc. posted for customers?		✓	
5	Environmental goals, objectives, issues, projects, and progress are evaluated at least annually and are regularly communicated to employees, customers, management, and the local community?			✓
6	Are written records of water quality monitoring activities, results, and control measures readily available?	✓		
7	Is there an inventory of bird and mammal species documented, maintained, and readily available?		✓	
8	Is there a general understanding of how course management practices may positively enhance or adversely impact wildlife species and habitats?	✓		
9	Are the environmental impacts of pest control measures such as leaching and runoff potential, toxicity to non-target organisms, soil absorption capacity, pesticide persistence, water solubility, and effects on soil microorganisms and non-target species considered as part of the course management planning process?	✓		
10	Are records of pest treatments employed and their effectiveness maintained and used to guide future pest control decisions?	✓		
	Point totals for each column	5	3	2

Safety, Training, & Awareness

U.S. Air Force GEM program goals

- Educate all employees on the benefits of an ecosystem based golf course environmental management program
- Store and handle all potentially harmful products to minimize employee exposure
- Regularly train employees on the potential health hazards associated with their duties
- Involve entire staff in ensuring a safe golfing opportunity for their customers



Superintendent Scites prepares daily work tasks and safety briefings.



*Sign, sign everywhere a sign...
...Keeping everyone aware is a full time job.*

Observations

- Expanded training for all employees a must to completely realize GEM goals
- Ensure employee's health is prime consideration
- Demonstrate genuine concern for player health and safety through actions
- Minimal funding hinders training plans
- Business tempo and training scheduling makes it difficult to involve much of the staff at one time

Safety, Training, & Awareness				
#	Environmental Compatibility Indicator	Yes	Partial	No
1	All employees are familiar with the GEM Plan and are trained regularly on the importance of environmental performance and compliance with the goals and objectives of the program?			✓
2	All appropriate employees are trained to be familiar with USAF, federal, Colorado, and OSHA regulations that apply to storage and handling of chemicals used on the property?	✓		
3	All employees are aware that chemical manufacturing, use, storage, and disposal may pose risks to human health and the environment?	✓		
4	All employees are trained to understand that poor management practices may adversely impact worker health, on- and off-site water quality, local soil health, and wildlife species and their habitats?	✓		
5	A current copy of all Material Safety Data Sheets (MSDS) for all chemicals used anywhere on the golf course property is maintained and readily available for use by employees?	✓		
6	Chemical applicators are encouraged to apply for continuing education programs and receive regular training to maintain currency?	✓		
7	The chemical storage structure/area is locked, well-ventilated, fire proof, and access is limited to select personnel?	✓		
8	Pesticides, fertilizers, and other chemicals are stored on plastic or metal shelving?	✓		
9	Are golfers notified in the pro shop and on the first and tenth tees about the day's planned or recently completed spraying of any chemical or fertilizer that may be hazardous to human health and safety?	✓		
10	Are key staff members trained regarding water quality and conservation issues?	✓		
Point totals for each column - Response percentage		9	0	1

Compliance

U.S. Air Force GEM program goals

- Integrate management practices with appropriate regulatory requirements and procedures
- Guarantee safe, healthy, and enjoyable experience for golfers while ensuring long-term operation of the facility
- Utilize installation expertise regularly on all matters dealing with bird aircraft strike hazards, regulators, impact analysis, and cleanup



Containment is not required for this fuel tank location.



Equipment wash rack shows its high use in maintenance complex yard.

Observations

- Assemble all applicable environmental management documents in one place
- Do more than what is required
- Ensure ECAMP results are outstanding
- Continue building relationships with installation environmental and engineering staffs

Compliance				
#	Environmental Compatibility Indicator	Yes	Partial	No
1	Are fuel storage/delivery managed in accordance with federal, Colorado and local regulations?	✓		
2	Are installation environmental staff members included in on-going course management discussions and plans at regularly scheduled meetings?	✓		
3	Are there regularly scheduled staff meetings to discuss environmental management issues?	✓		
4	Does the director of golf and the superintendent attend ECAMP in-briefings and out-briefings?		✓	
5	Does the director of golf and/or the superintendent coordinate with installation environmental staff on the various management plans that affect or include the golf course?	✓		
6	Are MSDSs readily available for all required substances?	✓		
7	Has appropriate impact analysis (NEPA) been performed on all proposed actions on or affecting the golf course property?	✓		
8	Are containers used to store used oil in good condition, not leaking, and clearly labeled?	✓		
9	Are oil/water separators operating properly and correctly maintained?	✓		
10	Are written and readily available records maintained of all applications of pesticides made by certified applicators, including the following? - the quantity of each pesticide used - the chemical or common name of the active pesticidal ingredient(s) (not the product name) - the pest or purpose for which the pesticide was applied --the date and place of application.	✓		
Point totals for each column - Response percentage		9	1	0

Course Playability

U.S. Air Force GEM program goals

- Create desirable playing conditions through the utilization of sound, ecosystem based environmental management practices
- To daily offer an enjoyable and challenging yet fair golfing experience for all levels of golfers
- Establish an open, courteous, and friendly relationship between the course manager, the superintendent, and the customer to maintain enthusiasm and interest



Hard to play when one is distracted by the natural beauty of the place!



Both courses seem to provide plenty of room for the less accurate.

Observations

- Ensure green speeds match the slope and contour
- Continue focusing maintenance efforts on appropriate in-play areas of the course
- Increase contour mowing for greater definition of fairway landing areas

Course Playability				
#	Environmental Compatibility Indicator	Yes	Partial	No
1	Pin placements and tee markers are regularly moved to minimize the impacts of play while increasing the enjoyment and diversity of the experience of the customer?	✓		
2	Course has sufficient number of tees to satisfy need of all types of golfers and their individual talent levels?	✓		
3	At least 75% of the greens are proportionally sized for the average length of approach shot for required all levels of golfers?	✓		
4	The speed of the greens is appropriate to their contours and size?		✓	
5	Fairway width and turf quality is sufficient for equitable challenges to all levels of golfers?	✓		
6	Roughs are regularly maintained to produce an equitable challenge to all levels of golfers?	✓		
7	Course conditioning and maintenance practices do not contribute to extending average playing times?	✓		
8	Extraneous fairway bunkers have been eliminated or converted to grass bunkers to help speed play?	✓		
9	Is bunker sand of appropriate quality and consistency?	✓		
10	Is proper drainage maintained near at least 95% of all greens and tees?	✓		
Point totals for each column - Response percentage		9	1	0

Pollution Prevention

U.S. Air Force GEM program goals

- Employ practices that eliminate or avoid the potential for polluting the environment
- Guarantee that the golf course facility will not allow chemicals, fertilizers, detergents, or petroleum products they use to migrate outside their property boundaries
- Create and utilize a comprehensive pollution prevention plan for all aspects of the golf course and its facilities



Recycling container and practices eliminate potential pollution.



Turf buffers can help keep fertilizers and pesticides out of water bodies.

Observations

- Further reduce solid waste streams from clubhouse operations
- Increase the use of slow release fertilizers
- Regularly provide training for all employees on the specifics of pollution prevention and how they can help
- Consider covering fueling areas

Pollution Prevention				
#	Environmental Compatibility Indicator	Yes	Partial	No
1	Are there designated "no-mow" areas and established "no spray zones" and buffer areas around pond, stream, or lake edges and have they been communicated to mower operators and technicians?	✓		
2	A spill containment kit is readily available and spill containment procedures are in place?	✓		
3	Does the chemical storage area have a sealed metal or concrete floor and are all pesticides handled over an impermeable surface?	✓		
4	Does the chemical storage area have a lip along the edges to contain spills?	✓		
5	Are liquid products stored below dry products and are dry materials stored on pallets or shelves to keep them off the floor?	✓		
6	Wash and wastewater is kept from making direct contact with surface water and is recycled or allowed to filter through a vegetative area when cleaning and maintaining equipment?	✓		
7	Are grass clippings blown off equipment with compressed air instead of or prior to washing?			✓
8	Are gasoline, motor oil, brake and transmission fluid, solvents, and other chemicals used to operate or maintain equipment and vehicles prevented from directly or indirectly entering water bodies?	✓		
9	Does the fuel storage and delivery area comply with local, Colorado, and federal regulations?	✓		
10	Are slow-release fertilizers used to reduce the negative potential for runoff?	✓		
Point totals for each column - Response percentage		9	0	1

Conservation Practices

U.S. Air Force GEM program goals

- Use natural resources efficiently while respecting their long term value to the local community and the mission of the USAF
- Provide important greenspace benefits
- Closely monitor and manage water use to prevent unnecessary depletion of installation or local water resources



Leafy spurge is an invasive exotic that the course is helping to eliminate from the roughs and contiguous natural areas.



Turkeys thrive on and around the courses at the Academy.

Observations

- Increase communication with customer on conservation practices that are already in place
- Continue building relationships with installation natural resources manager and other environmental professionals
- Provide detailed input to the scheduled update of installation integrated natural resources management plan (INRMP)

Conservation Practices				
#	Environmental Compatibility Indicator	Yes	Partial	No
1	Are all motorized golf course equipment checked regularly for excessive air polluting emissions?			✓
2	Has the irrigation system been completely checked for proper water distribution in all irrigated areas and are water leaks fixed in a timely manner?		✓	
3	Has the irrigation system or its components recently been upgraded to reduce inefficiency, malfunction, and overall water use?	✓		
4	Has all "non-target" irrigation (ponds, out of play areas, etc.) been eliminated or minimized?			✓
5	Have flow meters been installed to monitor water use and detect potential waste?	✓		
6	Have part circle irrigation heads been installed where possible to save water resources?		✓	
7	Are employees encouraged to minimize their trips around the course to conserve on the use of fossil fuels?	✓		
8	Does the snack bar utilize reusable plates and silverware for use by customers throughout the facility's operating hours?			✓
9	Have all potential wildlife habitats and their maintenance practices been coordinated with the installation BASH officer and environmental management personnel?		✓	
10	Are recycling containers conveniently provided for customer and employee use throughout the golf course facility?			✓
Point totals for each column - Response percentage		3	3	4

Aesthetics & Naturality

U.S. Air Force GEM program goals

- Create and maintain an attractive golf course facility that requires minimal outside chemical or fertilizer inputs
- Utilize native or indigenous plant materials exclusively
- Consider every aspect of the golf course facility as a positive contributor to the overall satisfaction of the customer



The innate beauty of the Front Range.



Turf stress due in part to cart traffic along the 7th on the Silver Course.

Observations

- Enlist environmental staff to determine how the golf course staff can assist in the removal of invasive exotics
- Increase number and variety of new native trees added to course every year
- Program for funds needed to expand landscape improvements

Aesthetics & Naturality				
#	Environmental Compatibility Indicator	Yes	Partial	No
1	Is the area near the clubhouse attractively landscaped and maintained?	✓		
2	Is there an appropriately located and attractive facility sign and has the on course signage been designed and maintained attractively?	✓		
3	Does the course seem to be part of the natural landscape and overall contours?	✓		
4	Are pest-resistant and drought-tolerant native trees, shrubs, groundcovers, or their cultivars used in landscaped areas?	✓		
5	Are there "targeted", highly visible areas where flowering annuals or perennials are appropriately maintained?	✓		
6	Are the relative numbers of the prominent deciduous, evergreen, and flowering golf course trees balanced and at least 75% native species?	✓		
7	Are the maintenance facility and the course's miscellaneous "outbuildings" maintained sufficiently and/or screened from view?		✓	
8	Is there an attractive and well-maintained site amenity group (bench, washer, etc.) at least 75% of the tees?	✓		
9	Do the driving range, practice areas, and parking areas present a positive image?	✓		
10	Is the cart barn integrated into the overall landscape plan of the course or the area in which it is located?	✓		
Point totals for each column - Response percentage		9	0	1

Maintenance Practices

U.S. Air Force GEM program goals

- Integrate the concept of ecosystem management into all course management decisions and practices
- Employ the principles of integrated pest management
- Document all activities for future reference
- Constantly examine management practices to look for improvements
- Insist on a well-trained staff



Exacting playing conditions typify the quality of the Blue Course.



Fairway turf quality is generally excellent on both courses.

Observations

- Continue training and involvement of staff on integrated pest management procedures
- Compile written pest profiles of common pest species
- Increase number of trained scouts on the maintenance staff

Maintenance Practices				
#	Environmental Compatibility Indicator	Yes	Partial	No
1	Is contour mowing used to conserve fuel and increase playability and aesthetics?	✓		
2	Are there designated non-maintained or minimally maintained buffers around core wildlife habitats?	✓		
3	Are green, tee, and fairway mowing heights maintained at reasonable levels without continually stressing turf or maximizing chemical inputs?	✓		
4	Are there regular procedures in place to continually improve soil health such as organic amendments, aeration, and drainage?	✓		
5	Is there a map of the course's "hot spots" requiring special care or regular attention?	✓		
6	Are there trained scouts on staff other than the superintendent to monitor turf and plant health and pest populations using scouting forms to record the type, severity, location, and treatment of pest problems and organized into a report or guide so that they can be used for future pest control solutions?	✓		
7	Are there written pest profiles of common pest species with a variety of potential control measures pre-evaluated including alterations in cultural management, biological, physical, and mechanical controls prior to treating the problem on the course?	✓		
8	Are there established and documented aesthetic and functional thresholds for insects, fungal diseases, and weeds for all managed areas to precisely and effectively manage pest populations and reduce chemical inputs?		✓	
9	Have all playing surfaces been inventoried and mapped for soil types including soil structure, nutrient levels, organic content, compaction, and water infiltration?			✓
10	Are soil tests and plant tissue analysis used to determine nutritional requirements?	✓		
Point totals for each column - Response percentage		8	1	1

Customer Relations & Education

U.S. Air Force GEM program goals

- Ensure that the customer knows that their opinions count and will be acknowledged, assessed, and acted upon
- Educate the customers about the benefits of environmentally responsible golf course management and the future of the game and the environment
- Enlist customer support and assistance on caring for the course and its facilities as well as GEM Plan goals



Receptionist inside clubhouse is another example of Academy style.



"Greeter" is the first person an Eisenhower customers encounter.

Observations

- Create and maintain a location to communicate environmental management goals and maintenance plan in the new clubhouse

Customer Relations & Education				
#	Environmental Compatibility Indicator	Yes	Partial	No
1	Are the course manager and superintendent involved in a long-term customer educational program that is regularly updated and documented?			✓
2	Is there a conveniently located and highly visible place at the course or clubhouse where golf course environmental management notices and informational messages are regularly posted?			✓
3	Do the course manager and superintendent actively communicate with customers to determine and document their points of view?	✓		
4	Is there active and regular communication with the Golf Council, Civil Engineering, Environmental Management, the Services manager, and commanders by course management?	✓		
5	Are there warning signs posted near parking lots to make highly sensitive individuals aware of the potential danger to their health and are all Colorado posting requirements being met?			✓
6	Is there consistent and attractive signage around the course and grounds that would increase the awareness of the average golfer to the environmental management practices employed?			✓
7	Are there signs appropriately located to warn golfers of hazards when drinking reclaimed or otherwise non-potable water?	✓		
8	Are there interpretive signs posted to highlight key habitats or have appropriate areas been designated "Environmentally Sensitive Zones" per USGA rules?	✓		
9	Are course staff members trained regularly on how to improve their dealings with customers?	✓		
10	Are there clinics provided to teach beginning golfers the basics of the game and to teach all levels of golfers the rules of the game?	✓		
Point totals for each column		6	0	4

Miscellaneous Special Projects & Activities

U.S. Air Force GEM program goals

- Educate the local community about the benefits of an environmentally responsible golf course management approach is for the future of the game and the environment
- Reach out to school children to raise their awareness and appreciation for the game of golf and the GEM Plan principles
- Further the great game of golf at all times in as many ways as possible



Lunchtime at the snack bar is a happening place.



Use dining room for special presentations to inform customers.

Observations

- Consider conducting field trips at the course for local school children
- Initiate an Earth Day environmental awareness golf tournament
- Educate customers about the benefits of an environmentally friendly golf course

Miscellaneous Special Projects & Activities				
#	Environmental Compatibility Indicator	Yes	Partial	No
1	Are there projects planned and funded for the next year that would communicate the compatibility of the course's management methods with protection of the environment?			✓
2	Are there projects planned and funded to reduce the course's potential negative environmental impacts?		✓	
3	Are there awareness raising tournaments planned that may provide for future environmentally related projects?	✓		
4	Are there regular field trips for local students or other local community groups hosted at the course?			✓
5	Are there projects planned to eliminate or minimize a potential erosion problem?	✓		
6	Does the course have a native tree installation program complete with planting plan and maintenance schedule?	✓		
7	Are any of the local schools or universities involved in educational or research activities at your course?	✓		
8	Are there special facility-wide recycling programs underway?			✓
9	Is your course an active participant in the USAF Golf Environmental Management Program?	✓		
10	Has your facility been nominated by your MAJCOM for the golf course environmental management award in the last 3 years?			✓
	Point totals for each column	5	1	4

ECQ Summary

#	Environmental Compatibility Quotient Category	Yes	Partial	No
1	Overall Management Philosophy & Documentation	5	3	2
2	Safety, Training, & Awareness	9	0	1
3	Compliance	9	1	0
4	Course Playability	9	1	0
5	Pollution Prevention	9	0	1
6	Conservation Practices	3	3	4
7	Aesthetics & Naturality	9	0	1
8	Maintenance Practices	8	1	1
9	Customer Relations and Education	6	0	4
10	Miscellaneous Special Projects & Activities	5	1	4
	Composite points & response percentage	72	10	18

GCEBA Results

* Eisenhower Golf Course, Academy, CO

- Actual ECQ (# of “Yes”) = 72 “Early Stages”

- Potential ECQ (Actual ECQ plus “Partial”) = 82 “Showing Progress”

Conclusion

Without a doubt, Eisenhower Golf Course is definitely one of the U. S. Air Force's finest recreational facilities. Director of Golf, Eddie Ainsworth and Director of Maintenance, Tony Scites and their respective staffs deliver the evidence every day. With two great courses and two fine, experienced managers, the future of the U. S. Air Force Academy's golf is in good hands.

Areas needing improvement

The ECQ Summary on the previous page highlights the following areas for relative improvement at Academy:

- Overall Management Philosophy & Documentation
- Conservation Practices
- Miscellaneous Special Projects & Activities

The gallery

This section of the report will be where some of the more revealing photographs (of the literally hundreds taken during the site visit) of pests, maintenance practices, and other areas where improvements may be made to create the best possible golf facility.



Even with a turf buffer, this small pond is showing signs of nitrification.



Bunker care is exemplary.



Poor soil conditions?



Simple and serviceable site amenity group.



Cart wear is a real problem here.



The 17th on the Silver course vividly portrays why customers flock.



Organized and efficient irrigation replacement parts.



Cart paths should be finished to prevent erosion and wear on carts.



Curbing is unsightly and is a potential hazard to customers.



The genius of R. T. Jones, Senior is obvious at the Blue's 17th.



Quality design and contour mowing make for a fine golfing experience.



Bluebird boxes are discreetly placed throughout the property.



Dead trees on Blue's 12th shows impacts of drainage pattern changes.

Environmental challenges

One of the important results of the GCEBA process is the identification of significant issues or challenges that should be addressed in the long term GEM Planning process. Ideally, the golf staff will address each issue from the best way to satisfy the goals of the golf facility and acceptable levels of course playability and customer satisfaction. The golf staff's preferred management approach for these issues should then be coordinated with the installation's environmental staff for refinement, coordination, and approval.

The GEM Plan would then consist of the environmental challenges, the approach to their management, a map showing where these challenges

occur on the golf course, a booklet that describes the mapped challenges, goals and objectives for future years, and a set of best management practices.

The following environmental challenges were identified during the GCEBA process at Eisenhower Golf Course, Air Force Academy, CO:

- Invasive exotics & vegetation management
- Threatened & endangered species
- Proposed golf course expansion
- Natural resources management
- Air quality
- Maintenance Facility Environmental Restoration Program (ERP) site
- Bird/Wildlife Aircraft Strike Hazard (BASH)
- Water use & conservation

INVASIVE EXOTICS & VEGETATION MANAGEMENT

Fortunately, the invasive exotics at the Academy consist mainly of forb-like weed species such as yellow toadflax, Canadian thistle, knapweed, and leafy spurge. More importantly, since the golf course is situated in the natural Ponderosa pines, regional and installation forest management issues are golf course issues. There are currently two major problems with the forests on the Academy: the pine bark beetle and mistletoe. The golf staff is working closely with natural resources manager, Jim McDermott, to assist with both of these challenges with great results. A healthy forest



Hoary cress is an invasive species on the Academy grounds.



The pine bark beetle is ravaging area Ponderosa pines.

THREATENED & ENDANGERED SPECIES

Areas nearby and along the Academy's Eisenhower Golf Course are home to one species of concern, the Preble's Meadow Jumping Mouse. The INRMP states that habitat fragmentation, or "the unrestrained expansion of developed areas into native habitat and the spread of impacts into the surrounding landscape." In regards to the Preble's mouse, the golf course just happens to be located both upstream and downstream of identified habitat for that species. Potentially, the golf course, when it was constructed, interrupted this corridor along the riparian zones and "fragmented" the Preble's mouse habitat. To further place an exclamation point on this challenge, the General Plan states that the Preble's Meadow Jumping Mouse "is currently considered the second rarest mammal in North America after the black-footed ferret." Fortunately, the golf course staff is already working closely with the environmental staff to properly maintain vegetation along the remaining habitat that occurs nearby or along the golf course property.

PROPOSED GOLF COURSE EXPANSION

The General Plan lists several projects on the golf course grounds. The short-range projects list includes a new 50,000SF clubhouse, golf cart maintenance facility, and golf maintenance facility. Long-range projects include an additional golf course for the Academy grounds.

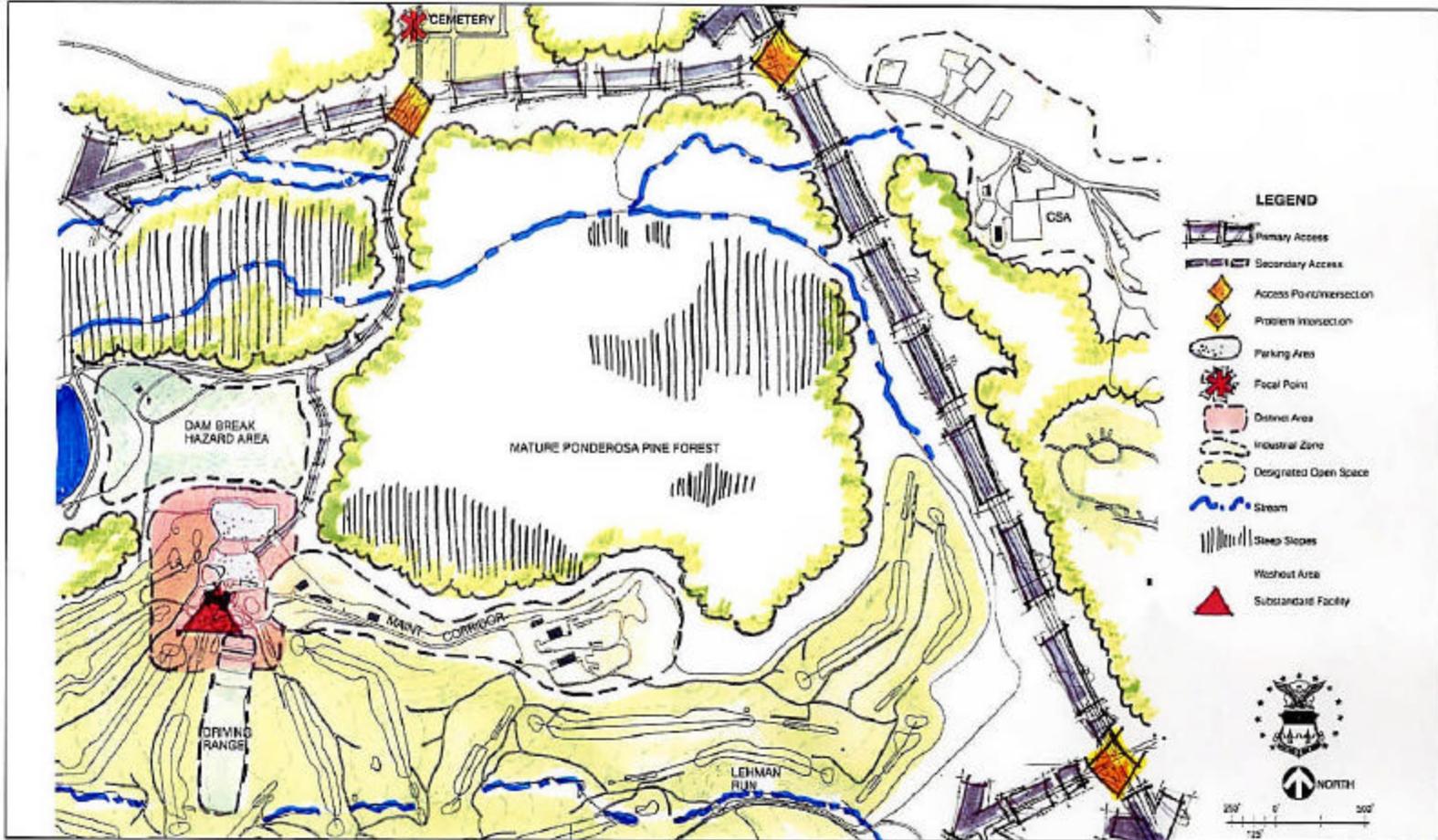


Wild turkeys are regulars on the Eisenhower courses.

NATURAL RESOURCES MANAGEMENT

The INRMP considers the golf course and its proposed expansion area to part of the "Seminatural Management Zone". These types of areas "have been modified by humans, but the natural resources provide the setting for human activities." With this in mind the golf staff should attempt to support the management philosophy and assist the installation to "prevent the impacts of human use from spreading beyond the zone, to prevent human-wildlife conflicts, and to maintain native vegetation connections with the natural zone.

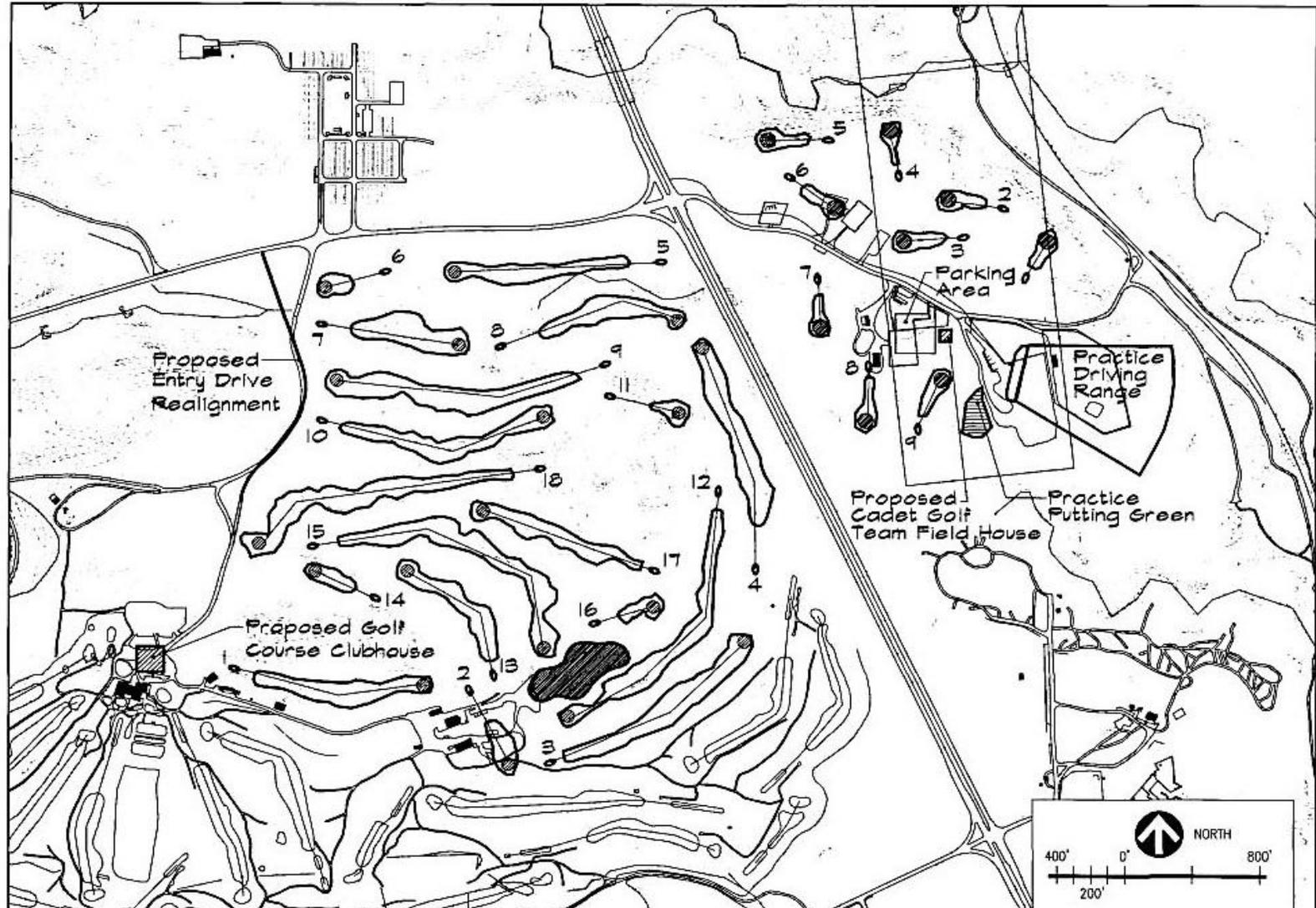
Site Analysis- Lehman Valley & Eisenhower Golf Club



Lehman Valley
Page 11.9

Excerpt from U. S. Air Force Academy Area Development Plan

Exhibit 12: Concept A (18 Hole, Championship Golf Course and Driving Range Learning Center)



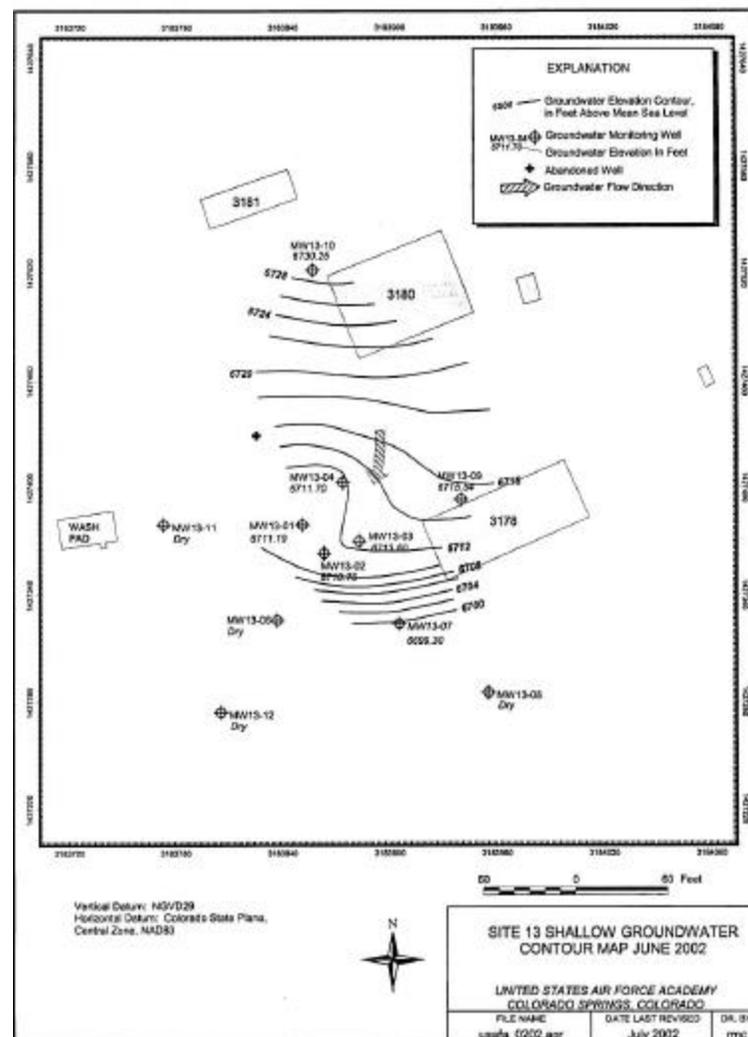
Excerpt from U. S. Air Force Academy Area Development Plan

AIR QUALITY

According to the INRMP, the Academy is located within the Colorado Springs region that has been designated as a nonattainment area for carbon monoxide. In addition, the region frequently is subject to winter inversions and has a particulate problem largely due to dust. The golf course staff needs to be aware of the challenge and consider electric operated carts and minimization of dust due to excessive travel on dry, unpaved road surfaces.

MAINTENANCE FACILITY ENVIRONMENTAL RESTORATION PROGRAM (ERP) SITE

“In 1994, an underground fuel storage tank, two aboveground storage tanks, and an aboveground metal drum rack used for storage and dispensing of solvents were removed from the golf course maintenance facility.” So states the Executive Summary of Site 13 Remedial Investigation/Feasibility Study Final. Soil was excavated and groundwater monitoring wells installed. No appreciable hydrocarbons were found in the groundwater yet volatile organic compound (VOC) analysis determined that PCE was present in concentrations higher than allowed by the state. The area was administratively closed out in 1995 but after further investigations the golf course maintenance area was officially added to the Academy’s ERP as Site 13 in 1997. Although the study indicates that “the site poses no quantifiable risk to human health and the environment”, the potential for impacting the natural balance of the ecosystem is great and all of the golf course’s activities should be examined in this light prior to taking action.





Canada geese frequently are seen loafing on the golf courses.

BIRD/WILDLIFE AIRCRAFT STRIKE HAZARD (BASH)

Since the airfield at the Academy is removed from the golf course, little direct BASH management is required. The INRMP does state, “some bird-aircraft safety measures should be considered outside this [airport subzone] zone.” It goes on to use as an example of this concept, “...populations of Canada geese, a major aircraft hazard, should be minimized on reservoirs and the golf course to prevent geese from being near the airfields.” This thinking demonstrates that the risk of BASH on the Academy is quantifiable and that the golf course facility itself may be at least perceived as the source of that risk. Accordingly, the golf staff should be an active member of the BASH safety team and regularly consult with the team prior to any potential

management plans that may impact water bodies on the golf course and their ability to attract waterfowl.

WATER USE & CONSERVATION

Although the Academy’s golf courses utilize non-potable water for irrigation purposes, conservation of the resource is paramount since the golf course shares its use with recreation fields, boulevard medians, the stadium, and cemetery. Overall, the installation desires to maximize the conservation of all resources including non-potable water. The Academy’s non-potable water resource is limited and receives its supply from “multiple sources including the wastewater treatment facility effluent, irrigation wells, and surface/stormwater runoff.” The golf course irrigation system could be upgraded to minimize non-targeted watering to minimize over watering while maintaining a quality playing surface.



Limited rains can leave water hazards dry and unsightly.

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<http://www.afcee.brooks.af.mil/ec/golf/>