

El Macero Tee Box Formalization

Redesign, Grading Plans, and Earthwork Calculations

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June 2013

UC Davis

Landscape Architecture



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El Macero Tee Box Formalization

by Anthony Robert Perkins

A Senior Project presented June 14, 2013, to faculty of the Landscape Architecture Program, University of California, Davis, in partial fulfillment of the requirements for the degree of Bachelors of Science in Landscape Architecture.



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||

Thank You

Dia Leigh Perkins

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Abstract

This project explores the defining characteristics of American golf course architecture in order to develop an understanding of Parkland golf courses. Augusta National Golf Club is used as a case study, and this research is applied to the conceptual redesign of several tee areas at El Macero Golf Club, a private Troon Golf facility in Yolo County California.

Rough topographic site maps have been created for each applicable tee area, and grading plans have been prepared to illustrate the earthwork required. Contour Method and Borrow Pit Method cut & fill calculations are used to estimate the volume of material that will be moved and purchased, and cost estimates for have been prepared for each hole.





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INTRODUCTION

**“The arbitrary values of
golf scoring are carefully
dissected in connection with
golf architecture”**

- Geo C. Thomas,
“Golf Architecture in America,” 1927





Background

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The golf course at El Macero Country Club is a championship-length par 72, parkland style layout, managed by Troon Golf. The purpose of this project is to bring a formal, unified, parkland style to the tee boxes at El Macero, and to help extend the length of the course to 7000 yards.

The first step of this process is to define Parkland Golf. Parkland Courses are characterized by tree-lined holes on a park-like expanse of turfgrass. Augusta National is the archetypal Parkland course, so I researched the design aesthetic of Augusta National, as well as the Olympic Club and other Parkland courses, in order to gain an understanding of what makes Parkland-style golf courses so appealing.

In addition to adding length, improving playability, and increasing uniformity throughout the course, design decisions based on this research will also reduce detailed labor practices, contributing to the economic and environmental sustainability of the course.

This project is designed to help management and stakeholders understand why the proposed changes are important, the extent of earthwork involved, and rough cost estimates for construction.

Goals

Goals set by the El Macero Country Club Greens Committee are listed as follows:

- 1. Improve the playability and overall aesthetics of all the tee areas.**
- 2. Make the tee areas more consistent with a “tiered step-down” look.**
- 3. Standardize stand-alone gold tees to an area approximately 25'x30'.**
- 4. Obtain a 7,000 yard golf course.**

More detailed goals are attributed to individual holes and tee boxes:

Hole 1: Move blue tee back as far as possible and elevate it 12” (Goal 10 yards)

Level and square up the entire tee area
Increase size of gold tee to standardized size of 25' x 30'

Hole 2: Move blue tee back as far as possible and elevate it 12” (Goal 15 yards)

Level and square up the entire tee area
Increase size of gold tee to standardized size of 25' x 30'

Hole 7: Level and square up the entire tee area
Increase size of gold tee to standardized size of 25' x 30'

Add a Drop Tee area for balls that enter the water

Hole 10: Move blue tee back as far as possible and elevate it 12” (Goal 20 yards)

Level and square up the entire tee area
Increase size of red and gold tees to standardized size of 25' x 30'

Hole 18: Expand left side of blue tee to line up with rest of tees and elevate it 12”

Level and square up the entire tee area
Increase size of gold tee to standardized size of 25' x 30'

Hole 14: Move blue tee as far back as possible (Goal 10 yards) and elevate it 12”

Remove small tree behind blue tee
Level and square up the entire tee area
Increase size of gold tee to standardized size of 25' x 30'





Research Question

5 What is Parkland golf, and how do the tee areas at Augusta National and other Parkland courses contribute to the success of the courses in their entirety?

1.2 17th Tee at Augusta



Hypothesis



1.3 18th Tee at Augusta



1.4 6th Tee at El Macero

Parkland-style golf courses are an American legacy that took shape due to America's wooded, inland geographic setting, and idealized by the pastoral designs of Frederick Law Olmsted. The views that are framed, and the obstacles the player must consider from the tees are the greatest contributions of the tee areas of Parkland-style courses. Length of the holes is also a factor that contributes to the difficulty and success of many holes.





RESEARCH

“A Parkland course is a golf course in a lush, inland setting, with well-manicured and watered fairways and greens... usually in a treed landscape.”

-Brent Kelley, golf.about.com



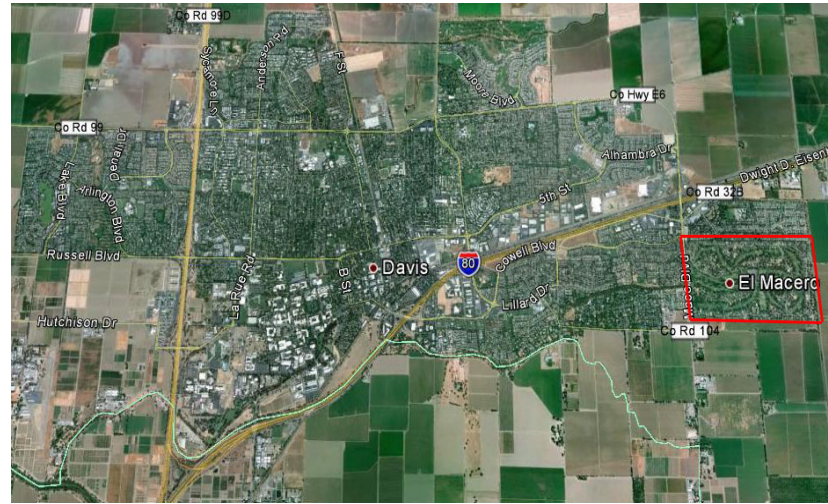


El Macero C.C.

9 The Troon Golf Facility at El Macero Country Club is a par 72 Championship Course, measuring 6,862 yards from the back tees (elmacerocc.org, 2012). Four sets of tees make the course enjoyable for golfers of all ages and ability levels.

The courses smooth, fast, *Poa annua* greens (elmacerocc.org, 2012) are guarded by earthen bunkers, and well-manicured sand traps.

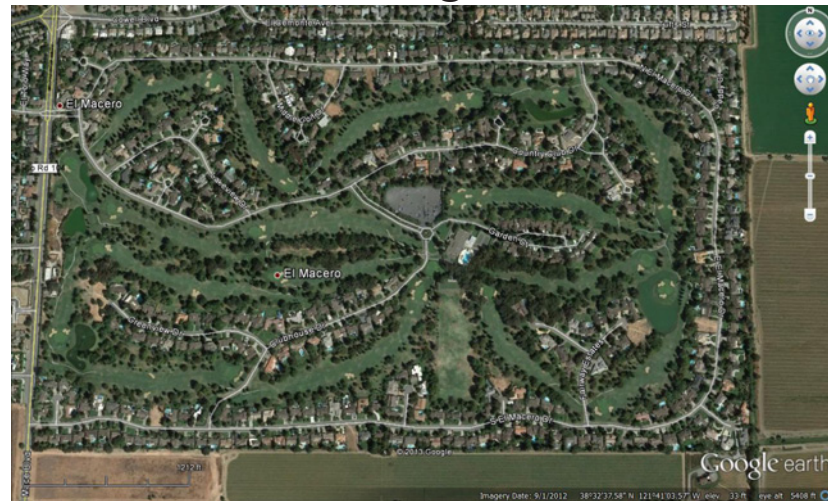
This walker-friendly Parkland-style layout traverses the El Macero community on the floodplains of the historic North Fork of Putah Creek. The huge, spreading Oaks and Cottonwoods outlining the holes are some of the last remaining relics of the Putah Creek North Fork riparian forest.



2.2 Aerial Image, Davis

El Macero Country Club is located in El Macero, California, a small, unincorporated community on the eastern edge of Davis, about 15 miles from Sacramento.

2.3 Aerial Image, El Macero





2.4 9th green at El Macero

El Macero has hosted numerous tournaments, including several USGA qualifying events. It is also the home course for the UC Davis Men's and Women's Golf teams (elmacerocc.org; 2012).

The course is managed by Troon Golf, the international leader in upscale golf course management.

It was designed by Bob Baldcock, a California Golf Course Architect who designed 69 courses, primarily in California and Nevada. Baldcock is best known for his design of the Shore Course at Monterey Peninsula Country Club in Pebble Beach, California (mpccpb.org; 2013).



2.5 Monterey Peninsula Country Club





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Augusta National

Augusta National is widely reputed to be the world-wide precedent for Parkland Golf. Augusta has maintained its character by keeping the greens the same and by not making dramatic changes to Amen Corner (holes 11, 12, & 13; the most famous holes of the course).



**2.6 Golden Bell (Hole 12 at Augusta),
by Katherine Schuber**

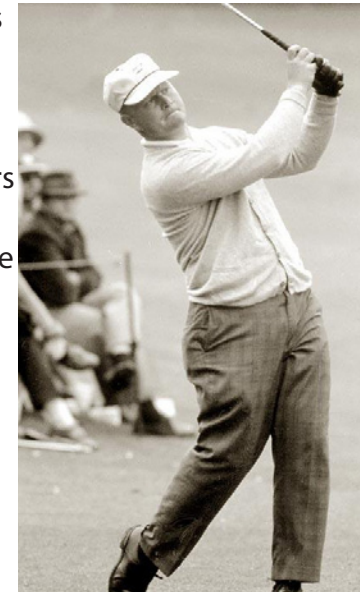


2.7 Amen Corner

2.8 Jack Nicklaus at The Masters, 1962

The length of the holes, as well as placement of trees, bunkers, and tee boxes, were some of the factors that Jack Nicklaus viewed to be the most important design decisions in the past decade at Augusta

National Golf Club
(Golf Magazine, 2013).



Augusta National Golf Club was designed by Dr. Alister Mackenzie and Robert Tyre Jones, Jr. in 1931. According to Clifford Roberts (1976), one of Augusta National's original planners and former executive committee chairman, "One of the greatest features of the Augusta National is that each hole bears no resemblance whatever to any other on the course."

Changes to the placement of tee boxes at Augusta National over the years have been an important piece to the evolution of the course and the Masters golf tournament. The third tee was moved in 1953 "to cause the one fairway bunker to become more of a hazard" (Roberts, 1976). Many tees were rebuilt in 1974 to improve grading and drainage.

"All of [the tees], including the practice tees, began receiving substantially the same treatment as the greens, including the use of the new type of winter grass." (Roberts, 1976)

Because of space constraints, tee boxes are moved to the side more often than they are moved directly back. This strategy was used to add length and difficulty to hole 11 at Augusta.



2.9 White Dogwood (Hole 11 at Augusta)

Another outstanding feature of the 11th tee is the fact that it is bordered by large, well-pruned trees that give the tee area a "Cathedral-like" feel (Roberts, 1976).





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Design Strategy

“The strategy of the golf course is the soul of the game”

(Sutton, 1950).

Strategic course design is manifested at Augusta National, which requires strategy and skill, yet gives an average golfer a fair chance at making par. Robert Tyre Jones, who helped design Augusta National, believed that “a really great course must be a source of pleasure to the greatest possible number of players” (Sutton, 1950).

A Parkland-style golf course is one “defined by its design features and natural setting,” says Brent Kelley of golf.about.com (2013). These design features include formal, well-manicured, tees, fairways, and greens, deep rough, and relatively flat fairways as compared to links courses (Kelley,

2013). “Most PGA Tour courses are parkland courses,” adds Kelley, and “Augusta National is the Parkland course that all other Parkland golf courses aspire to be” (2013).

In his 1927 book, *Golf Architecture in America: Its strategies and Construction*, Geo C. Thomas Jr. suggested that Americans should value golf’s British coastal roots, but pursue golf course architecture in our own unique style. American golfers “now have our own history, our own traditions, our own superlative courses,” said Thomas, and “we need our own technique added to the general rules of standard usage which we have assimilated from our friends across the sea” (1927).

American courses are generally inland and unnaturally well-groomed, compared to coastal British courses (Sutton, 1950).

Thomas defines character as “proper hazards,” and states that any course without hazards is not a true golf course. In addition to common hazards such as sand and water, wind, soil conditions, rocks, trees, even railroad tracks could serve as hazards if these features are appropriate for the site, and are incorporated into the design. Excessive bunkering, especially within 150 yards of the tee, is expensive, unnecessary. These would not be considered proper hazards because they over-penalize high-handicappers who do not need the additional challenge (Roberts, 1976).

A well-designed strategic golf course requires as much mental agility from a player as physical ability, rather than “penal” design that punishes players for the slightest error (Sutton, 1950). If there is not imminent danger in the most direct line off the tee, there should be deferred danger on the approach shot (Sutton, 1950), but players should have the burden to choose between the safe shot, and the risk/reward shot.

Golf Course Architect, Pete Dye, once said that good golf course architecture is simply making the drainage look good (renaissancegolf.com, 2012). Improper drainage can result in greater expenses in the future (Roberts, 1976).

In 1927, it was standard to have only one tee area, but Thomas defended the use of multiple tee areas in order to change the course in response to weather/course conditions (like they do in major tournaments). Thomas is opposed to elevated tee boxes, but suggests that if the tees are to be raised, “their boundaries should, of course, fade gradually into the ground near them” (1927).

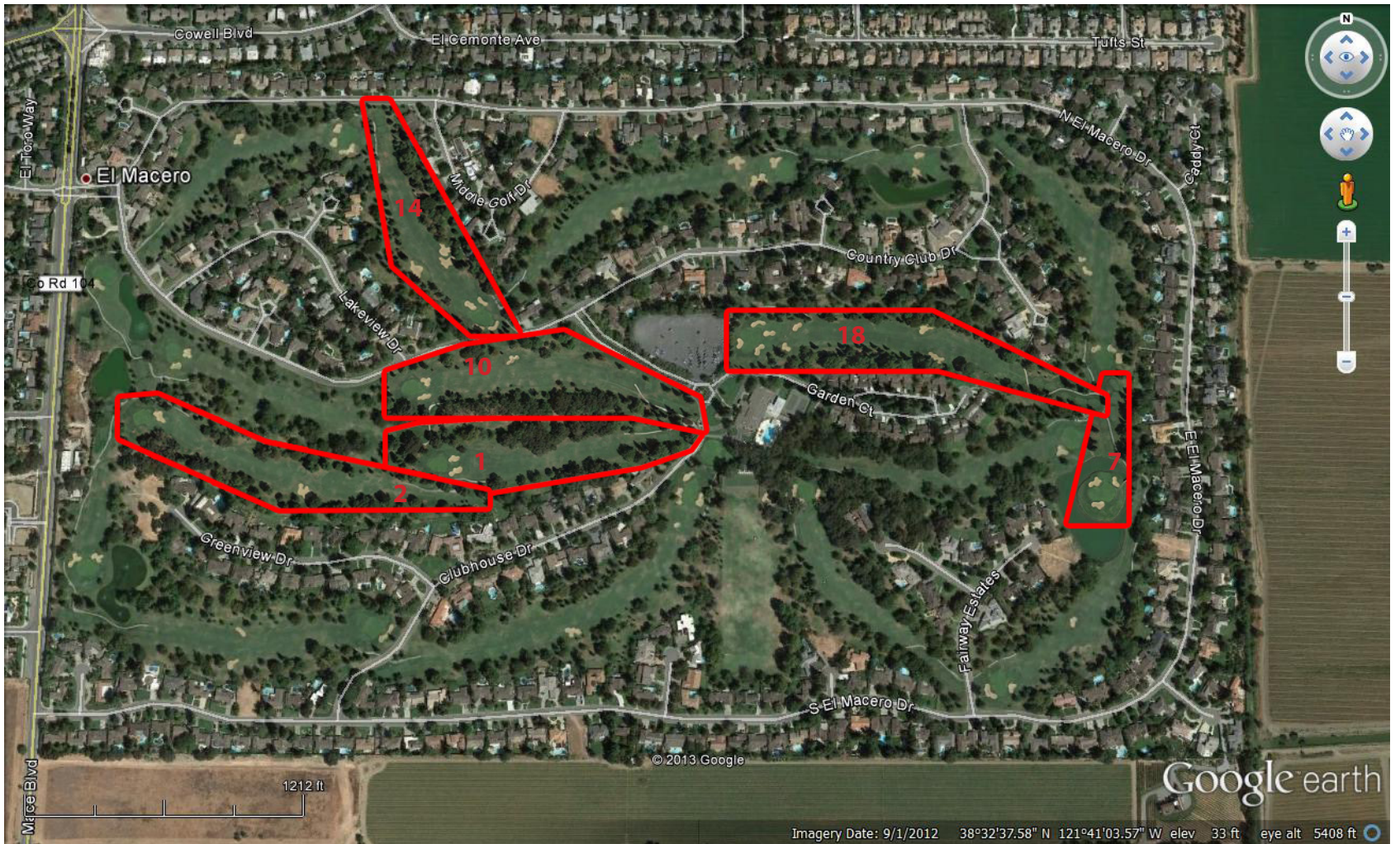
Different courses can be equally interesting regardless of length by exploiting the character of each site, and making par threes more difficult and longer holes more diverse (Thomas, 1927).



DESIGN

“The harder you work, the luckier you get”

- Gary Player, Professional Golfer





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Hole 1

Goals:

- Move blue tee back 10 yards and elevate it 12"
- Level and square up the entire tee area
- Increase size of gold tee to standardized size of 25' x 30'

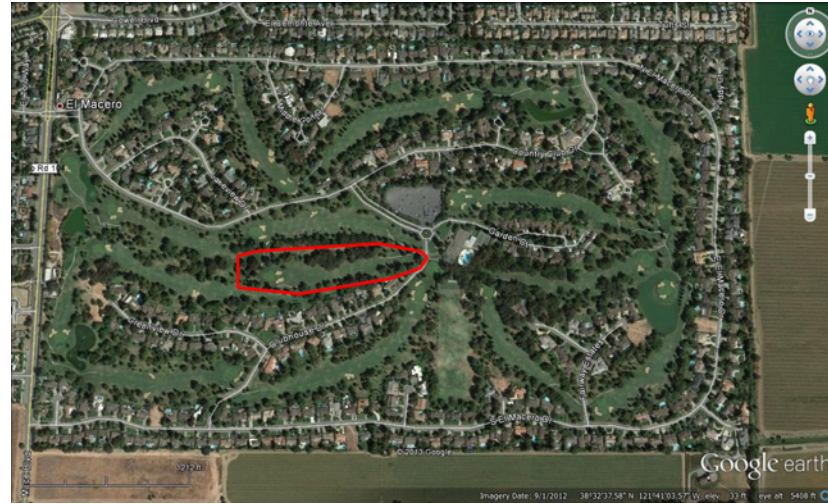
"Setting the tone for the rest of the course, the first tee shot on this opening Par-4 demands accuracy. Not much relief if you go into the right rough and treeline. A large tier runs across this green, and it's best to miss pins on the right side."

-David Knox, Head Professional, El Macero Golf Club

(elmacerocc.org, 2013)



3.3 Hole 1- Layout



3.2 Hole1- Context

Par 4

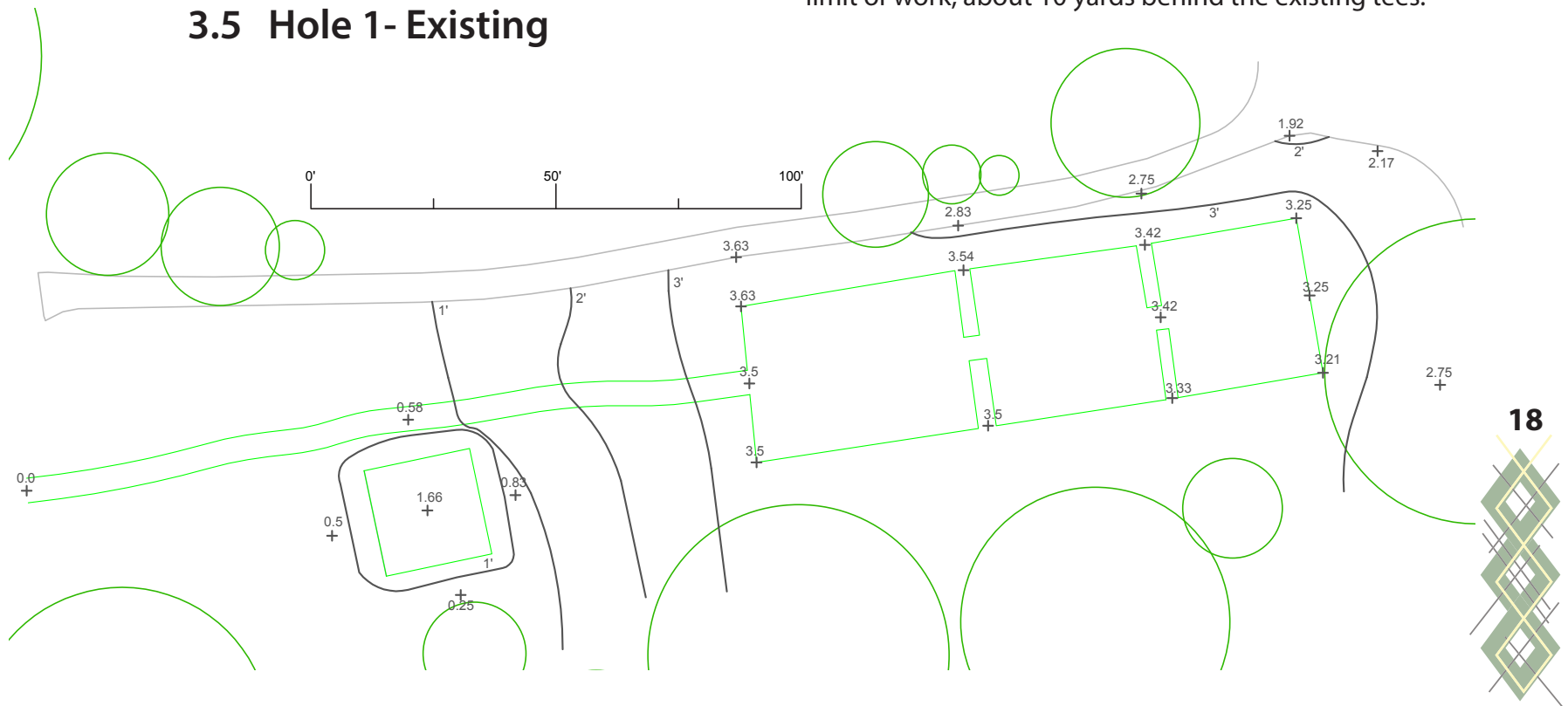
Gold	Red	White	Blue
294	324	345	356



Existing Conditions

Proximity to trees and hardscaping make subtle grading changes challenging on the first hole. The tee areas currently slope to the back, left corner, and the gold and blue tees are heavily shaded. A large oak and a raised planter define the limit of work, about 10 yards behind the existing tees.

3.4 Hole 1- Tees 3.5 Hole 1- Existing





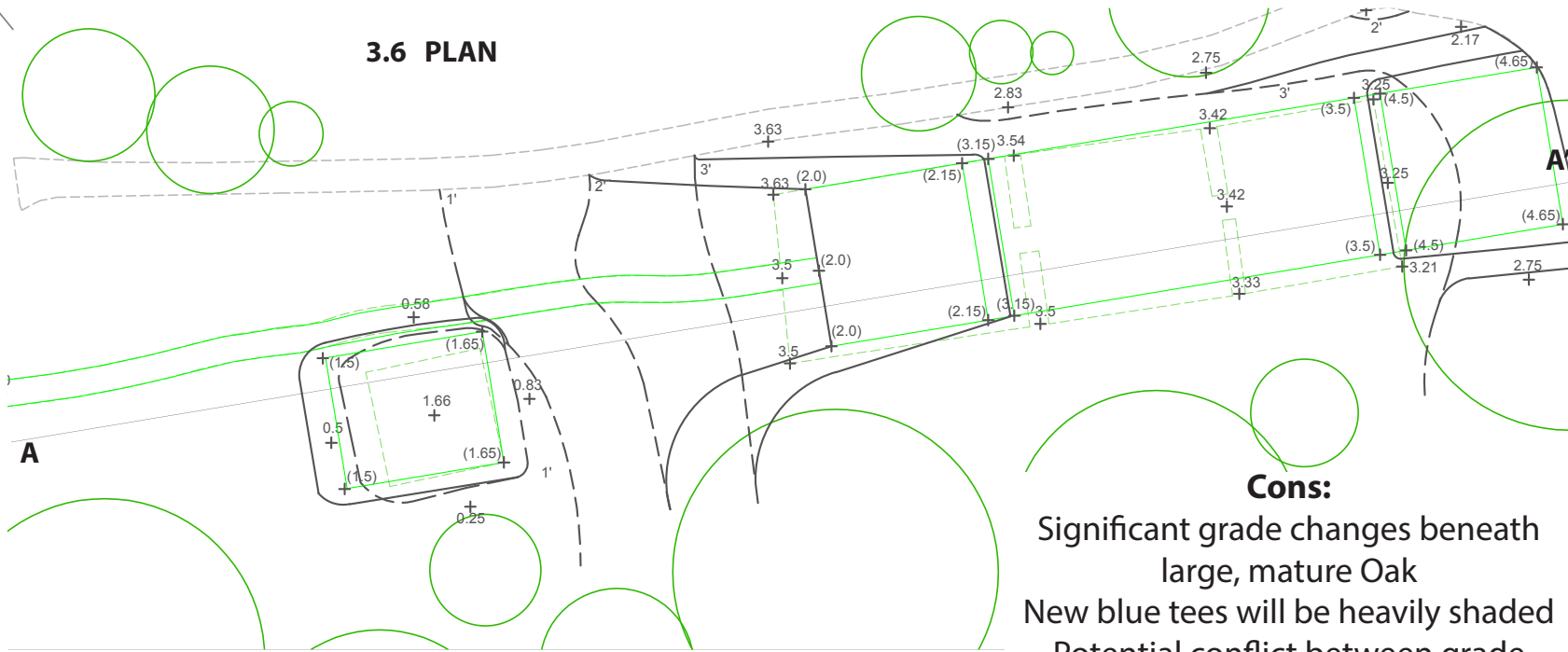
19

Alternative A

Pros:

- Ten yard gain
- Tiered, step-down aesthetic
- Clear separation of tees
- Standardized tee sizes

3.6 PLAN

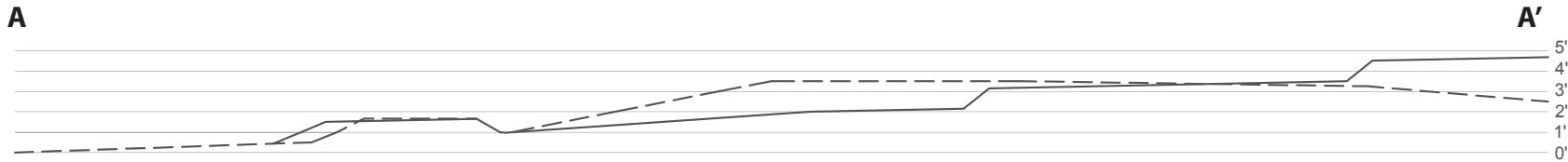
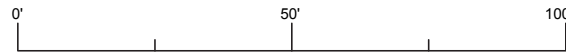


Cons:

- Significant grade changes beneath large, mature Oak
- New blue tees will be heavily shaded
- Potential conflict between grade changes and raised planter
- Flat area between red and gold tees

3.7 SECTION

vertical scale exaggerated 4:1`



Earthwork Calculations & Cost Estimates

Contour Method Cut & Fill Calculations- Hole 1 Alternative A

Contour #	Cut		Fill	
1	20		150	
2	815		150	
3	2525		580	
4	0		620	
Total SF	3360		1500	
Total CY	125		55	

Total Cut: 70 Cubic Yards

Cost Estimates- Hole 1

Description	Unit	Material	Labor	Quantity	Total
Site Cut & Fill	CY	2.55	2.17	180	\$850.00
Strip & stock pile 6" topsoil	CY	1.70	1.30	223	\$669.00
Fill Material	CY	10	2.17	-70	\$0.00
Sod	SF	\$0.50	\$0.50	12,000	\$12,000
Head Adjustment	EA	5	20	8	\$200
Isolation Valve Adjustment	EA	5	20	1	\$25
Quick Coupler Adjustment	EA	5	20	1	\$25
Total					\$13,750

(Source: Strychaz, 2008; data.bls.gov, 2013; costowl.com, 2013)

Recommendations

- Developed preferred alternative that does not threaten the mature Cork Oak
- Make transition between tiered tees and cart path as smooth as possible
- Minimize earthwork beneath dripline of mature trees as much as possible
- Top of raised planter should serve as an at-grade garden edger for raised blue tees
- 5:1 slope between levels
- 12:1 slope around Gold tees where applicable
- 0.5% forward slope on all tee boxes
- Ensure proper drainage behind gold tees





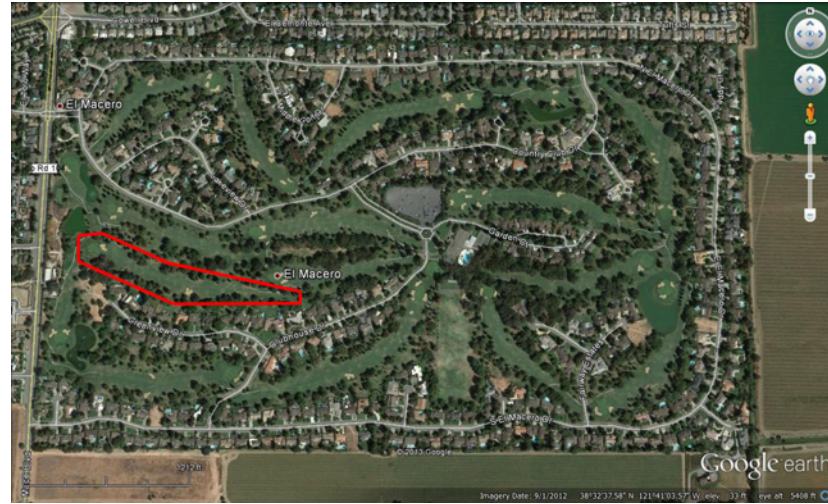
21

Hole 2

“The first Par-5 on the course penalizes players for going right on either first or second shots. Smart positioning leaves one 100 - 150 yards into the green, which demands an uphill approach shot to one of our most undulating greens.”

-David Knox, Head Professional, El Macero Golf Club

(elmacerocc.org, 2013)



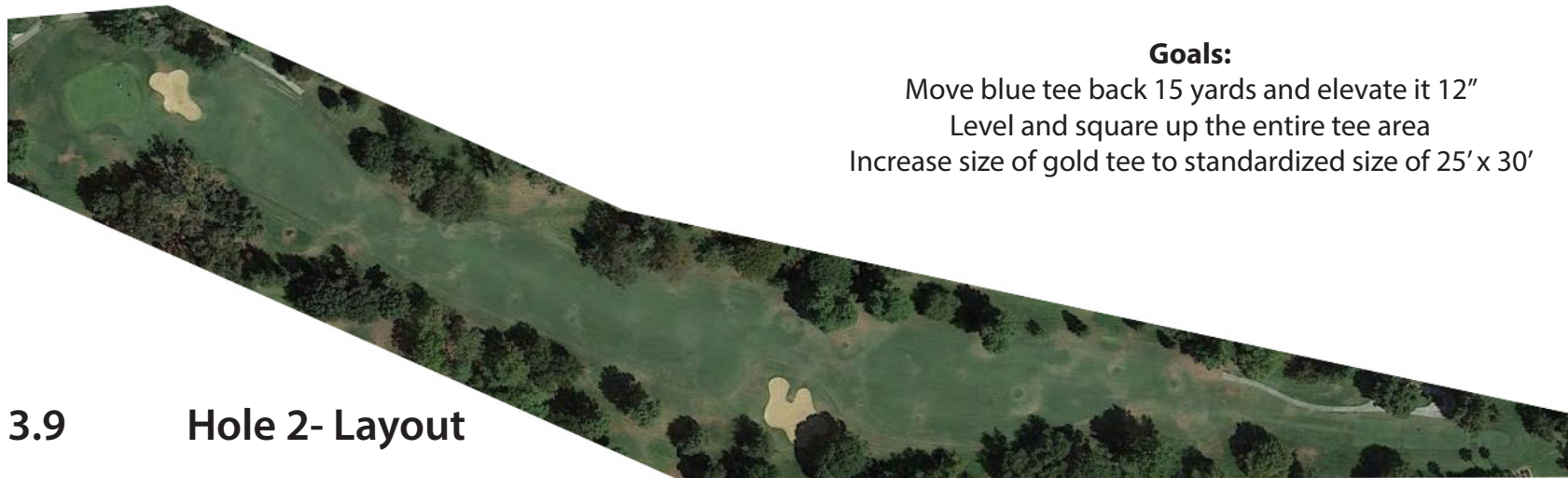
3.8 Hole 2- Context

Par 5

Gold	Red	White	Blue
434	481	504	525

Goals:

- Move blue tee back 15 yards and elevate it 12"
- Level and square up the entire tee area
- Increase size of gold tee to standardized size of 25' x 30'



3.9 Hole 2- Layout

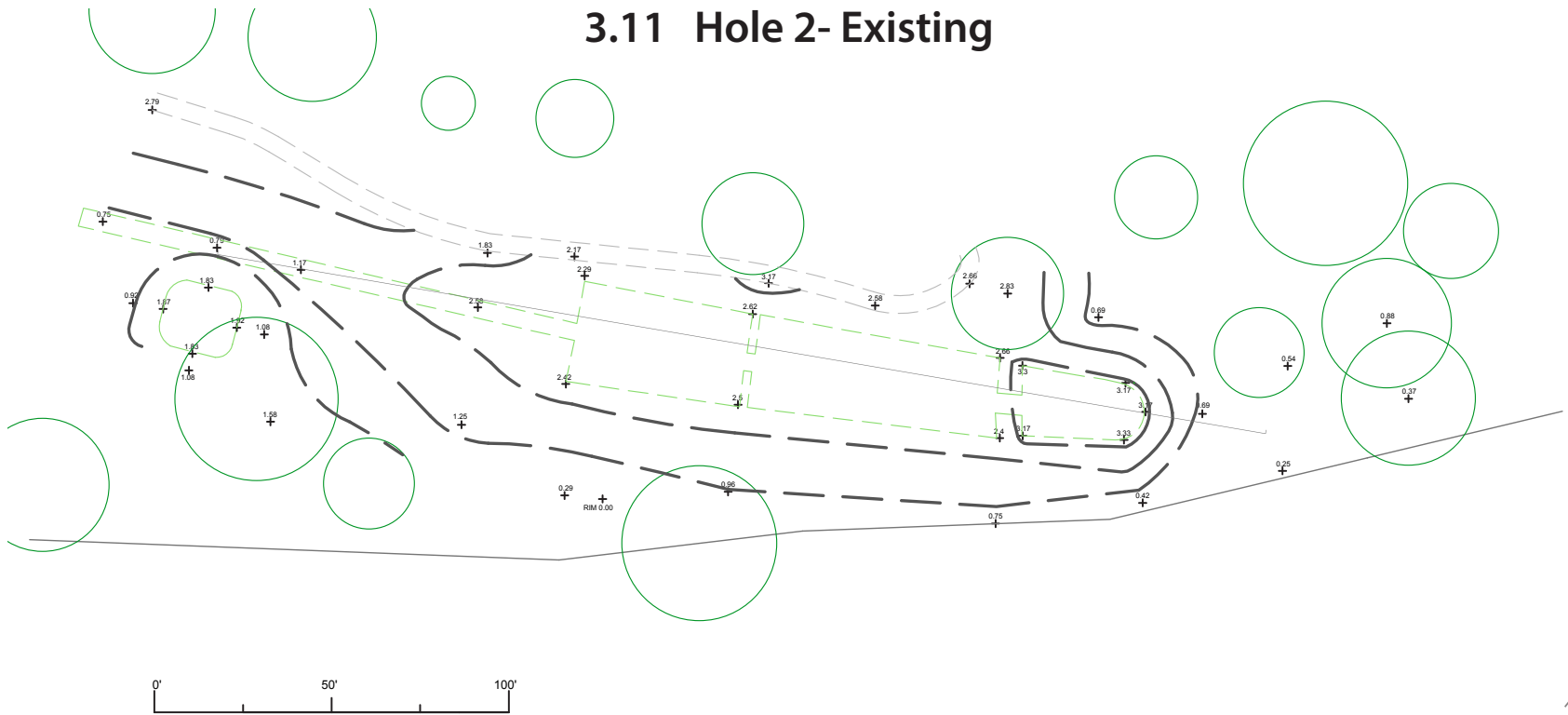


3.10 Hole 2- Tees

Existing Conditions

The back tees on hole two are tucked between several large trees and the property line. Due to space constraints, the tee areas taper with distance. The gold tees are small and heavily shaded, and all of the tee boxes are slightly crowned.

3.11 Hole 2- Existing

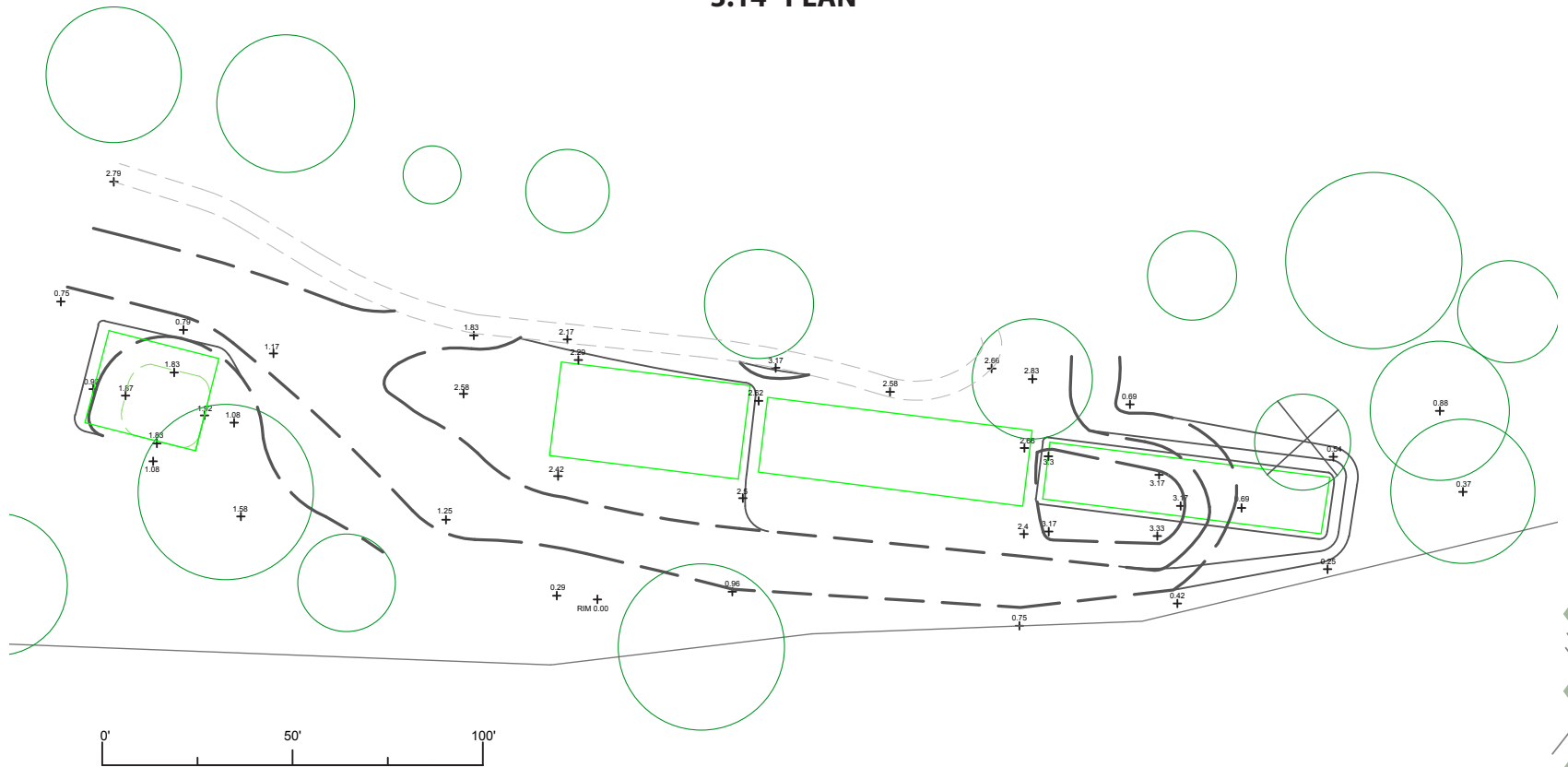


Pros:
13 yard gain
Uniformity
Long Tee Boxes

Alternative B

Cons:
One tree removed
Earthwork gets close to neighboring property

3.14 PLAN

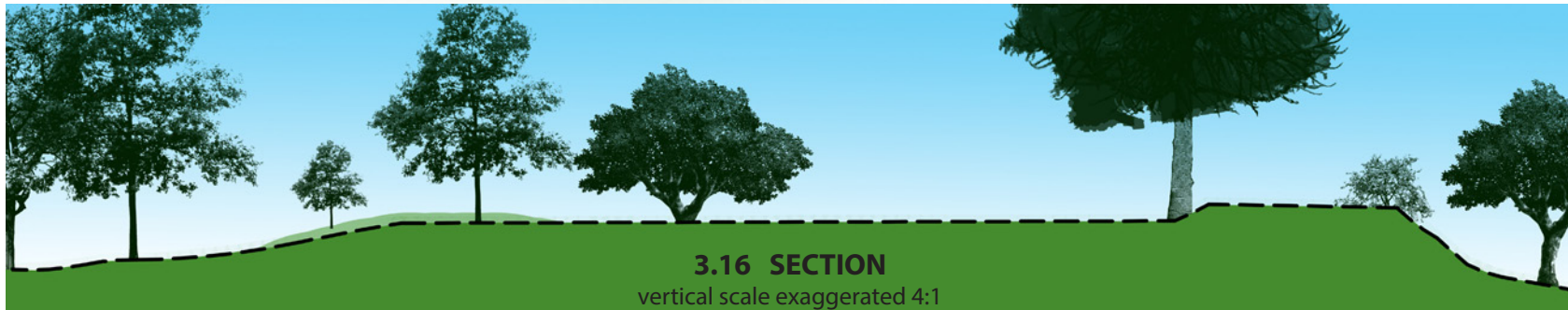




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Before

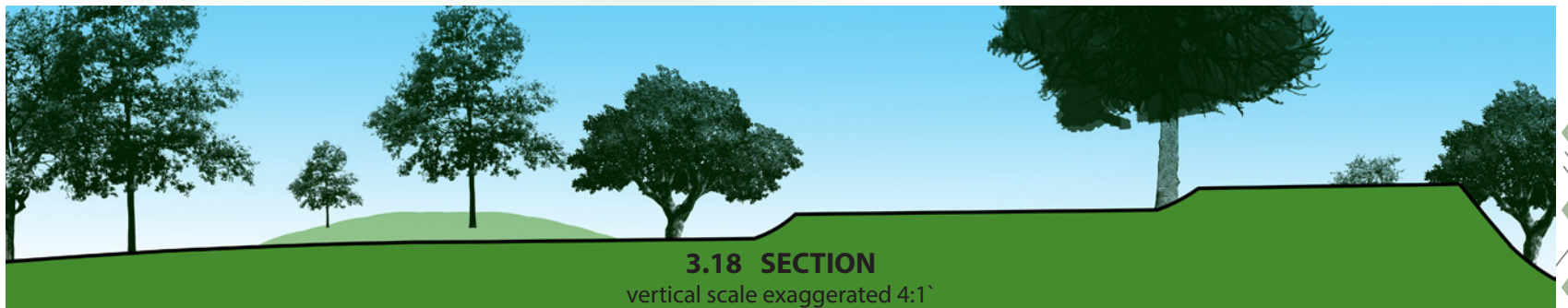
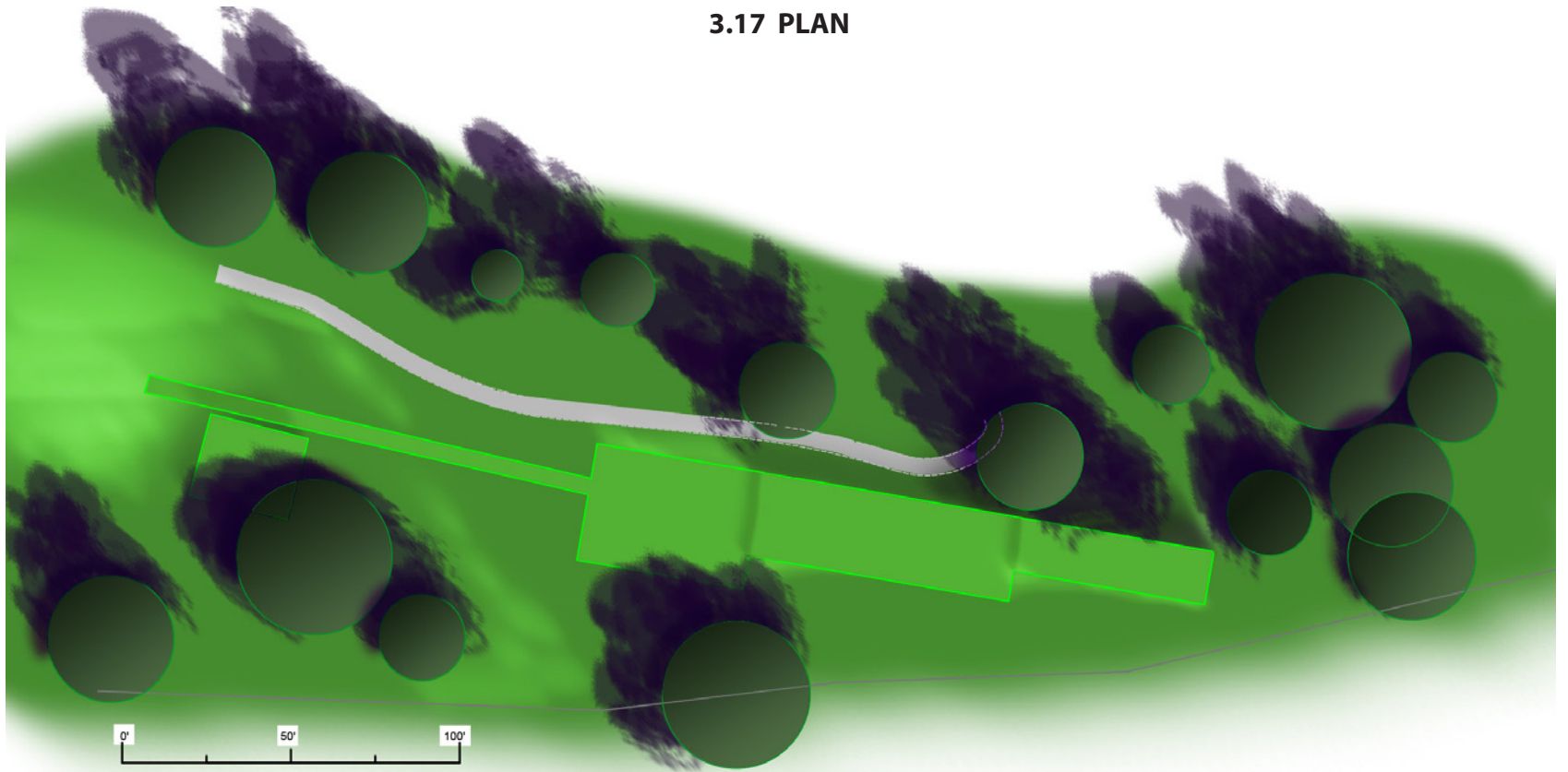
3.15 PLAN



3.16 SECTION
vertical scale exaggerated 4:1

After

3.17 PLAN



3.18 SECTION
vertical scale exaggerated 4:1



Earthwork Calculations & Cost Estimates



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Contour Method Cut & Fill Calculations- Hole 2 Alternative A

Contour #	Cut		Fill	
1	0		276	
2	1189		335	
3	42		484	
Total SF	1231		1095	
Total CY	45.5		40.5	

Total Cut: 5 Cubic Yards

Contour Method Cut & Fill Calculations- Hole 2 Alternative B

Contour #	Cut		Fill	
1	0		564	
2	1258		1145	
3	91		1310	
Total SF	1349		3019	
Total CY	50		112	

Total Fill: 62 Cubic Yards

Cost Estimates- Hole 2, Alternative A

Description	Unit	Material	Labor	Quantity	Total
Site Cut & Fill	CY	2.55	2.17	86	\$406
Strip & stock pile 6" topsoil	CY	1.70	1.30	185	\$555
Fill Material	CY	10	2.17	-5	\$0.00
Sod	SF	0.50	0.50	10,000	\$10,000
Head Adjustment	EA	5	20	5	\$125
Isolation Valve Adjustment	EA	5	20	0	\$0.00
Quick Coupler Adjuster	EA	5	20	3	\$75
Total					\$11,150

(Source: Strychaz, 2008; data.bls.gov, 2013; costowl.com, 2013)

Cost Estimates- Hole 2, Alternative B

Description	Unit	Material	Labor	Quantity	Total
Site Cut & Fill	CY	2.55	2.17	162	\$765.00
Strip & stock pile 6" topsoil	CY	1.70	1.30	204	\$611.00
Fill Material	CY	10	2.17	62	\$754.54
Sod	SF	0.50	0.50	11,000	\$11,000
Head Adjustment	EA	5	20	5	\$125
Isolation Valve Adjustment	EA	5	20	0	\$0.00
Quick Coupler Adjuster	EA	5	20	3	\$75
Total					\$13,330

(Source: Strychaz, 2008; data.bls.gov, 2013; costowl.com, 2013)

Recommendations

- Grading changes must not increase the amount of water drained onto neighboring properties
- Ensure proper drainage north of the blue tees
- Keep surrounding trees well-pruned
- Do not exceed 3:1 slopes
- 5:1 slopes between levels
- 12:1 slopes around gold tees where applicable
- 0.5% forward slopes on all tee boxes
- If Alternative B is selected, re-align tees to minimize conflict with trees.





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Hole 7

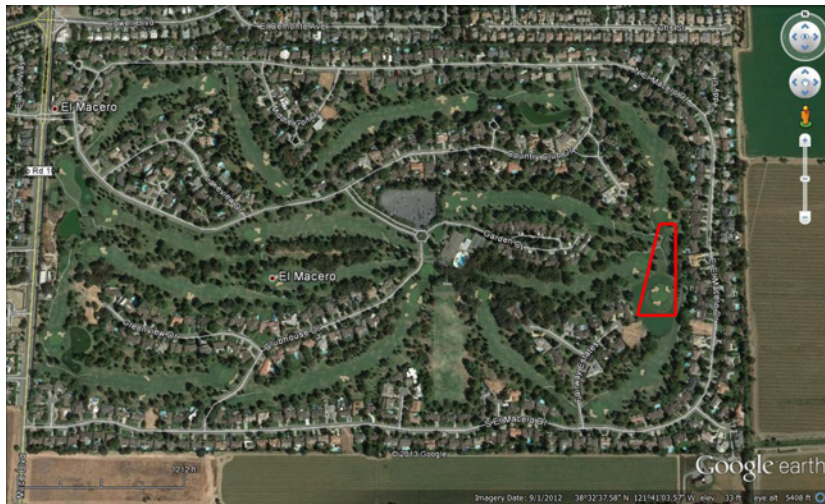
Goals:

- Level and square up the entire tee area
- Increase size of gold tee to standardized size of 25' x 30'
- Add a Drop Tee area for balls that enter the water

Par 3

Gold	Red	White	Blue
96	111	131	148

3.19 Hole 7- Context



3.20 Hole 7- Layout

“Our island Par-3 requires a confident tee shot. While these waters have claimed many a golf ball, this hole has also yielded more aces than any other at El Macero! Aim for the left edge of the front-right bunker to ensure any errant shots stay on the island.”

-David Knox, Head Professional,
El Macero Golf Club
(elmacerocc.org, 2013)





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Alternative A

Pros:

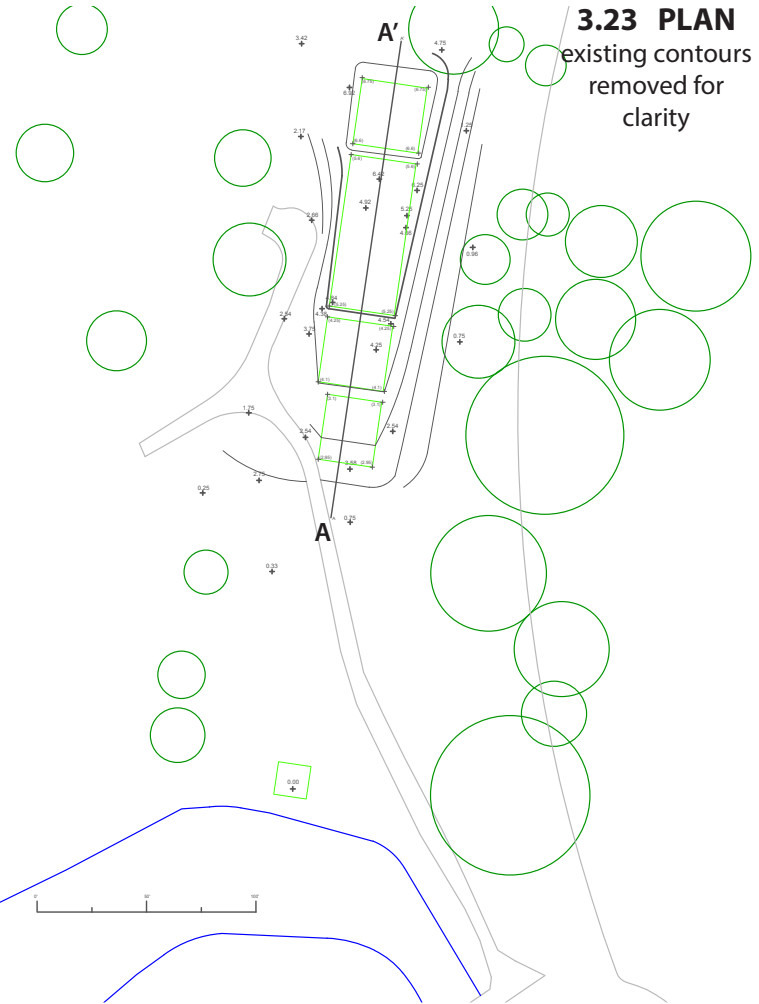
- Standardized tee sizes
- Tees leveled and squared
- Uniformity
- All tees have same alignment
- Requires less fill material than Alternative B
- Drop area added

Cons:

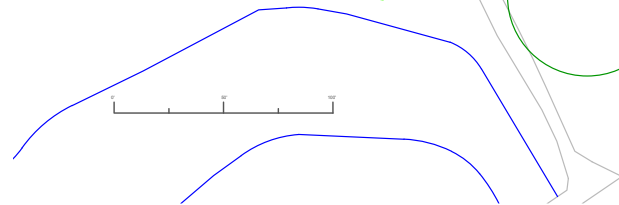
- Potential conflict between gold tees and cart path
- Steep slope between white tees and cart path
- More difficult to construct than Alternative B

Slopes:

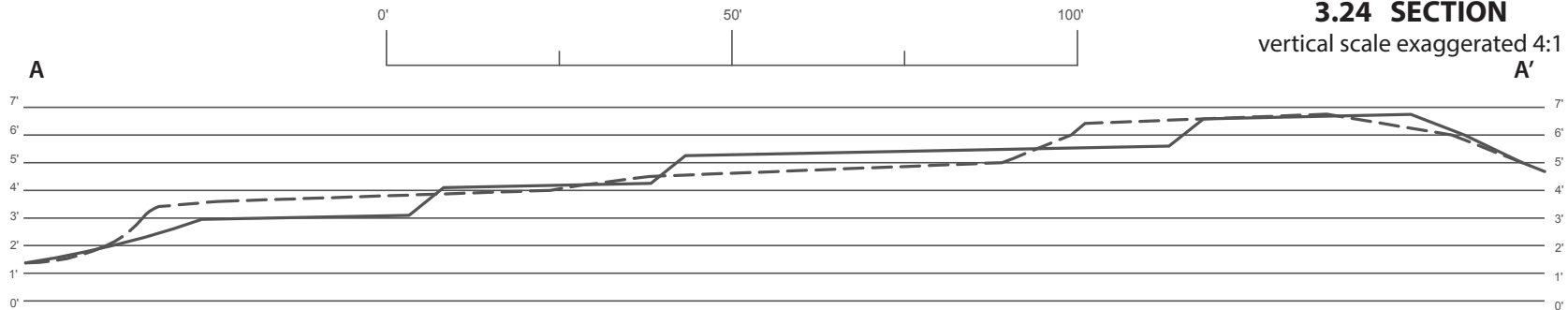
The slope on the east side of the tee area is to gradually and evenly change from a 12:1 slope at the front of the gold tees to a 5:1 slope at the back of the blue tees. Slopes on the north and west should be adjusted to minimize earthwork.

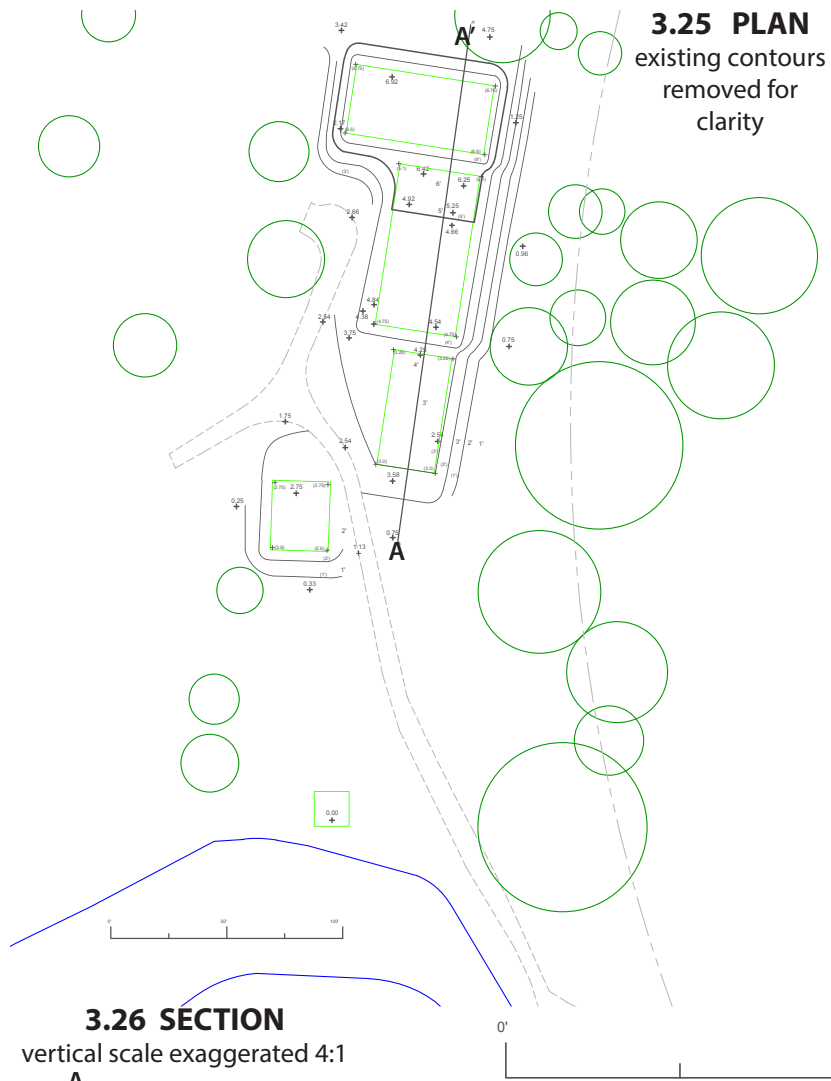


3.23 PLAN
existing contours
removed for
clarity



3.24 SECTION
vertical scale exaggerated 4:1





Alternative B

Pros:

- Tees leveled and squared
- Diversity between tees
- Standardized gold tee
- Logical alignment of tees
- Uniformity
- Easier to construct than Alternative A
- Drop area added

Cons:

- Large amount of earthwork/fill
- Potential conflict between golf carts and tee shots from back tees

Slopes:

The standard slope surrounding the 7th tees is 5:1, except for the east side of the white (4:1) and blue tees (3:1). The gold tees should be accessible by a 12:1 slope on at least one side of the tee box.





Earthwork Calculations

Contour Method Cut & Fill Calculations- Hole 7 Alternative A

Contour #	Cut		Fill	
1	155		125	
2	1265		280	
3	630		400	
4	375		830	
5	70		1640	
6	175		405	
Total SF	2670		3680	
Total CY	100		135	

Total Fill: 35 Cubic Yards

Contour Method Cut & Fill Calculations Alternative B

Contour #	Cut		Fill	
1	253		74.33	
2	650.5		343.5	
3	653.25		829.75	
4	517		1321.25	
5	320.75		1387.38	
6	405.5		1237.38	
Total SF	2800		5194	
Total CY	103		192	

Borrow Pit Method Calculations Alternative B

Contour #	Cut		Fill	
1	0		0	
2	414		0	
3	819		0	
4	0		553	
5	600		0	
6	0		115	
Total SF	1833		668	
Total CY	68		25	

Total Fill: 49 Cubic Yards

Cost Estimates

Cost Estimates- Hole 7, Alternative A

Description	Unit	Material	Labor	Quantity	Total
Site Cut & Fill	CY	2.55	2.17	235	\$1110
Strip & stock pile 6" topsoil	CY	1.70	1.30	305	\$915
Fill Material	CY	10	2.17	35	\$425.95
Sod	SF			16,500	\$16,500
Head Adjustment	EA			8	\$200
Isolation Valve Adjustment	EA			0	\$0.00
Quick Coupler Adjustment	EA			1	\$25
Total					\$19,175

(Source: Strychaz, 2008; data.bls.gov, 2013; costowl.com, 2013)

Cost Estimates- Hole 7, Alternative B

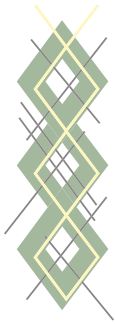
Description	Unit	Material	Labor	Quantity	Total
Site Cut & Fill	CY	2.55	2.17	295	\$1392.00
Strip & stock pile 6" topsoil	CY	1.70	1.30	350	\$1050.00
Fill Material	CY	10	2.17	49	\$596.33
Sod	SF	0.50	0.50	19,000	\$19,000
Head Adjustment	EA	5	20	8	\$200
Isolation Valve Adjustment	EA	5	20	0	\$0.00
Quick Coupler Adjustment	EA	5	20	1	\$25
Total					\$22,250

(Source: Strychaz, 2008; data.bls.gov, 2013; costowl.com, 2013)

Recommendations

- Do not exceed 3:1 slopes
- 5:1 slopes between levels
- 12:1 slopes around gold tees where applicable
- 0.5% forward slopes on all tee boxes
- Align tees on east side (away from cart path)
- Ensure proper drainage between back tees and 17th green
- 15'x15' drop area requires little to no earthwork





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Hole 10

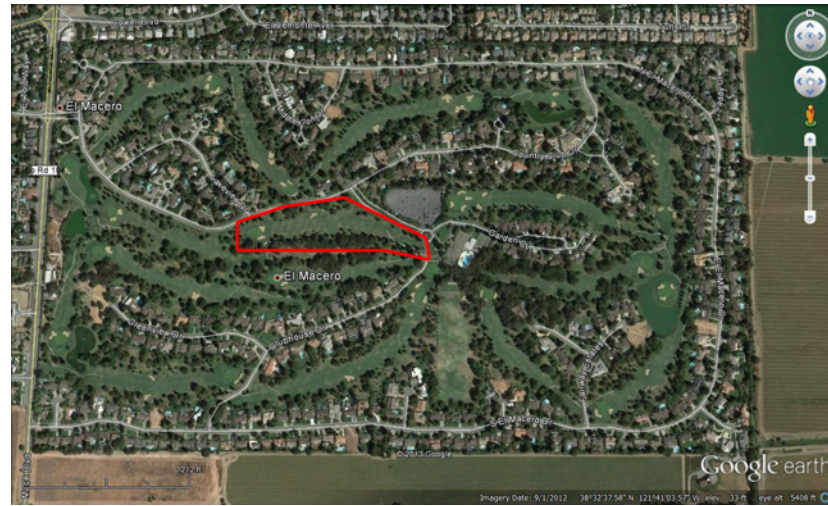
Goals:

- Move blue tee back 20 yards and elevate it 12"
- Level and square up the entire tee area
- Increase size of red and gold tees to standardized sizes of 25' x 30' and 30' x 30'

"The back nine starts with a dogleg left Par-4... Avoid the right fairway bunker, even if it means a longer approach shot. Favor the left side of any pin position with your approach shot."

-David Knox, Head Professional, El Macero Golf Club

(elmacerocc.org, 2013)



3.27 Hole 10- Context

Par 4

Gold	Red	White	Blue
314	356	391	411



3.28 Hole 10- Layout



Existing Conditions

Hole 10 is one of the most visible holes on the course. The gold and red tees are isolated on separate elevated tee boxes, giving them a better angle to the green on this long dogleg left. Adding another stand-alone tee box across the street, in front of the clubhouse, would add a unique challenge and maximize the yardage of the course.

3.29 Hole 10- Tees

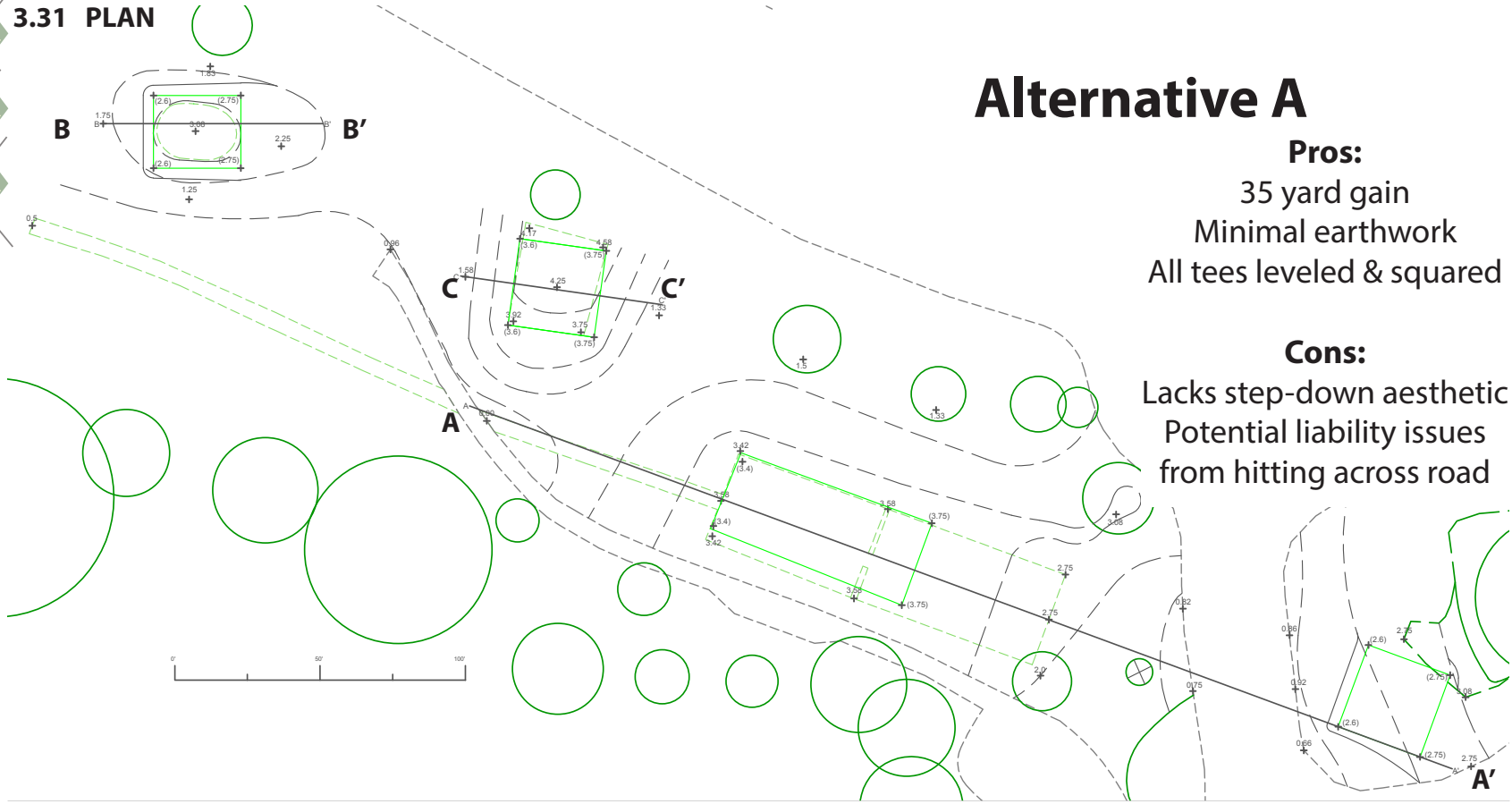


3.30 Hole 10- Existing





3.31 PLAN

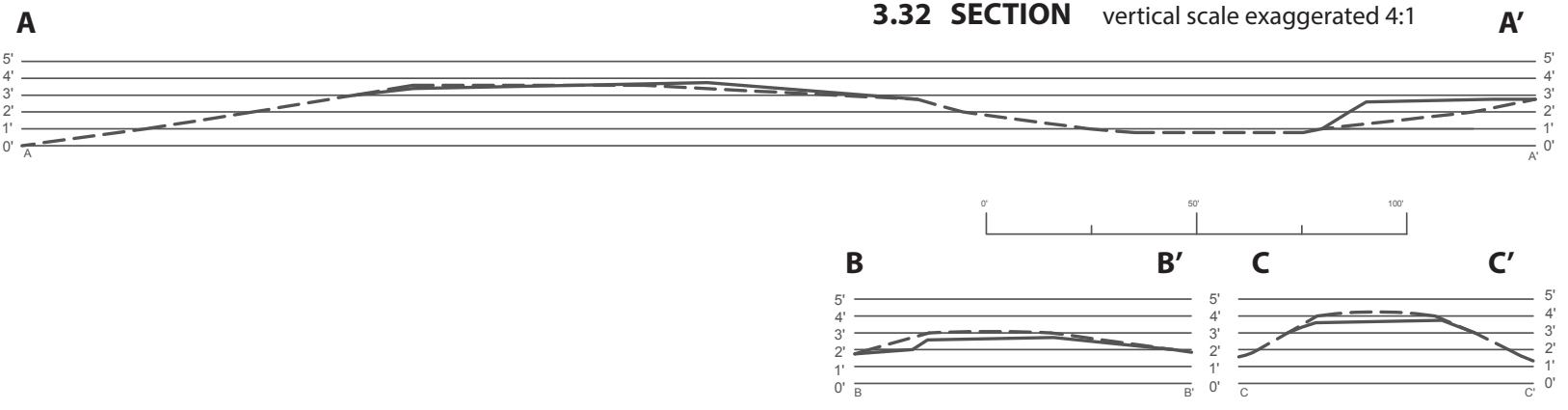


Alternative A

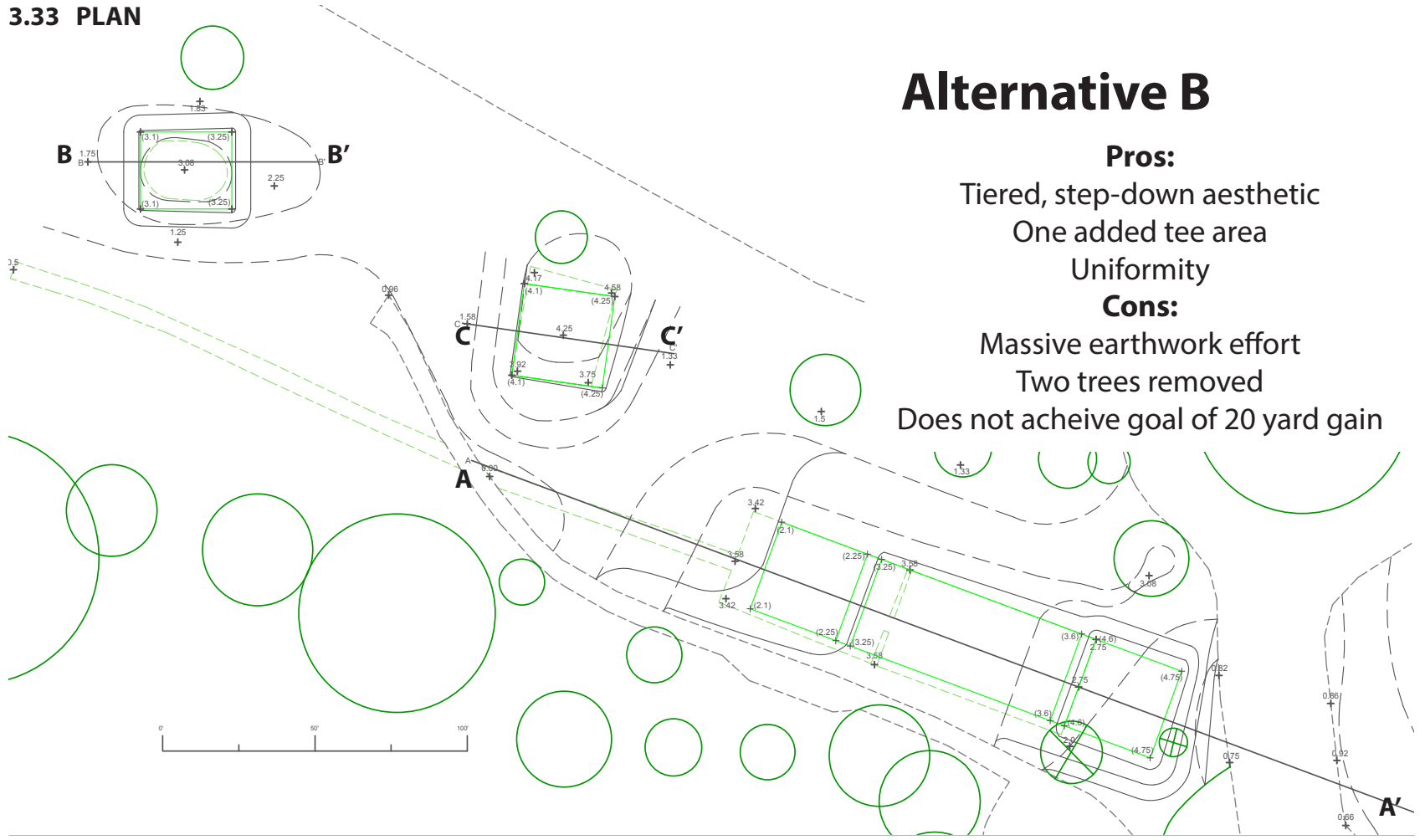
- Pros:**
- 35 yard gain
 - Minimal earthwork
 - All tees leveled & squared

- Cons:**
- Lacks step-down aesthetic
 - Potential liability issues from hitting across road

3.32 SECTION vertical scale exaggerated 4:1



3.33 PLAN



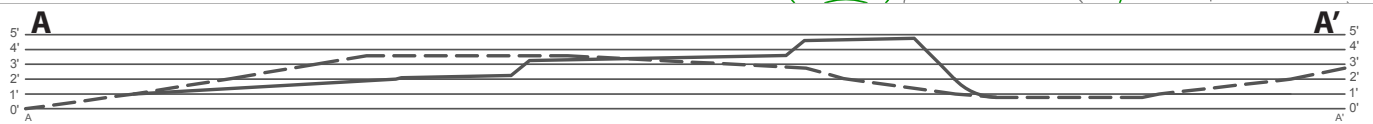
Alternative B

Pros:

- Tiered, step-down aesthetic
- One added tee area
- Uniformity

Cons:

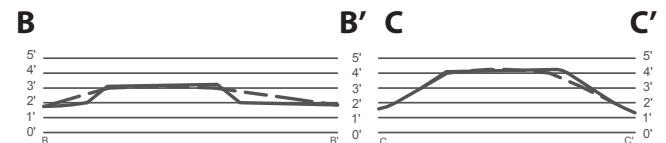
- Massive earthwork effort
- Two trees removed
- Does not achieve goal of 20 yard gain



3.34 SECTION vertical scale exaggerated 4:1

Slopes:

- 3:1 slope behind blue tees
- 12:1 slopes around gold tees
- 5:1 slopes around red & white tees



Earthwork Calculations



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**Contour Method Cut & Fill Calculations- Hole 10
Alternative A**

Contour #	Cut		Fill	
1	0		0	
2	210		295	
3	0		0	
Total SF	210		295	
Total CY	8		11	

**Borrow Pit Method Calculations
Alternative A**

Contour #	Cut		Fill	
1	0		0	
2	0		205	
3	561		362	
Total SF	561		567	
Total CY	20.5		20.5	

Total Fill: 3 Cubic Yards

**Contour Method Cut & Fill Calculations- Hole 10
Alternative B**

Contour #	Cut		Fill	
1	0		71	
2	1700		1046	
3	3100		2725	
4	0		2233	
Total SF	4800		6075	
Total CY	175		225	

**Borrow Pit Method Calculations
Alternative B**

Contour #	Cut		Fill	
1	0		0	
2	0		162	
3	0		660	
4	0		765	
Total SF	0		1587	
Total CY	0		60	

Total Fill: 110 Cubic Yards

Cost Estimates

Cost Estimates- Hole 10, Alternative A

Description	Unit	Material	Labor	Quantity	Total
Site Cut & Fill	CY	2.55	2.17	19	\$90.00
Strip & stock pile 6" topsoil	CY	1.70	1.30	102	\$306.00
Fill Material	CY	10	2.17	3	\$36.50
Sod	SF	0.50	0.50	5,500	\$5,500
Head Adjustment	EA	5	20	9	\$225
Isolation Valve Adjustment	EA	5	20	1	\$25
Quick Coupler Adjustment	EA	5	20	1	\$25
Total					\$6,150

(Source: Strychaz, 2008; data.bls.gov, 2013; costowl.com, 2013)

Cost Estimates- Hole 10, Alternative B

Description	Unit	Material	Labor	Quantity	Total
Site Cut & Fill	CY	2.55	2.17	400	\$1888.00
Strip & stock pile 6" topsoil	CY	1.70	1.30	305	\$915.00
Fill Material	CY	10	2.17	110	\$1338.70
Sod	SF			16,500	\$16,500
Head Adjustment	EA			9	\$225
Isolation Valve Adjustment	EA			1	\$25
Quick Coupler Adjustment	EA			1	\$25
Total					\$20,900

(Source: Strychaz, 2008; data.bls.gov, 2013)

Recommendations

- Do not exceed 3:1 slopes
- 5:1 slopes between levels
- 12:1 slopes around gold tees where applicable
- 0.5% forward slopes on all tee boxes
- Ensure proper drainage to the north and west of the white tees
- If Alternative A is selected, add warning signage for golf balls crossing road
- If Alternative B is selected, use care to make transition between blue tees and road as smooth as possible





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Hole 14

3.35 Hole 14- Layout

Goals:

- Level and square up the entire tee area
- Remove small tree behind blue tee
- Move blue tees 10 yards back and elevate 12"
- Increase size of gold tee to standardized size of 25' x 30'



"Bunkers abound on this short Par-4. If you can maneuver through this hole without picking up a bunker rake, you've done a nice job! Center of green is the target on your approach, and driver isn't needed off this tee."

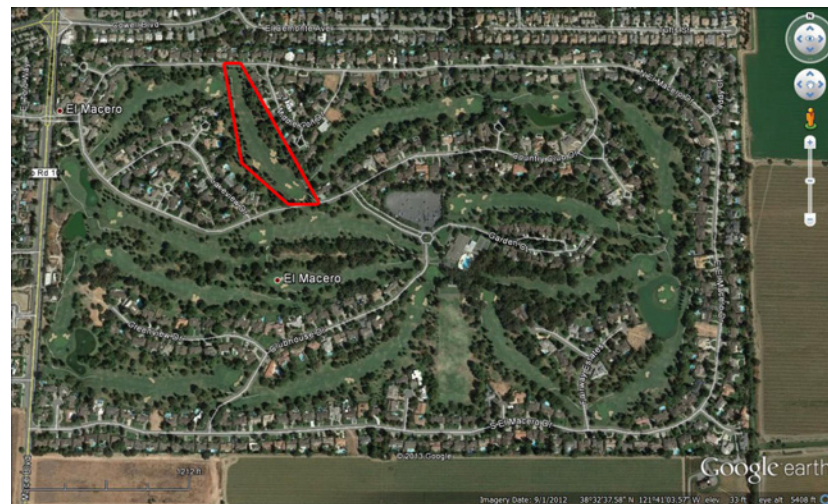
-David Knox, Head Professional, El Macero Golf Club

(elmacerocc.org, 2013)

Par 4

Gold	Red	White	Blue
307	327	340	355

3.36 Hole 14- Context



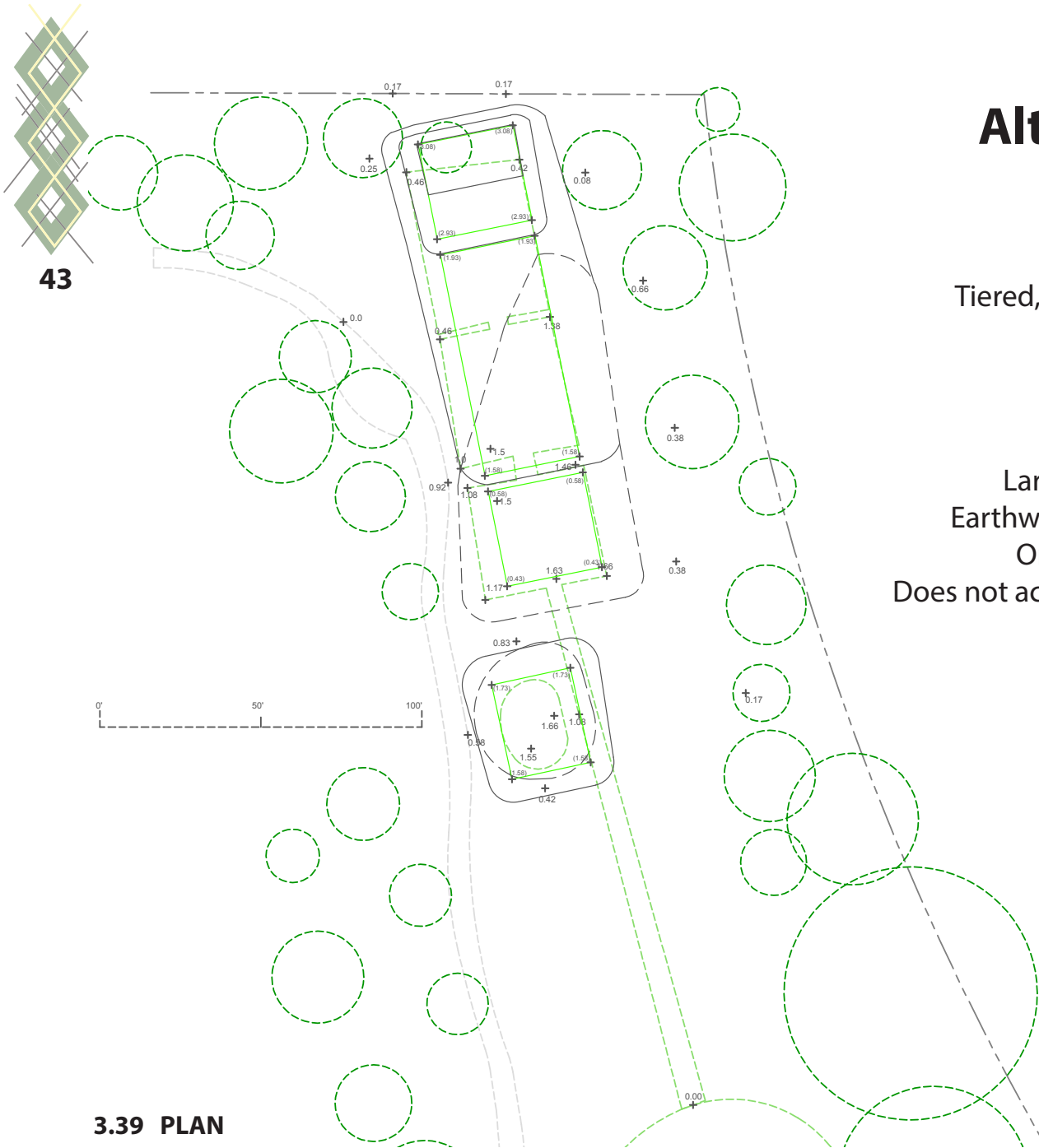
Existing Conditions



3.38 Hole 14- Tees

The tee area at hole 14 is fairly open and flat. There is a road about 7-8 yards behind the blue tees, and the gold tee is small and oval shaped. A 6 inch ridge on the west side of the white and red tees needs to be leveled out.

3.37 Hole 14- Existing



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Alternative A

Pros:

- Tiered, step-down aesthetic
- Uniformity
- 6.5 yard gain

Cons:

- Large Amount of Fill
- Earthwork gets close to road
- One tree removed
- Does not achieve goal of 10 yard gain

3.39 PLAN

Earthwork Calculations & Cost Estimates

Contour Method Cut & Fill Calculations- Hole 14 Alternative A

Contour #	Cut		Fill	
1	1170		2000	
2	0		2000	
3	0		1000	
Total SF	1170		5000	
Total CY	45		185	

Total Fill: 140 Cubic Yards

Cost Estimates- Hole 14, Alternative A

Description	Unit	Material	Labor	Quantity	Total
Site Cut & Fill	CY	2.55	2.17	230	\$1,085
Strip & stock pile 6" topsoil	CY	1.70	1.30	197	\$590
Fill Material	CY	10	2.17	140	\$1,705
Sod	SF	0.50	0.50	10,600	\$10,600
Head Adjustment	EA	5	20	7	\$175
Isolation Valve Adjustment	EA	5	20	0	\$0.00
Quick Coupler Adjustment	EA	5	20	1	\$25
Total					\$14,280

(Source: Strychaz, 2008; data.bls.gov, 2013; costowl.com, 2013)

Recommendations

- 3:1 slope behind blue tees
- 5:1 slopes between levels
- 5:1 slopes above 2' contours
- Even slopes between 2' contours and existing grades
- 12:1 slopes around gold tees where applicable
- 0.5% forward slopes on all tee boxes
- Do not exceed 3:1 slopes
- Ensure proper drainage around the lowered red tees, (especially between gold and red tees)





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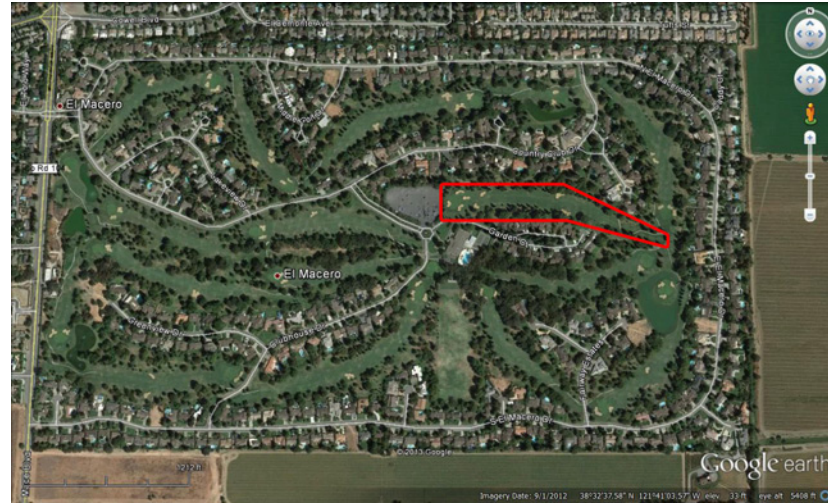
Hole 18

“The finishing hole at El Macero is a Par-5 that is very well-protected by bunkers. If you are not a long hitter going for the green in two shots, try positioning your second shot 100-150 yards from the green. This is a very wide green, but regardless of pin position, aiming for the center of the green

is a smart play leaving yourself in 2-putt territory.”

-David Knox, Head Professional, El Macero Golf Club

(elmacero.org, 2013)



3.40 Hole 18- Context

Par 5

Gold	Red	White	Blue
435	455	502	522

Goals:

- Expand left side of blue tee to line up with rest of tees, and elevate it 12"
- Level and square up the entire tee area
- Increase size of gold tee to standardized size of 25' x 30'



3.41 Hole 18- Layout

The bean-shaped tee boxes on hole 18 are distinct from all other tees on the course. There is an awkward 6" tier in the middle of the back tee.

The curvilinear cart path and existing trees make it difficult to square up and align all of the tee boxes.

Existing Conditions



Alternative A

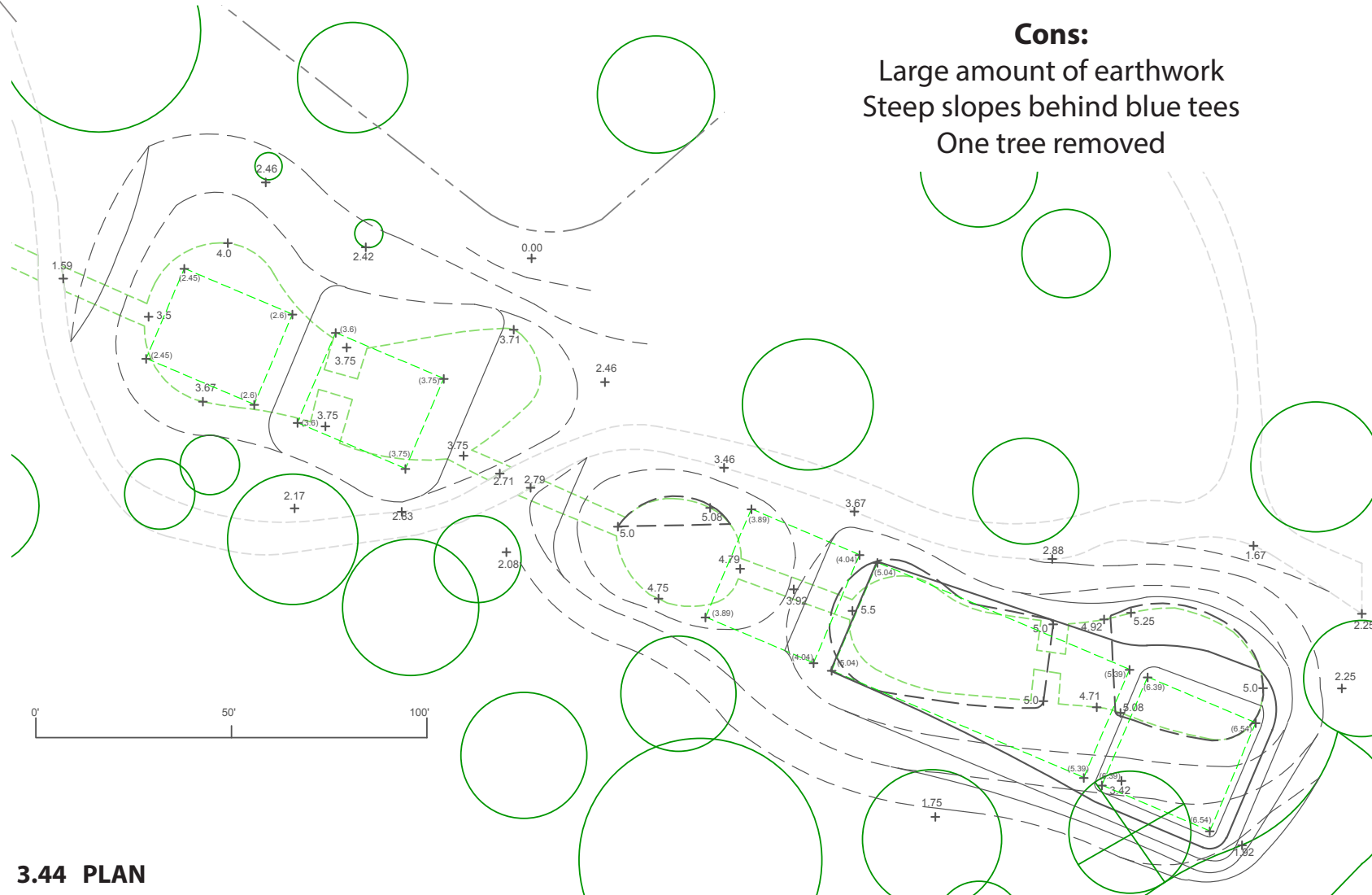
Pros:

- Tiered, step-down aesthetic
- Tees leveled and squared
- Logical alignment of tees
- Uniformity

Cons:

- Large amount of earthwork
- Steep slopes behind blue tees
- One tree removed

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3.44 PLAN

**Contour Method Cut & Fill Calculations- Hole 18
Alternative A**

Contour #	Cut		Fill	
1	0		0	
2	110		225	
3	1700		550	
4	1700		1050	
5	670		1650	
6	0		555	
Total SF	4180		4030	
Total CY	155		150	

Total Cut: 5 Cubic Yards

Cost Estimates- Hole 18, Alternative A

Description	Unit	Material	Labor	Quantity	Total
Site Cut & Fill	CY	2.55	2.17	305	\$1440
Strip & stock pile 6" topsoil	CY	1.70	1.30	315	\$945
Fill Material	CY	10	2.17	-5	\$0.00
Sod	SF	0.50	0.50	17,000	\$17,000
Head Adjustment	EA	5	20	10	\$250
Isolation Valve Adjustment	EA	5	20	0	\$0.00
Quick Coupler Adjustment	EA	5	20	2	\$50
Total					\$19,685

(Source: Strychaz, 2008; data.bls.gov, 2013; costowl.com, 2013)

Earthwork Calculations Cost Estimates & Recommendations

- 3:1 slope transitions to existing slope behind blue tees
- 5:1 slopes left (south) of blue tees
- 5:1 slopes between levels
- Even slope between blue tees and cart path (about 12%)
- 12:1 slopes around/between gold tees where applicable
- 0.5% forward slopes on all tee boxes
- Do not exceed 3:1 slopes
- Minimize grading changes wherever possible





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Cover - Tony Perkins, 2013

UC Davis Seal- "seal_black," UC Davis Identity Standards, 5/23/13: <http://identitystandards.ucdavis.edu/>

1.1 Intro Graphic - Tony Perkins, 2013

1.2 17th Tee at Augusta- handicaptracker.golf.com, 5/23/13

1.3 18th Tee at Augusta- www.golf.com, 5/22/13

1.4 6th Tee at El Macero- Tony Perkins, 2013

2.1 Research Graphic - Tony Perkins, 2013

2.2 Aerial Image, Davis- Google Earth, 2013

2.3 Aerial, El Macero- Google Earth, 2013

2.4 El Macero Banner- www.elmacero.org, 5/23/13

2.5 MPCC- www.montereypeninsulagolf.com, 2012

2.6 Golden Bell- Katherine Schuber, www.katherineschuber.com, 5/22/13

2.7 Amen Corner- www.golfdigest.com, 6/5/13

2.8 Jack Nicklaus, 1962- www.golf.com, 5/22/13

2.9 White Dogwood- <http://www.athlonsports.com/sites/default/files/slideshow-images-Masters-hole-11.jpg?1302027638>, 5/22/13

3.1 Context Map- Google Earth, 2013

3.2 Hole 1- Context- Google Earth, 2013

3.3 Hole 1- Layout- Google Earth, 2013

3.4 Hole 1- Tees- Google Earth, 2013

3.5 Hole 1- Existing- Tony Perkins, 2013

3.6 Hole 1- Alt. A- Tony Perkins, 2013

3.7 Hole 1- Section- Tony Perkins, 2013

3.8 Hole 2- Context- Google Earth, 2013

3.9 Hole 2- Layout- Google Earth, 2013

3.10 Hole 2- Tees- Google Earth, 2013

3.11 Hole 2- Existing- Tony Perkins, 2013

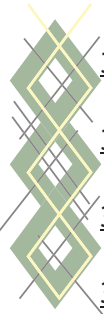
3.12 Hole 2- Alt. A- Tony Perkins, 2013

3.13 Hole 2- Section- Tony Perkins, 2013

3.14 Hole 2- Alt. B- Tony Perkins, 2013

3.15-3.18 Hole 2- Graphics- Tony Perkins, 2013





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3.19 Hole 7- Context- Google Earth, 2013

3.20 Hole 7- Layout- Google Earth, 2013

3.21 Hole 7- Existing- Tony Perkins, 2013

3.22 Hole 7- Tees- Google Earth, 2013

3.23 Hole 7- Alt. A- Tony Perkins, 2013

3.24 Hole 7- Section- Tony Perkins, 2013

3.25 Hole 7- Alt. B- Tony Perkins, 2013

3.26 Hole 7- Alt. B Section- Tony Perkins, 2013

3.27 Hole 10- Context- Google Earth, 2013

3.28 Hole 10- Layout- Google Earth, 2013

3.29 Hole 10- Tees- Google Earth, 2013

3.30 Hole 10- Existing- Tony Perkins, 2013

3.31 Hole 10- Alt. A- Tony Perkins, 2013

3.32 Hole 10- Section- Tony Perkins, 2013

3.33 Hole 10- Alt. B- Tony Perkins, 2013

3.34 Hole 10- Alt. B Section- Tony Perkins, 2013

3.35 Hole 14- Layout- Google Earth, 2013

3.36 Hole 14- Context- Google Earth, 2013

3.37 Hole 14- Existing- Tony Perkins, 2013

3.38 Hole 14- Tees- Google Earth, 2013

3.35 Hole 14- Alt. A- Tony Perkins, 2013

3.36 Hole 14- Section- Tony Perkins, 2013

3.37 Hole 18- Context- Google Earth, 2013

3.38 Hole 18- Layout- Google Earth, 2013

3.39 Hole 18- Tees- Google Earth, 2013

3.40 Hole 18- Existing- Tony Perkins, 2013

3.41 Hole 18- Alt. A- Tony Perkins, 2013

3.42 Hole 18- Section- Tony Perkins, 2013